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Temperatures in India

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LYING straddled across the Tropic of Cancer, India is essentially a warm country. Nevertheless, a large portion of the country becomes quite hot during the Northern Hemisphere summer, while during winter the temperatures become lower to some extent over the entire country, becoming very cold over the thousand miles long ranges of the Himalayas to the north and the north

east, where considerable snowfall occurs during this season.

If we imagine a straight line drawn through Phalodi in Rajasthan to Visakhapatnam on the Bay of Bengal coast and take some ten places lying approximately on this line and examine the temperatures recorded at these places the results would be somewhat as shown in Table 1.

TABLE 1

June and December Temperatures

Station	Altitude in Metres	June			December		
		Mean* oC	Daily Range oC	Mean** Re- duced to Sea Level	Mean* oC	Daily Range oC	Mean** Re- duced to Sea Level oC
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Phalodi	234	35.0	12.7	35.9	16.5	15.5	17.4
Jodhpur	224	33.8	11.9	34.7	18.4	16.1	19.3
Neemuch	496	30.7	11.5	32.7	18.2	16.2	20.2
Bhopal	501	30.4	11.1	32.5	18.4	16.5	20.5
Hoshangabad	302	31.7	10.6	32.9	19.9	14.6	21.1
Panchmari	1,075	26.3	8.9	—	15.5	14.3	—
Nagpur	312	31.4	12.1	32.7	21.0	13.7	22.3
Brahmapuri	229	33.5	12.6	34.4	22.3	14.7	23.2
Jagdalpur	553	28.3	9.7	30.6	18.6	16.3	20.8
Visakhapatnam	38	30.0	6.1	30.2	23.7	7.2	23.8

* (Max. + Min. + T_{03} + T_{12})/4

** Correction applied 1°C for each 205 m.

June Temperatures

It will be seen from Table 1 that during the month of June the mean temperatures at these places lie in the range of 30°—35°C. The only exception is Panchmari where the mean temperature is 26.3°C. The elevation of Panchmari is 1,075 m above sea level. Also Jagdalpur which is 553 m above sea level shows a mean temperature which is nearly 2°C below this range. A closer examination will show that differences in the elevation of the places cause, at least in part, deviation in the regular sequence of temperature along our imaginary straight line. In order to remove the factor of different elevations, if we reduce the temperatures to the mean sea level by using the approximate relation 1°C=250 metres height we obtain the figures shown in column 5 of Table 1. The above relation is very approximate hence it is not used for reducing temperatures of stations whose elevation is 900 metres or above. The reduced mean sea level temperatures along this straight line are nearly the same except a noticeable rise at one end and a fall at the other end. One infers from this that during June which is a representative month of the summer conditions, the same hot air envelopes a considerable portion of the country.

In the fourth column the daily ranges of temperatures are given which show that during the course of the day, the temperatures vary through the same limits at all these places except coastal stations and the high level stations where the range is smaller.

December Temperatures

During the month of December the temperatures are lower by more than 10°C (Table 1, col. 6 & 8). Further, during this month there is a noticeable rise of the mean temperatures as we travel from Rajasthan towards Andhra Pradesh which is opposite of what

was seen during the month of June. Here too we notice the exception of Panchmari and to a lesser extent for Jagdalpur. The gradient of the temperatures is more clearly shown by the mean temperatures reduced to the mean sea level. The daily range of temperatures during December is a few degrees higher than during June.

Highest Temperatures

The highest temperature recorded in India seems to be 50.0°C, touched at Shri-ganganagar in Rajasthan on 14-6-1934. A close second is 49.4°C recorded at Bikaner, also in Rajasthan, on 28-5-1914. The temperature can at times rise quite high even further east, for example, Sambalpur in Orissa experienced a maximum temperature of 47.2°C on 27-5-1892. Along the West Coast the highest maximum temperatures appear to be lower, Mangalore shows 37.8°C recorded on 28 February 1920, the highest recorded at this place during May being 1°C lower. Map 1 shows the highest maximum temperature recorded along with the date of occurrence at a few representative places; the temperatures examined were for period 1891-1957.

During more oppressive spells in the summer the minimum temperature during the course of a day is also found to be quite high. An examination of the minimum temperatures at a number of places for a period (1933—1945) shows that at Barmer (Rajasthan) the highest minimum temperature of a day was 36.7°C during the month of May. The same highest minimum temperature was recorded at Kanpur (U.P.) during the month of June. The physical meaning is that the air at these places never cooled below 36.7°C during the course of 24 hours on these occasions. Table 2 gives the highest minimum temperatures recorded at a few places.

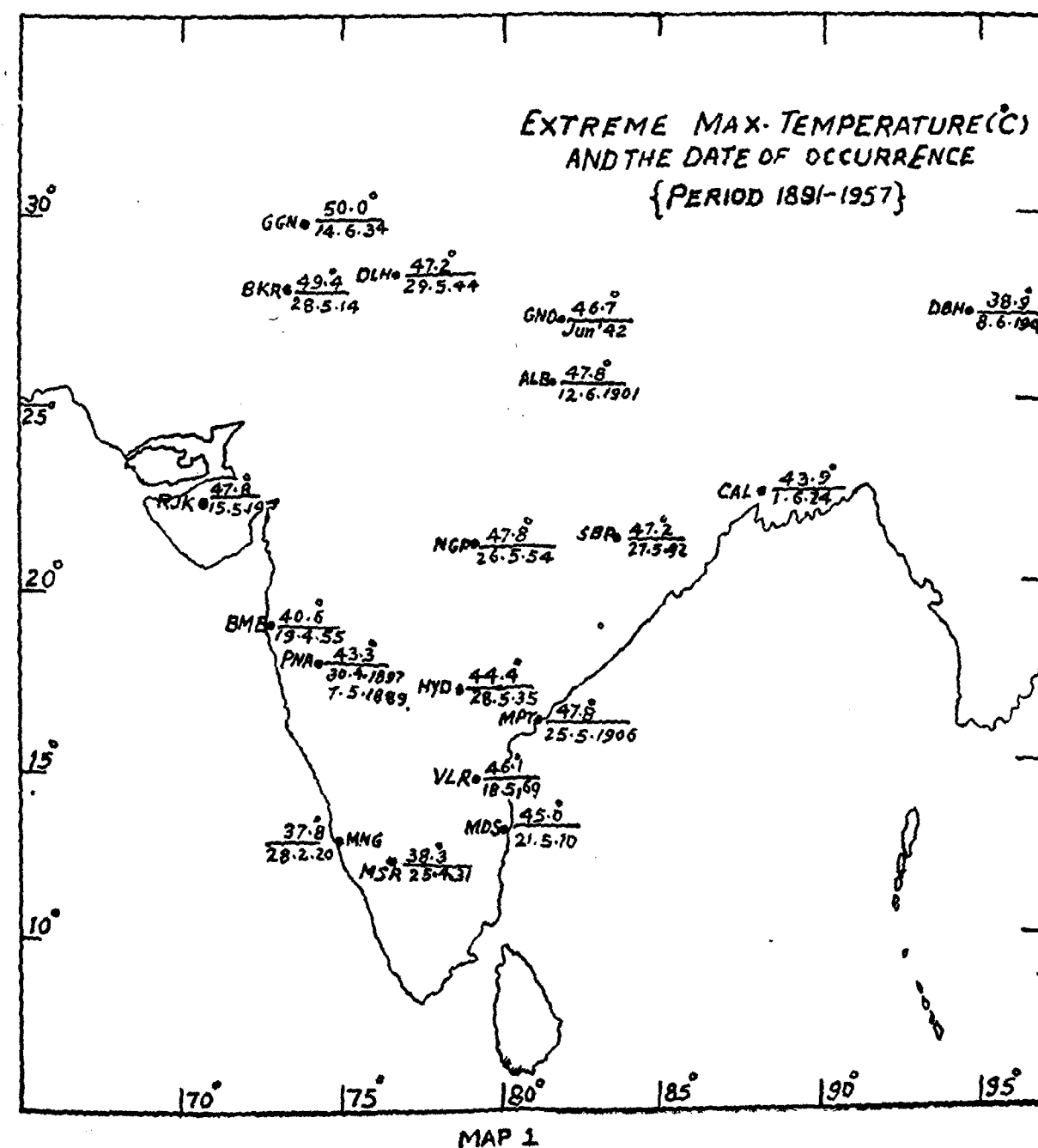


TABLE 2

Highest Minimum Temperature
(Recorded during period 1933-1945)

Station	May °C	June °C
Agra	34.4	36.1
Barmer	36.7	33.3
Bikaner	35.0	34.4
Cuddappa	32.8	32.2
Jhansi	35.6	36.1
Kanpur	35.6	36.7
Madras	31.7	30.6
Nagpur	33.9	33.9
New Delhi	34.4	36.1
Nellore	32.8	33.9
Rentichintala	34.4	35.0

In some years the summer is more severe than usual. For example, recently during 1958 the temperatures over several States reached record values for those areas. In Table 3, the highest maximum temperatures recorded at various places in the different States are shown.

TABLE 3

Highest Maximum Temperatures in 1958

Station	May °C	June °C
<i>West Bengal</i>		
Krishnagar	46.1	—
Suri	46.1	45.4
<i>Orissa</i>		
Baripada	46.9	47.8
<i>Bihar</i>		
Gaya	46.1	46.1
Dehri	—	46.1
Chaibasa	45.0	46.1
<i>Uttar Pradesh</i>		
Gonda	49.9	—
Bahraich	—	46.7
Mainpuri	47.3	47.3

Station		1958	
		May °C	June °C
<i>Punjab</i>			
Hissar	.. ..	44.7	47.4
<i>Rajasthan</i>			
Dholpur	.. ..	46.2	46.0
Shriganganagar	.. ..	48.1	47.1
<i>Madhya Pradesh</i>			
Nowgong	.. ..	46.7	45.6
Chanda	.. ..	46.3	—
Sutna	.. ..	—	45.6
Nagpur	.. ..	46.7	45.8
Gwalior	.. ..	—	45.9
Shespurkalan	.. ..	47.7	—
<i>Andhra Pradesh</i>			
Ramagunda	.. ..	45.3	—
Badrachalam Road	.. ..	—	48.6

It will be seen from these figures that the hot-spell was quite extensive. Such spells of varying intensity and extension occur every few years and are caused by a combination of special meteorological situations.

Lowest Temperatures

In columns 6 and 8 of Table 1 are shown the mean temperatures during December. These lie in the range of 16° to 20°C. This is also the approximate range of winter mean temperatures in plain stations throughout the country.

However, during winter every year there are a number of spells of cold weather when the temperatures go down markedly. The minimum temperatures are known to have gone below zero in Rajasthan, Gujarat and Delhi. Bikaner recorded -2.8°C on four occasions, Shriganganagar recorded -2.8°C on 11-2-1950, Rajkot recorded -0.6°C on 16-1-1935 while for Delhi we find -0.6°C on the same day (16-1-1935). The lowest minimum temperature on record at Dibrugarh in northeast Assam is 4.4°C on 13-2-1905. In coastal areas the lowest minimum temperature lies in the range 14-16°C.

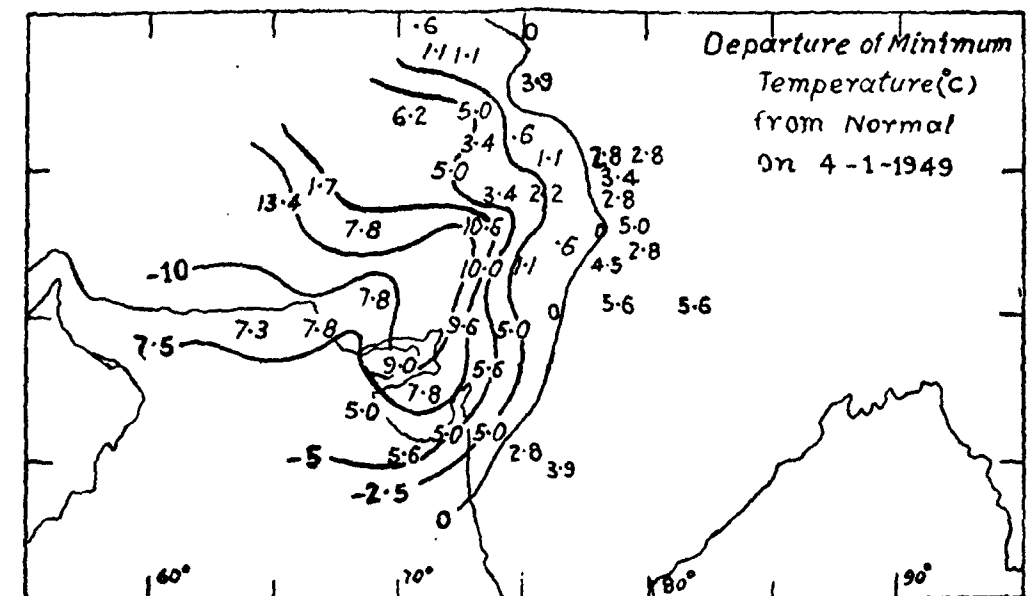
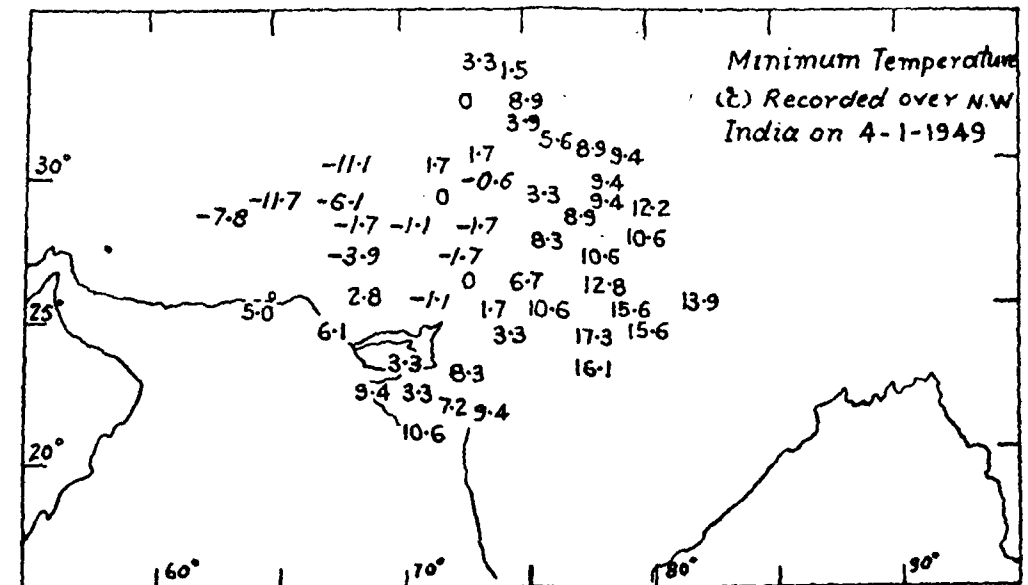
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It is believed that these cold waves, as they are called, are associated with the incursion of intensely cold-air mass from across the mountains to the northwest.

As this air mass spreads over India from that northwest towards east and south, the temperatures fall markedly with the arrival

of the cold air. Map 2 is an interesting example in illustration of this point.

It shows the minimum temperature recorded on 4-1-1949 at several stations in Northwest India as well as the departure of this temperature from the normal. The isoline drawn clearly demarcates the cold



Isotacs show lines of negative departures

Map 2

air mass. However, this cold air is soon heated up to the normal temperature in Indian area by solar radiation. The minimum temperature recorded at Jodhpur on this date (4-1-1949) was 0°C having fallen by 19°C overnight. The radio-sonde observation on the 3rd evening revealed that the temperature at 3 km above ground level was -2.8°C . However, on the 5th the minimum temperature was 3.9°C and it rose to 9.4°C by the 7th January. Other examples of such cold waves can be found in the records for earlier and later years. Temperatures below freezing are experienced more frequently over the mountains even at the inhabited places.

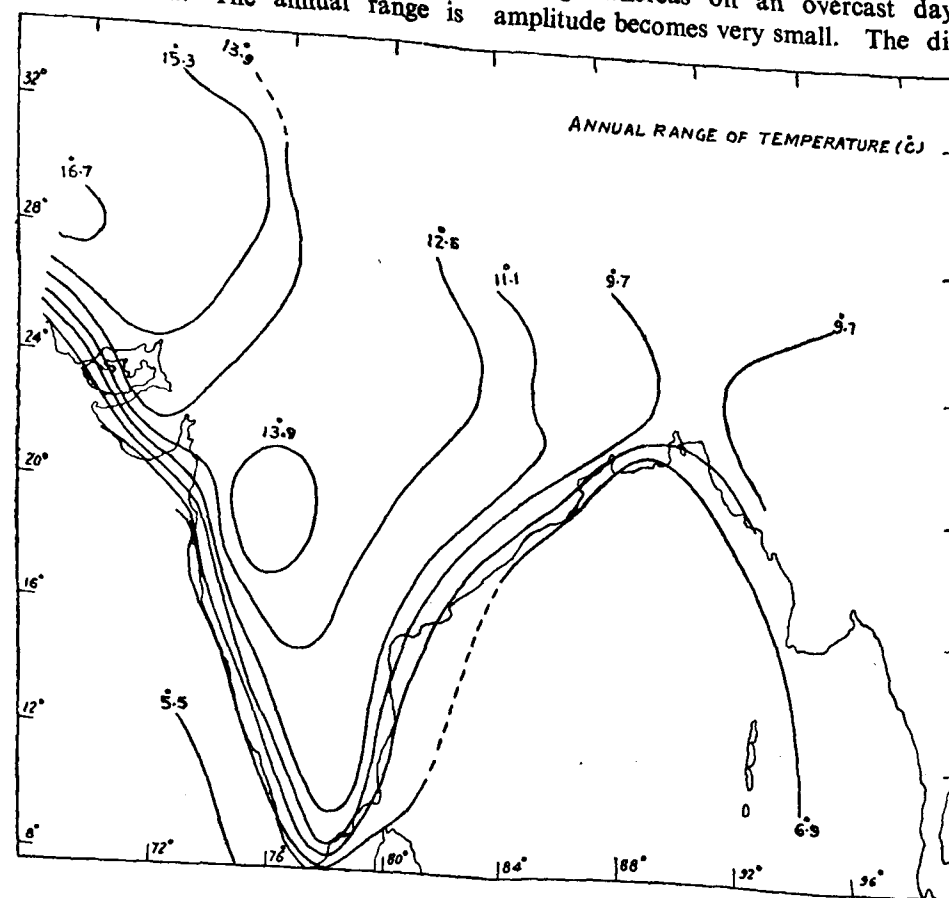
Annual Range of Temperatures

Map 3 shows the annual range of temperatures over India. The annual range is

defined as the difference between the mean maximum and the mean minimum temperatures. Punjab, West Uttar Pradesh and Gujarat have a range of 14°C . There is a decrease towards the east and south. Bihar, Bengal and Assam show a range of $10-11^{\circ}\text{C}$. In the Peninsular India the iso-range lines closely follow the shape of the Peninsula. Over the Deccan plateau the range is as high as 14°C . It decreases to about 11°C at some distance from the coast and is nearly 8°C along the coast.

Diurnal Variation

The diurnal run of temperature at a place can be roughly represented by a sign curve with varying amplitudes. On clear sunny days followed by clear nights the amplitude is large whereas on an overcast day the amplitude becomes very small. The diurnal



MAP-3

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run of temperature at New Delhi during the months of May, June and December are separately represented in Fig. 1. These are based on eleven years' data of hourly temperatures recorded with a self-recording thermograph.

All these curves show a steep rise of temperature upto a few hours after sunrise. After sunset the temperatures begin to fall but more gradually. From the slope of these temperature curves at points 2 and 3 hours after sunrise the rates of increase of temperature per hour have been determined and are shown in Table 4. In a similar manner the rates of cooling 2 and 3 hours after sunset were determined.

TABLE 4
Rates of Change of Temperature
($^{\circ}\text{C}$ per hour) at New Delhi.

Month	After Sunrise		After Sunset	
	2 hrs.	3 hrs.	2hrs.	3 hrs.
May	1.7	2.2	1.3	0.9
June	1.2	1.6	1.9	0.7
December ..	3.0	2.6	1.4	1.0

The figures for the rate of rise of temperatures show that during all these three months the air gets quickly heated up after the rising of the sun. While the rates of cooling of the air 2-3 hrs. after sunset, though perceptible, are much smaller. Also the rates of heating and cooling in December have higher values than the other two months. The higher rates of rise of temperature during December when the heating power of solar radiation is low is understood if we remember that part of this rise in temperature is due to the churning of the air during the process of wiping out of the winter ground inversion of temperature. Our awareness of temperature depends, among other things, on the

rate of change of temperatures. The explanation of this may perhaps be sought in the need for the continuous physiological readjustments needed in such a situation by the body. Also the high rate of change of temperature is responsible for the feeling of discomfort during the summer forenoon and the feeling of pleasant warmth in winter mornings.

It is now fairly well known that the feeling of comfort or otherwise depends on the temperature, the moisture content as well as the movement of the air. Therefore, optimum comfort conditions will be determined not by the temperature or the rate of change of temperatures but by suitable combinations of the parameters representing the temperature, the moisture content of the air and its movement. The same remarks apply to the feeling of discomfort in sub-freezing temperature conditions.

October Heat

A study of the march of temperature through the year at a particular place is of considerable interest. In Fig. 2 the average temperatures at Poona for all the months of the year are plotted.

The temperature can be seen rising from month to month as the sun travels northwards till the temperature reaches the highest value in the month of May. But the intriguing feature of the curve is the second hump showing a secondary maximum temperature in the month of October. This feature is more pronounced in the case of a place to the south of the Tropic of Cancer. The second rise is associated with the approach of the sun overhead, this time from the north on its southwards journey. In this particular case the pronounced decrease in the cloud cover during October is also a contributory factor.

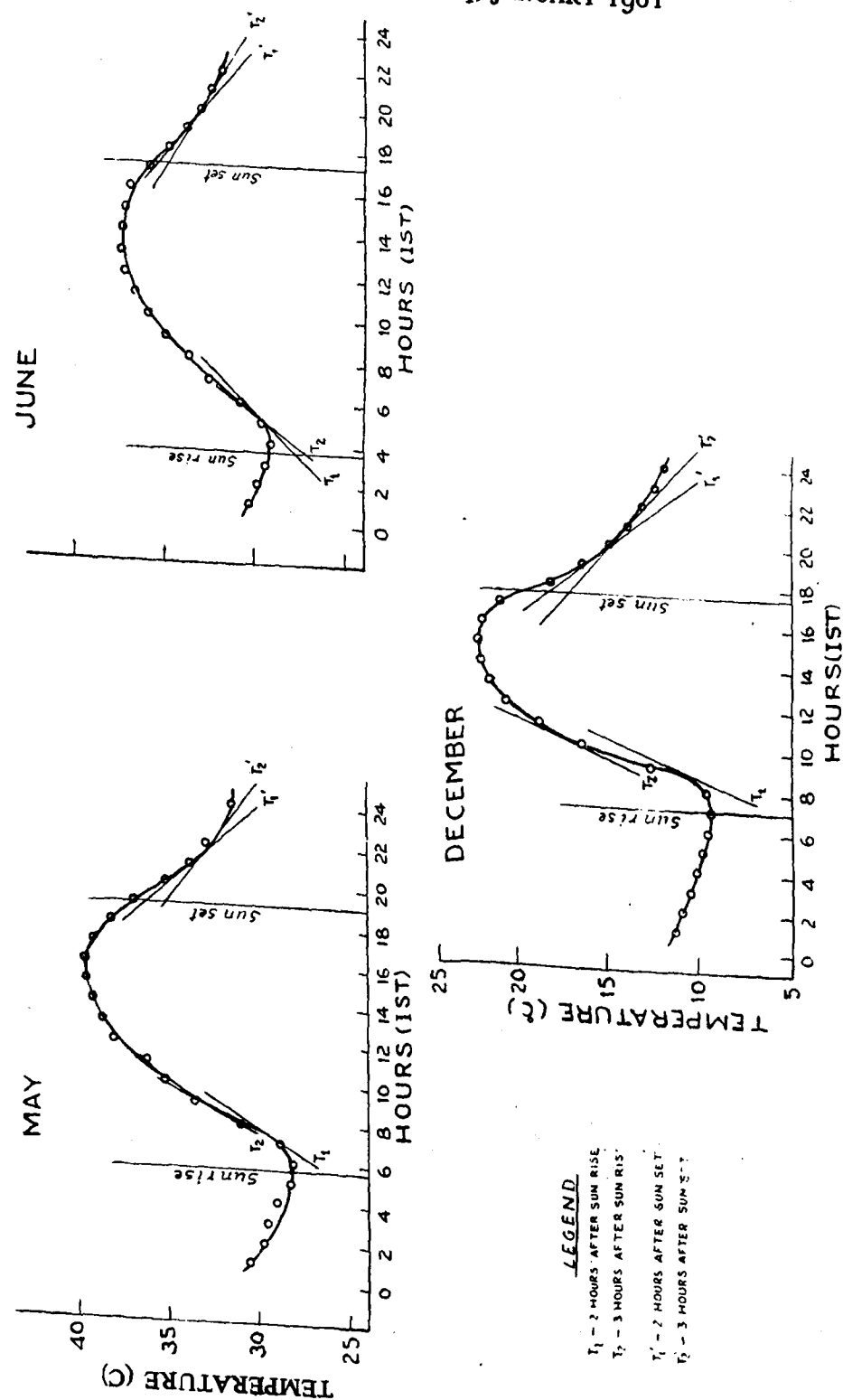


Fig. 1—Diurnal Variation of temperature at New Delhi during May, June and December.

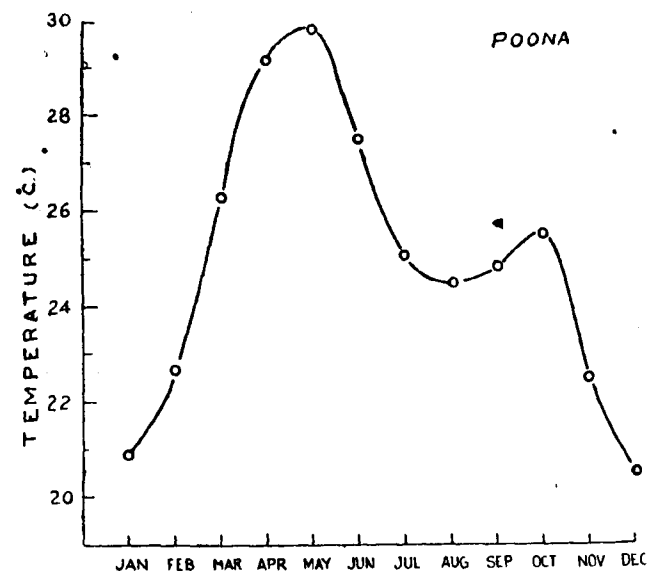


FIG. 2
 Fig. 2—Average temperature of Poona for all months. Note the October hump which indicates 'October heat.'

Height and Temperatur

Attention was drawn earlier to the fact that there is a perceptible decrease in the temperature with an increase in the elevation of the place. As a matter of fact, during summer we can expect to find a larger decrease in temperature by a change of altitude by, say 1 or 1.5 km, than by a very large lateral displacement in any direction.

Fig. 3 depicts comparative figures of average temperatures each month at the pairs of stations Delhi-Simla, Lucknow-Nainital and Nagpur-Panchmari. It will be seen that there is a difference of more than 10 °C between the pairs of places, although the pairs of places are not far apart from one another. If a bird was to judiciously migrate from any one of the pairs to the other and back, it could fly throughout the whole year in air of more equitable temperature than either of the places as shown by the thick line on each of the three diagrams.

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Is India Getting Hotter

A question often asked is : 'Is the temperature of the country rising during recent times?' Before attempting to answer this, it may be worthwhile to explain a basic point at some length. When we talk of the temperature at a place we refer to the ambient air temperature. When measuring this temperature one has to free carefully the observed value from all disturbing local influences, such as direct radiation, radiation from below or neighbouring bodies, excessive or insufficient flow of air past the temperature sensitive element etc. Therefore, temperatures recorded at a meteorological observatory are measured under very strictly specified conditions of exposure. These are faithfully reproduced at all the observatories for the sake of uniformity. Any deviation from these specifications would cause changes in the temperatures recorded at that observatory.

As a result of urbanization or artificial alteration of the local environments a significant change in the exposure of the meteorological instruments can be effected, in which case the records would show a significant change. This change should not be confused with the change implied in the context of climatic change of a country, a continent or the whole world. Climatic changes over geological time-scale are well established on the basis of evidence brought forward from different scientific disciplines. Difference of opinion exists regarding theories which try to explain these climatic changes. And the matter becomes still more controversial when we consider 'climatic changes' in recent times.

As far as change of temperatures is concerned, a number of investigators in various regions of the northern hemisphere are of the opinion that there is definite evidence of a slight warming of the air temperatures

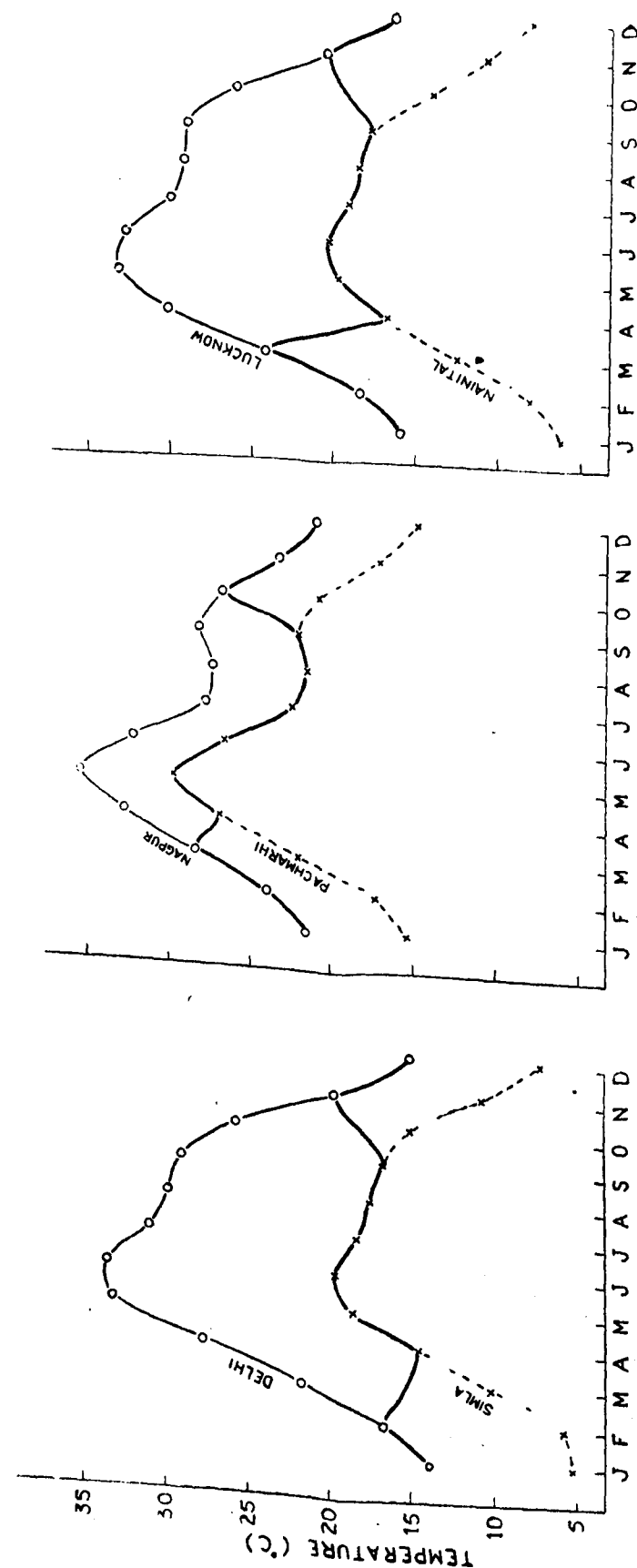


Fig. 3—Shows effect of height on temperature.

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and that the warming has been most pronounced in the higher latitudes. In a recent study with records of American stations, carefully chosen to eliminate the influences of urbanization and other local effects mentioned above, it has been established that the annual temperature changes show a noticeable zonal variation and the zones in the higher latitudes show larger changes. Stations in the zone north of 40° N latitude average a value $+1.0^{\circ}$ F (0.56° C) in zone 35° – 40° N change is $+0.7^{\circ}$ F (0.39° C) and in zone south of 35° N change is $+0.5^{\circ}$ F (0.28° C).

A number of investigations have been undertaken in India also using temperature records over a large number of years and at a large number of stations well distributed to represent the different regions of the country, and fairly advanced methods of statistical analysis have been employed. The results obtained are that there is no general significant change of temperature over India in recent times. This does not contradict the findings of the other workers referred to in the previous paragraph when we take the latitudinal extension of India into consideration.

Magnitude of Change-over

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FROM 1 October 1960, the use of metric weights has become compulsory in certain areas already notified and in the more important industries. Each State and Union Territory has some area which has 'gone metric'. The areas range from large Divisions of many districts to small towns. It would be interesting to analyse State-wise and Union Territory-wise the proportion of the population which has now gone over legally to metric weights.

In industries, preference has been shown for those employing large labour force like the jute, textile and iron and steel industries or where the impact would be felt by the general public as in the case of

vanaspati, cement, woollen mills and the like. In view of the rapid industrialization of the country, an estimate of the labour force which has to deal in metric units may prove of help.

An analysis of these two aspects of the change-over would be useful in assessing the future demand for weights and in taking steps to correct any deficiencies that may arise, particularly as the entire country would go over to the compulsory use of metric weights from April 1962.

Population Changing Over

In Table 1 is given an analysis of the population changing over in various areas. The figures have been obtained from the

various reports dealing with the 1951 census and particularly *Census of India*, Paper No. 1, 1957, General Population Tables and Summary Figures by Districts of Reorganized States, 1951 Census. The population of India has increased since 1951 and according to some estimates, the urban population in general may have increased substantially. The exact figures of such increase could be analysed only when the results of the next census become available later this year. Till then, the data gathered now may serve to indicate the extent of population in each State and Union Territory using only metric weights.

The figures show that among the States, Bihar tops the list with slightly over 52 percent of the population being covered by the reform, while Andhra Pradesh with over 38 percent comes second. Punjab and Kerala vie for the third and fourth positions. Among the Union Territories, Delhi and Pondicherry with 100 percent top the list, while Himachal Pradesh with 43 percent comes next. Of the entire Indian population, some 22.1 percent have begun the change-over to the metric system from October 1960. The remaining 78 percent or so would have to change over before April 1962.

Industries Changing Over

In Table 2 are shown figures for the labour force changing over to the metric system from October 1960. The total labour force involved in the change-over is slightly over 40 percent of the total, although only about 15 industries are involved. These include major labour employing industries such as cotton textiles which account for about 20 percent of the labour force, as also jute and engineering industries which together account for some 10 percent of the total labour.

It has been somewhat difficult to collect the figures for the labour employed as the type of industry covered under a particular heading is often nebulous. For example, under engineering industries, one may include electrical machinery as well as other machinery. In the latter category come mechanical and general engineering industries, industrial machinery, tools, diesel engines, pumping sets, air compressors, automobiles and ancillaries etc. In the cotton textiles industry, not only are the textile mills concerned but also cotton ginning and pressing establishments to some extent. Every attempt has been made to collect the figures from various sources but it is possible that they may not fully cover the entire industry involved.

The labour figures are generally for the year 1958-59. Since then there may have been large variations in the labour position. A case in point is that of the iron and steel industry. With the partial commissioning of the three new steel mills, the labour force under iron and steel industry would have increased substantially. The figures given here may, however, serve as a pointer to the total labour force involved in the change-over. Here again from April 1962, all industries would have to change over to the new weights.

Future Demands

From an analysis of the table it is seen that nearly 80 percent of the population will have to be supplied with weights by April 1962. The experience gained in the pioneering change-over from October 1960 would be valuable in arranging the supply of weights to traders in the rest of the country.

It has been estimated that the requirements of weights by the trade and others for the October 1960 change-over was of

the order of 70 lakh pieces of weights. Assuming that the requirements for the April 1962 change-over would be proportional, the number of weights required additionally would be 280 lakhs. This means that within the next 15 months, a monthly average production of 19 to 20 lakh pieces of weights is necessary and the off-take of the weights produced has to be ensured by planning it judiciously. Similarly, the requirements of industries not only for weights, but for measures has to be satisfied.

There are now over 450 manufacturers of weights and many more are being licensed. A conservative estimate of the present production capacity available in the country is 15 lakh pieces per month. But this can be increased substantially if the demand for weights is steady and continuous. It would, therefore, be possible to supply the needs of India if the production is properly dovetailed. In other words, the demand for weights can be fully met by April 1962, if the existing capacity is in-

creased suitably by giving more licences to capable manufacturers and ensuring optimum production from the present licensees. It is clear that huge stocks of weights cannot be piled up by the manufacturers and dealers as most of the factories and shops have neither the physical nor the economic facilities.

The best solution, as recommended at the recent Conference of Controllers at Bhubaneswar, would be that without waiting for the last date i.e. April 1962 for effecting the change-over all the major towns, as also district and taluq headquarters or selected districts should change-over fully well before that date according to a planned programme. Through this process the areas which are left over for the final date would be comparatively small and their requirements could be met with ease. The success of the full adoption within the next 15 months depends on the smooth flow and offtake of weights. That is the crux of the problem.

TABLE 1
Population Using Metric Weights From October 1960

Sl. No.	State	District/City/Town	Population Covered	Population of State	Percentage Covered
(1)	(2)	(3)	(4)	(5)	(6)
(1)	Andhra Pradesh	 Dist. Visakhapatnam	20,72,698	3,12,60,133	38.49
		Krishna	17,79,484		
		Guntur	25,49,996		
		Kurnool	16,18,621		
		Hyderabad	15,96,750		
		Warangal	15,81,326		
		Nizamabad	8,33,611		
			1,20,32,486	3,12,60,133	
(2)	Assam	 Town Gauhati	43,615	90,43,707	10.29
		Dist. Nowgong	8,86,955		
			9,30,570	90,43,707	

TABLE 1—contd.

Sl. No.	State	District/City/Town	Population Covered	Population of State	Percentage Covered
(1)	(2)	(3)	(4)	(5)	(6)
(3)	Bihar	Divisions Bhagalpur Chhotanagpur Municipal & Notified Areas in Divisions of Patna & Tirhut	1,04,33,717 85,44,259 12,45,893	3,87,83,778	
			2,02,23,869	3,87,83,778	52.15
(4)	Maharashtra	Towns		3,20,03,086	
		Bombay	28,39,270		
		Poona	4,80,982		
		Nagpur	4,49,099		
		Aurangabad	66,636		
		Sholapur	2,77,087		
		Kolhapur	1,36,835		
		Akola	89,606		
		Amravati	87,099		
		Wardha	39,827		
		Yeotmal	35,980		
			45,02,421	3,20,03,086	14.07
(5)	Gujarat	Towns		1,62,62,135	
		Ahmedabad	7,88,332		
		Rajkot	1,32,069		
		Baroda	2,11,407		
			11,31,808	1,62,62,135	6.96
(6)	Kerala	Dist.		1,35,49,118	
		Kozhikode	1,58,724		
		Ernakulam	15,44,486		
		Quilon	29,66,514		
			46,69,724	1,35,49,118	34.47
(7)	Madhya Pradesh	Dist.		2,60,71,637	
		Sehore	5,21,116		
		Indore	5,96,622		
		Gwalior	2,41,577		
		Jubbulpur	10,45,596		
			24,04,911	2,60,71,637	9.22
(8)	Madras	Dist.		2,99,74,936	
		Madras	14,16,056		
		Chingleput	18,53,619		
		South Arcot	27,76,767		
		North Arcot	28,59,157		
			89,05,599	2,99,74,936	29.71

TABLE 1—contd.

Sl. No.	State	District/City/Town	Population covered	Population of State	Percentage covered
(1)	(2)	(3)	(4)	(5)	(6)
(9)	Mysore	Dist.		1,94,01,193	
		Bangalore	21,27,061		
		Raichur	9,53,640		
		Dharwar	15,75,386		
			46,56,087	1,94,01,193	24
(10)	Orissa	Towns		1,46,45,946	
		Berhampur	62,343		
		Cuttack	1,02,505		
		Sambalpur	23,525		
			1,88,373	1,46,45,946	1.29
(11)	Punjab	Dist.		1,61,34,890	
		Amritsar	13,44,427		
		Jullundur	10,55,600		
		Ludhiana	8,08,105		
		Ambala	9,43,734		
		Patiala	5,24,269		
		Gurgaon	9,67,664		
			56,43,799	1,61,34,890	34.98
(12)	Rajasthan	Dist.		1,59,70,774	
		Ajmer	6,93,372		
		Bikaner	3,30,329		
		Jodhpur	6,91,786		
		Jaipur	16,56,097		
		Kotah	6,70,060		
		Udaipur	11,91,232		
			52,32,876	1,59,70,774	32.77
(13)	Uttar Pradesh	Towns		6,32,15,742	
		Meerut	1,58,407		
		Agra	3,33,530		
		Lucknow	4,44,711		
		Bareilly	1,94,679		
		Moradabad	1,54,018		
		Varanasi	3,41,811		
		Kanpur	6,36,443		
		Jhansi	1,06,333		
		Allahabad	3,12,259		
		Gorakhpur	1,23,844		
			28,06,035	6,32,15,742	4.44
(14)	West Bengal	Cities		2,63,02,386	
		Calcutta	25,48,677		
		Howrah	4,33,630		
			29,82,307	2,63,02,386	11.34

Sl. No.	State	District/City/Town	Population Covered	Population of State	Percentage Covered
(1)	(2)	(3)	(4)	(5)	(6)
(15)	Andaman & Nicobar Islands	Town			
(16)	Delhi	Port Blair etc.	8,014	30,971	25.88
		Whole of Delhi	17,44,072	17,44,072	100
(17)	Himachal Pradesh	Dist.			
		Mandi	3,10,626	11,09,466	
		Sirmur	1,66,077		
			4,76,703	11,09,466	42.97
(18)	Manipur	Town			
(19)	Tripura	Imphal	2,862	5,77,635	0.50
(20)	Pondicherry	Town			
		Agartala	42,595	6,39,029	6.67
		Whole of Pondicherry	3,17,163	3,17,163	100
	India		7,89,02,274	35,70,37,796	22.10

TABLE 2
Labour Force Changing over to Metric System from October 1960

Industries	Labour Employed	Percentage of Total Labour Force
(1)	(2)	(3)
Cotton Textile Mills, Cotton Baling etc.		
Engineering Industries	8,85,472	19.19
Iron & Steel Factories	1,92,379	4.17
Heavy Chemicals	1,15,158	2.50
Cement	12,054	0.26
Jute Mills, Presses, etc.	27,084	0.59
Salt Refineries	2,45,719	5.32
Paper, Pulp and Paper Board	9,801	0.21
Refractories	31,081	0.67
Non-ferrous Metals (Copper, Aluminium, Tin, Lead, Antimony, etc.)	15,104	0.33
Vanaspati Factories	17,871	0.39
Soap Factories	6,271	0.14
Woollen Mills, Woollen Baling and Pressing	8,428	0.18
Petroleum Refineries, Distribution, Storage, Kerosene etc.	15,761	0.34
	13,474	0.29
Plantation		
Coffee Curing Works, Coffee Plantations etc.		
Rubber Plantations	2,03,441	4.41
	63,034	1.37
Total and Percentage of Industries and Plantations Covered by the Introduction of Metric System		
All Industries and Plantations in India	18,62,132	40.36
	46,15,258	100.00

Metric System in Higher Technical Education

A Conference of representatives of various universities and engineering and technological colleges and institutions, Ministry of Education, Ministry of Commerce and Industry and others concerned was held on 23 October 1960 in Udyog Bhavan, New Delhi.

Prof. M. S. Thacker, Secretary, Ministry of Scientific Research and Cultural Affairs, presided over the meeting. In his opening remarks, Prof. Thacker said that the question of introduction of metric system in technical education had been discussed earlier at the APTI (Association of Principals of Technical Institutions) meeting which was held at Gauhati. As a result of those discussion, the present Conference was being held to assess views and make recommendations.

Prof. Thacker said that the metric system would be adopted in commercial transactions throughout the country by the end of 1966. It had already become compulsory in law to use metric weights in trade in selected areas. On 1-4-1962, metric weights would be compulsory throughout the country. Difficulties had been experienced in the supply of weights but the supply was expected to improve in the next few weeks. The metric system had also been adopted in all the major industries in the country. All the steel plants both in the public and private

sectors had begun producing metric steel sections. Very soon the entire production of steel in the country would be in metric sections. By 1966, he expected a substantial part of the productive equipment in the country to be capable of manufacturing products according to metric specifications.

The need to introduce the metric system in higher technical education had, therefore, become urgent. At the same time, he recognised that for several years to come, the foot-pound system would also have to be taught. Thus it was necessary that both the systems would have to be used simultaneously in engineering colleges. This might impose an extra load on teachers and students, but this was unavoidable. He invited the Principals to suggest a specific programme for adopting the metric system in technical education.

Phased Programme

The Principals agreed that there would be no major difficulty in adopting the metric system provided they were given sufficient time and assistance for the replacement or recalibration of equipment. The Conference unanimously recommended the adoption of the metric system in teaching in the first and second year classes commencing from the Academic Session 1962-63. The following year, i.e. 1963-64,

it would be introduced in the third and fourth year classes, to be followed by the introduction in the fifth and final year classes in 1964-65. Heads of technical institutions would take preparatory action to implement the programme.

It was suggested by the Committee that from 1970 onwards the metric system should be fully used for the All India Engineering Examinations. Both the metric and FPS systems may be used for the All India Engineering Examinations from 1965 till 1970. These suggestions may also be made to universities and other engineering examination bodies. The Ministry of Commerce and Industry would take the necessary steps for the production of measuring tools and instruments calibrated in metric units for the use of technical institutions. The instruments now in use would be re-calibrated wherever necessary and possible. All instruments to be purchased in future would be in the metric system. Steps would be taken to encourage the production of textbooks either by translation from German or Russian, or by adaptation of English textbooks.

(The following list of firms claim to be either able to supply or manufacture various types of instruments that may be needed by technical institutions. This list does not cover all firms. It is realised that there may be others who could also supply the requirements. If there are any others, *Metric Measures* would be glad to publish their names. It is, however, hoped that the present list will prove useful—Editor).

Small Tools

- (1) The Indian Manufacturers Ltd., 101, Sion Road, Bombay.
- (2) The New India Tools Manufacturing Co., 48, Gariahat Road, Calcutta—19.
- (3) The Small Tool Manufacturing Co. of India Ltd., 33/1A, Upendra Chandra Banerjee Road, Calcutta—1.
- (4) Hindustan Small Tools Ltd., 4, Nandeville Gardens, Ballygunge, Calcutta—19.

- (5) The Praga Tools Corporation Ltd., 17, Saifabad, Hyderabad.
- (6) Bharat Tool Manufacturing Co., Ltd., Swastik Mills Compound, Ferguson Road, Lower Parel, Bombay—13.
- (7) Addisen & Co. (Private) Ltd., 158, Mount Road, Madras-2.

Scales

- (1) National Instruments Factory, Jadavpore, Calcutta.
- (2) Cottage Industries Co-operative Society Ltd., 17, Civil Lines, Roorkee (U.P.).
- (3) Eastern (Scales) Private Ltd., 23, Ansari Road, Delhi-7.
- (4) Raj-der-kar & Co., Commissariat Building, Hornby Road, Fort, Bombay.
- (5) Kohinoor (India) Ltd., University Road, Banaras-4.
- (6) J.V. Navalakhi & Co., 533, Kalbadevi Road, Bombay.
- (7) J. Sur & Co., Private Ltd., 10, Old Court House Street, Calcutta-1.

Woven Metallic Tapes

- (1) Everest Tapes, Block No. 7, 382, Lamington Road, Bombay-7.
- (2) India Tapes, No. 5, Iswarbai Patel Estate, Goregaon East, Bombay.
- (3) National Tape Co., 188, Ikbalganj, Ludhiana (Punjab).
- (4) The Ludhiana Measuring Tape Co-operative Industrial Society Ltd., 130, Manawar Road, Ikbalganj, Ludhiana (Punjab).
- (5) Diamand Metallic Tape Co., 67-A, Netaji Subhash Road, Calcutta.
- (6) India Tapes, Sambhaji Vilas, Lashkar (Gwalior), Madhya Pradesh.
- (7) East & West Products, 184, Civil Lines, Ludhiana (Punjab).
- (8) Lawrence & Mayo (India) Private Ltd., 274, Dr. D. Naoroji Road, Bombay.
- (9) J. Sur & Co., Private Ltd., 10, Old Court House Street, Calcutta-1.
- (10) Masterman Tapes, C/o Associate Textile Engineers, 36-Chawri Bazar, Delhi.

Steel Tapes

- (1) M. Somnath & Co., 94, Lehar Chawl, Bombay-2.

METRIC SYSTEM IN HIGHER TECHNICAL EDUCATION

- (2) Bombay General Agencies, Ji Ji House, Ravelia Street, Bombay-1.
- (3) Bharat Engineering Stores, Bombay—3.
- (4) Shah Engineering Stores, Bombay-3.
- (5) Jairamdas & Sons, Silver Jubilee Park Road, Bangalore-2.

Surveying Chains

- (1) National Instruments Factory, Jadavpore, Calcutta.
- (2) National Emporium, Civil Lines, Roorkee (U.P.).
- (3) P. Orr & Sons, P. B., No. 317, Madras-2.
- (4) J. Sur & Co., Private Ltd., 10, Old Court House Street, Calcutta-1.

Levelling Staves

- (1) Cottage Industries Co-operative Society Ltd., Civil Lines, Roorkee (U.P.).
- (2) Government Electric Factory, Mysore Road, Bangalore.
- (3) National Instruments Factory, Jadavpore, Calcutta.
- (4) National Emporium, Civil Lines, Roorkee (U.P.).

- (5) Kohinoor (India) Ltd., University Road, Banaras-4.
- (6) Ordnance Factory, Dehradun, (U.P.).
- (7) P. Orr & Sons, Ltd., P. B. No. 317, Madras-2.
- (8) J. Sur & Co., Private Ltd., 10, Old Court House Street, Calcutta.

Pressure and Vacuum Gauges

- (1) Government Precision Instruments Factory, Lucknow.
- (2) Industrial Gases, 138, Canning Street, Calcutta.
- (3) National Instruments Factory, Jadavpore, Calcutta.

Thermometers

- (1) National Instruments Factory, Jadavpore, Calcutta.
- (2) Scientific Glass Works, Ambala Cantt.

Hydrometers

- (1) National Instruments Factory, Jadavpore, Calcutta.
- (2) Andhra Scientific Co. Ltd., Masaulipatam.

Third Conference of Controllers

THE Third Conference of Controllers was held at Bhubaneswar on 14 November 1960. It was attended by the Controllers of Weights and Measures of the various States and Union Territories as also by representatives of the Ministries of Commerce and Industry, Scientific Research and Cultural Affairs, Law, Finance (Government of India Mints at Bombay and Calcutta), Information and Broadcasting as well as Indian Standards Institution, National Physical Laboratory and others.

The Conference was inaugurated by the Chief Minister of Orissa, Shri H. K. Mehtab, and the inaugural session was presided over by Shri Radhanath Rath, Development Minister.

Inaugurating the Conference, the Chief Minister said that India was undertaking an ambitious programme of the introduction of metric weights and measures in the country. The decimal system on which the metric system is based was not new to India. It was in vogue in Orissa during the reign of the Ganga Kings. The decimal system of measurement was used for measuring and recording inter-planetary distances by the 11th century astrologer, Shri Satanand Acharya. The architects of the famous temple at Konarak also used the decimal system of measurement in their calculations.

The metric system would unify the country so far as weights and measures were concerned. In the introduction of this reform, it was necessary, he stressed, to take into consideration the conservatism of the people. The most important step was to take the metric system to the rural people and to get them acquainted with it. The problem of replacing old weights could be tackled by withdrawing old weights from the markets and making the old weights scarce. It was necessary to proceed in stages with firmness and tact.

Shri Radhanath Rath, Development Minister, in his presidential address said that even in ancient times, commerce and industry in India did not enjoy a 'no control' or 'laissez-faire' system. *Arthashastra* of Kautilya gives instances of how weights and measures were controlled in the old days. In the present-day India, and particularly in Orissa, there were a number of systems of weights and measures in use. Now that the metric system was being introduced, the old systems would be replaced by a better system. With the unification of the weights and measures system, it would now be possible to guarantee accuracy and prevent cheating in the trade which is the duty of the Weights and Measures Department. He said that the reform had to be planned carefully and cautiously, so that the change-over was effected with the minimum trouble to people. Difficulties can be overcome by co-operation.

The Conference then reassembled to consider the various points on the agenda under the chairmanship of Shri K. V. Venkatachalam, Joint Secretary, Ministry of Commerce and Industry, New Delhi. Some of the important recommendations made by the Conference are listed below.

(1) Review of Progress

It was noted that the demand for weights of all types and denominations in the specified areas was about 70 lakh pieces and it was expected that this demand would be met within a few months. During the two year period, October 1958-60, Organizations of Weights and Measures had been set up in the country and duly equipped and they had issued licences to a number of manufacturers, dealers and repairers of weights, measures and weighing and measuring instruments. The traders were persuaded to purchase weights well before October 1960, but the smaller traders had not purchased the weights and the demand had gone up suddenly after October and was being met expeditiously. It was noted that there was eagerness on the part of the people to purchase weights and start using them, but if the entire trade of an area did not switch over, a single trader preferred to wait for all the others to proceed. However, the production of weights was now mounting up and it was expected that it would be doubled shortly.

(2) Enforcement in Other Areas

The next important step was to introduce weights all over the country by April 1962. To achieve this, it was necessary that the production of weights should not only be stepped up, but the produce is taken up by the traders without delay so that the same situation as arose in October 1960 did not come up again. One of the steps to maintain the tempo of production and introduce weights was to concentrate

on the introduction of weights in a district, meet its demand fully, see that it changes over to the metric system and go on to the next. To expedite this process, the Organizations of Weights and Measures should be fully manned and adequately equipped during the next year. Publicity should be widespread and persuasion used in getting people to change over by easy steps.

(3) Introduction of Capacity Measures

Capacity measures have up to now been introduced in the petroleum industry and the period of change-over was one year ending on 1 March 1961. It was now intended to introduce capacity measures for other materials like milk, oil, (where sold by measure) etc. It was noted that there would be enough working standard capacity measures with the States by April 1961. It was recommended that the introduction of capacity measures should start in the whole of India in April 1961, but different periods of transition should be prescribed for selected areas, the change-over being complete within two years in two or three stages.

(4) Introduction of Linear Measures

The Central Government Mint at Bombay would supply 50 working standard linear measures by April 1961 for distribution to States. Every State and Union Territory would receive a few of these measures. This limited supply of standard measures would be used mainly for verifying and stamping commercial linear measures used in organized industry, particularly the cotton textile industry. By September 1961, the Mints would have supplied 150 standard linear measures. The introduction of metric linear measures in the general and retail trade would be considered at the Fourth Conference. Since

standard linear measures would be available soon, Controllers may grant licences for the manufacture of commercial linear measures at their discretion.

(5) Supply of Weights, etc. Direct to an Actual User in Another State

A manufacturer might be permitted to sell weighing and measuring instruments directly to customers in a State other than his own. Commercial weights and measures should, however, be sold only through licensed dealers.

(6) Weighing Machines with Dual Graduations

Considerable part of India's export trade is with countries on the foot-pound system. Customers from these countries insisted on indications in the old manner. In order to satisfy this demand it was necessary that machines marked in both metric and pound systems should be used. Such permission would be given only to recognised exporters and manufacturers who packed for export. They would have to report such machines to the Controller of the State concerned.

(7) Application of Enforcement Acts to Export Trade

The State Enforcement Acts applied to transactions connected with exports also, provided the transactions took place in India. Care should be taken, however, to ensure that the Act was applied in such a way as not to hamper the country's export trade with countries like the UK and the USA, which were on the foot-pound system. Importers in these countries may not like any change being made in the sizes of packages or in the manner in which invoices were prepared. They insisted on the net contents being marked on packages in foot-pound units. Packers may, therefore, be permitted to mark the net weight in foot-pound units also on packages intended for export trade. In invoices and other docu-

ments connected with exports, quantities, prices, etc., may be shown in metric as well as foot-pound units. Manufacturers and exporters may be allowed to use weighing machines calibrated exclusively in foot-pound unit, or in both foot-pound and metric units. (See also Recommendation 6).

(8) Use of Carat Weights

Carat weights not conforming exactly to the specification laid down in the Enforcement Rules, have been in use in the diamond and real pearl trade in the country. To facilitate the diamond and pearl trade to change over to the metric system, it was agreed that the use of such carat weights might be permitted provided they conformed to the Rules as regards denominations and permissible errors. The period of allowance for such use would be not more than two years.

(9) Balances in Use in the Pearl and Diamond Trade

Many of these balances did not conform to the specifications in the Rules although they satisfied the tolerances prescribed. The State Governments have the power to permit the continued use of these balances for a prescribed period. Since these balances are of the specified accuracy, their continued use might be allowed for the time being.

(10) Inter-State Sale of Weights

A manufacturer who wished to sell weights, etc. to a State other than that in which his factory was situated was required to appoint sole selling agents in other States if he desired to sell his weights there. Where the weights had to be supplied to large States, it was found that the sole agent had difficulties in distributing the weights. In view of these difficulties, it was recommended that a limited number

of agents may be appointed instead of a sole agent, depending on the discretion of the Controller.

(11) Production of Seer Weights

Although the use of seer weights in trade is not yet illegal, it would be illegal on 1 April 1962. The manufacture of seer weights in the country must, therefore, be actively discouraged.

(12) Repairing of Weighing Machines by Users

A user had the right to repair his own machine and was not under any compulsion to go to a repairer for the purpose. After repair, however, the machine must be offered for verification by a Government Inspector.

(13) Licensed Repairers of Weighing Machines

Every repairer must take out a licence from the Government of the State in which

he had his establishment. A licensed repairer of one State could serve customers in other States as well.

(14) Not for Trade Weighing Instruments

Weighing machines used exclusively for internal purposes in industry, and not in transactions with other parties, need not be verified or stamped by the State Inspectors.

(15) Prohibition of Wooden Beams

Wooden *dandi* type of beams did not conform to the specification in the Enforcement Rules. State Governments, however, may permit existing scales for a short period which may be determined by that State.

(16) Cast Iron Weights for Bullion

The use of cast iron weights for bullion trade was undesirable for a number of reasons and their use should not be allowed.

News & Views

Recent Notification

(1) *Conversion of Weights other than Standard Weights*

No. S. O. 2760 Dated 11-11-60.

In exercise of the powers conferred by clause (e) of subsection (2) of section 17 read with subsection (2) of section 16 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby makes the following rules, namely:—

1. Short title

These rules may be called the Standards of Weights and Measures (Conversion to Standards Weights) Rules, 1956.

2. Definitions

In these rules,—

(a) 'Act' means the Standards of Weights and Measures Act, 1956 (89 of 1956);

(b) 'Schedule' means the schedule to these rules.

3. Conversion of Weights other than Standard Weights

A value expressed in terms of any weights set forth in the Schedule may be converted into a value expressed in terms of a Standard Weight at the rates specified in the Schedule.

4. Manner of Conversion

All references in any contract, deed, instrument, record or other document to values expressed in terms of any weight set forth in the schedule shall be construed as references to that value expressed in terms of a Standard Weight, converted thereto at the rates specified in the Schedule.

SCHEDULE**Weights other than Standard Weights prevalent in Madras State**

1 palam	=	34.9914 grams.
1 viss	=	1.39966 kilograms
1 gundu	=	25.4011744 kilograms
1 thookku	=	1.74957 kilograms
1 podi	=	111.97248 kilograms

(b) Weights other than Standard Weights prevalent in Kerala State

1 Sovereign weight	=	8.030813 grams
1 Kazhachu	=	5.0989289 grams
1 Panamida	=	3382.42 milligrams
1 Rattal	=	489.8796 grams

(c) Weights other than Standard Weights prevalent in Maharashtra State

1 val (1/40 Tola)	=	291.5 milligrams
1 Rati (1/62 Tola)	=	188.1 milligrams
1 Dram	=	1.7718 grams
1 Scruple (20 Grains)	=	1.29598 grams
1 Dram (60 grains)	=	3.88794 grams
1 Ounce (480 Grains)	=	31.10352 grams

(d) Weights other than Standard Weights prevalent in Orissa State

1 Katki Seer	=	1.22470 kilograms
1 Katki Maund	=	48.98796 kilograms
1 Viss	=	1.39966 kilograms

(e) Weights other than Standard Weights prevalent in Mysore State

1 Mysore Seer	=	279.936 grams
1 Coorg Seer	=	317.517 grams

(2) Amendment of Indian Power Alcohol Rules, 1950 S. O. No. 2693, dated 7th November 1960

In pursuance of the provisions contained in Rule 9 of the Indian Power Alcohol Rules, 1950, the Central Government hereby makes the following amendments in the Notification of the Government of India in the Ministry of Commerce and Industry No. SRO 1601, dated the 17th September, 1952, namely :—

In the said Notification,—

- (1) in paragraph 1, for the second sentence, the following sentence shall be substituted, namely :—

“The rate of such handling charges shall be 10 nP. (ten naye Paise only) per litre until further orders”;

- (2) for the words, figures and brackets

“As -/14/- (annas fourteen only) per bulk gallon” the figures, words and brackets “19 nP. (naye Paise nineteen only) per litre” shall be substituted.

Water Charges in Delhi

It is understood that the Water Supply and Sewage Disposal Committee of the Delhi Municipal Corporation has switched over to the metric system for water charges with effect from October 1.

The unit of measurement for water charges would be the kilolitre *i.e.* 1,000 litres. Previously it was 1,000 gallons. The new rate would be 11 nP. per kilolitre for I class premises, 17 nP. for class II, III, IV, and V and 22 nP. for class VI. The present rates for these categories are 50 nP., 75 nP. and one rupee per 1,000 gallons.

Marking of Containers

The manner of marking of containers weighing less than a kilogram was indicated some time back. One of the ways suggested was to mark the packages as $\frac{1}{4}$ kilo or $\frac{1}{2}$ kilo or even 0.250 kg or 0.500 kg. The matter has been examined and it was felt desirable that the package containing a $\frac{1}{4}$ kilo, or $\frac{1}{2}$ kilo should be marked 250 grams or 500 grams and not $\frac{1}{4}$ kilo or $\frac{1}{2}$ kilo or even 0.250 kg. or 0.500 kg. This practice is recommended because it would be in line with the marking on the weights to be used in trade and would not lead to confusion in the purchaser's mind.

Standards News

(Indian Standards which have a particular bearing on the change-over to the metric system are indicated here. Copies would be available from the Indian Standards Institution, Manak Bhavan, 9, Mathura Road, New Delhi or their branch offices at Bombay, Calcutta and Madras.)

Indian Standards Specification for Steel Drums and Kegs (Galvanized and Ungalvanized) (IS : 1549—1960)

The Indian Standard Specification for Steel Drums and Kegs (Galvanized and Ungalvanized) (IS : 1949—1960) published recently by ISI supersedes IS : 442—1954 Drums for Paints and IS : 618—1956 Kegs (Open Top Drums) for paints. The two latter mentioned standards were published earlier by ISI for the exclusive use of the paint industry, but it has been felt that more comprehensive specifications should be drawn up for drums and kegs for use of paint industry and other industries.

The standard covers a range of galvanized and ungalvanized steel drums and kegs up to 150 litres nominal capacity in 15 different size.

Price : Rs 3.00

Indian Standards for Copper Steel and Strip (IS : 1550—1960)

The Indian Standards Institution has recently published IS : 1550—1960 Specification for Copper Sheet and Strip for the Manufacture of Utensils and for the General purposes which covers the requirements for two grades of copper sheet for the manufacture of utensils and for general

purposes, such as roof coverings, flashings, weatherings, gutters, damp-proof courses in buildings, etc. Grade 1 includes copper sheet and strip for pressing quality while Grade 2 includes the same for hand worked articles and general purposes.

The standard is one of a series of Indian Standards on copper sheet and strip. Another standard on copper sheet and strip for electrical purposes is under preparation.

Draft Indian Standards for Steel Products for General Engineering Purposes [Doc : SMDC 6(253—255)]

The Indian Standards Institution has prepared the following Indian Standard Specifications for Steel Products for General Engineering Purposes :

- Mild Steel Plate, Sheet and Strip for General Engineering Purposes [Doc : SMDC 6(253)],
- Mild Steel Flats for General Engineering Purposes [Doc : SMDC 6(254)] and
- Mild Steel Bars—Round and Square for General Engineering Purposes [Doc : SMDC 6(255)].

The sizes and other properties to be included in these standards will be in metric units. These size have been arrived at after taking into consideration the sizes of steel products at present used in the general engineering industry. A list of sizes

for these products has been given as a guide in the ISI Handbook for Structural Engineers—1 : Structural Steel Sections. A general guidance with regard to the selection of these sizes had also been given in IS : 1138—1958 Sizes of Metal Strip, Sheet, Bars (Round and Square), Flats and Plate (for Structural and General Engineering Purposes). But, it has now become necessary to standardize the sizes for various steel products.

After these standards are published, it is intended to withdraw IS : 1138—1958.

The draft standards will be circulated by the middle of October 1960 to interested producers, consumers and technologists for eliciting technical comments. These draft standards will be open for comments for a period of three months from the date of circulation.

Draft Indian Standard for Screwing Taps [Doc : EDC 45 (552)]

The Indian Standards Institution has prepared the Draft Specification for Screwing Taps [Doc : EDC 45(552)].

This will be circulated to the interests concerned for their critical comments and suggestions for improvement.

This draft standard belongs to a series of Indian Standards for small Tools which ISI is preparing in connection with the changeover to the metric system. It includes the taps required for cutting metric screw threads with ISO profile and for BSP threads.

Indian Standard for Coated Abrasive, Glue Bond (IS : 715—1957)

The Indian Standards Institution has prepared a revised draft of IS : 715—1957 Specification for Coated Abrasives, Glue Bond at the request of some of the manufacturers.

This standard covers the requirements for coated abrasives in the form of sheets, rolls, belts, discs and converted shapes; with paper, cloth or combination backing. It was originally issued in 1957 and the main modifications incorporated in the revised draft are :

- (1) Metricization of the standard.
- (2) Recasting of the table for "Allowable Limits for the sizing of Abrasive Grains".

Indian Standard for Steel Bars and Steel Wire for Concrete Reinforcement (IS : 432—1960)

The Indian Standards Institution has just published IS : 432—1960 Specification for Mild Steel and Medium Tensile Steel Bars and Hard-Drawn Steel Wire for Concrete Reinforcement which is a revision of the same specification published in 1953. The revision of the specification became necessary in view of the considerable experience gained in working to this specification by both the manufacturers and the users. Furthermore, in view of substantial quantities of the so called untested steel being on the market, it has been found necessary to bring this category of concrete reinforcement under a separate grade having a lower ultimate tensile strength. Such a step has been considered to pave the way towards better utilization of the available supplies of concrete reinforcement.

Another important change that has been incorporated in this revision is that concrete reinforcement having an ultimate tensile strength of not less than 58 kg/mm² and not more than 90 kg/mm² has been categorized under the name 'Medium Tensile Steel' as compared to the originally adopted name of 'High Tensile Steel' which covers steels of strength in a very much higher range.

STANDARDS NEWS

High tensile steel bars, high tensile hard-drawn steel wire, deformed bars, twisted steel bars, hard-drawn steel wire fabric and twisted steel fabric are not covered by this standard.

Price : Rs. 2.50

Indian Standard for Beam Scales (IS : 1433—1960)

The Indian Standard Specification for Beam Scales (IS : 1433—1960) belongs to a series of Indian Standards on commercial weighing instruments being prepared by ISI at the instance of the Standing Metric Committee, Government of India in connection with the introduction of metric system of weights and measures in the country. Other standards published in this series already cover general requirements for beam instruments and specifications for counter machines, platform weighing machines, weighing bridges, crane weighing machines and steelyards.

Beam scales are one of the most commonly used instruments and they are made in the country in large quantity both by large scale and small scale manufacturers.

This standard recognizes four classes of beam scales. The trades for which the different classes of scales are intended to be used are given below for the sake of guidance :

Class of Scale	Use
A	Assay purposes, fine weighments and for weighing precious stones, jewels, pearls, etc.
B	Bullion, precious metals, saffron & similar expensive commodities, chemists & druggists, perfumery, etc.
C	Base metals and relatively costlier commodities, such as cereals, tea, coffee, tobacco, jute, dry fruits, species, oil-seeds, etc.
D	Weighment of relatively cheaper commodities such as scrap iron, fuel, wood, charcoal, cotton waste, vegetables, etc.

The standard includes more important dimensions of the beam scales of classes, B.C. and D. with the exception of the beam for scale of certain capacity which are still under consideration. The standard does not cover beam of round cross-section commonly known as 'dandi'.

Price : Rs. 2.50

Indian Standard for Asbestos Cement Pressure Pipes (IS : 1952—1960)

The Indian Standard Specification for Asbestos Cement Pressure Pipes (IS : 1952—1960) published recently by ISI specifies the requirements for manufacture, classification, dimensions and acceptance tests for these pipes.

The standard mainly follows the ISO Draft Recommendation No. 149 relating to asbestos cement pressure pipes. The agreements reached at the international level, on the sizes and pressure ratings of these pipes, have been incorporated in this standard and test requirements together with the methods of test have been aligned with the international standard. As considerable quantities of these pressure pipes are likely to be imported into the country, the indigenous manufacture being very small at present, it is hoped that this standard would provide the necessary guidance for the purchase of asbestos cement pressure pipes from different sources abroad.

Price : Rs. 2.50

Indian Standard Specification for Milk Bottle Crates

The Indian Standard Specification for Milk Bottle Crates (IS : 1613—1960) published recently by ISI prescribes the dimensions and other requirements for three types of milk bottle crates namely :

- (1) Type 1—to hold twelve one-litre milk bottles,

- (2) Type 2—to hold twenty 500-ml milk bottles, and
(3) Type 3—to hold thirty 250-ml milk bottles.

The main consideration in the preparation of this standards was the interstackability of the different crates used for the different types of milk bottles. For this purpose, it was decided that the length and breadth of the milk bottle crates for the different types of milk bottles should be the same. The dimensions of the crate have been adjusted to suit the glass milk bottles as specified in IS : 1392—1959.

Price : Rs. 2.00

Indian Standard Specification for Liquor Bottles

The glass liquor bottles of a wide number of sizes and shapes are used as containers for liquor of various types. The

purpose of IS : 1662—1960 Specification for Glass Liquor Bottles published recently by ISI is to rationalize the sizes and shapes of these types so as to effect greater economy in production.

With the introduction of the metric system in the alcohol industry in the country, the need for recommending a rationalized series of capacities in the metric system has been urgently felt and it is hoped that this standard would be of help to the industry in this direction. As the packers of the liquor prefer to retain the individuality of the shapes and dimensions of the bottles they use, it has been decided not to specify the same in this standard. The tests prescribed for the liquor bottles are based on the trade practice currently followed in the country.

Price : Rs. 2.00

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Business Manager
Publications Division
Ministry of Information & Broadcasting,
Old Secretariat, Delhi-8.

Controllers etc. in States and Union Territories

Metric Measures is publishing below a list of Controllers of Weights and Measures of the various States and Union Territories. *Metric Measures* has been receiving a number of enquiries about the persons to be contacted in the States for obtaining licences for manufacturing, selling or repairing of weights, measures and weighing and measuring instruments. It is hoped that the publication of this list will prove of help to the general public.

(1) ASSAM

Shri S.R. Barua
Director of Agriculture and Ex-Officio Controller of Weights and Measures,
Government of Assam,
Shillong.

(2) ANDHRA PRADESH

Shri Anil De,
Ex-Officio Controller of Weights & Measures,
Chirag Ali Lane,
Hyderabad-Dn.

(3) BIHAR

Shri V. N. Singh,
Controller of Weights & Measures,
Government of Bihar,
Patna.

(4) GUJERAT

Dr. C.B. Patel,
Director of Industries,
Government of Gujarat,
New Civil Hospital,
Block No. B-4,
Asarva, Ahmedabad.

(5) JAMMU & KASHMIR

Shri M. M. Siddiqui,

Financial Commissioner & Ex-officio Controller, Weights & Measures,
Government of Jammu & Kashmir,
Jammu/Srinagar.

(6) KERALA

Shri T.P. Krishnan Nair,
Controller of Weights & Measures,
Office of the Board of Revenue,
Trivandrum.

(7) MADHYA PRADESH

Shri Ram Singh Bawal,
Controller of Weights & Measures,
Government of Madhya Pradesh,
Bhopal.

(8) MADRAS

Shri A.S. Venkataraman,
Controller of Weights & Measures,
19-A, Woods Road, Mount Road,
Madras-2.

(9) MAHARASHTRA

Shri V.M. Pednekar,
Deputy Director of Industries
(Weights & Measures) and,
Deputy Controller of Weights & Measures,
Old Custom House Yard,
Fort, Bombay.

(10) MYSORE

Shri Syed Ahmed Khan,
Deputy Controller of Weights and Measures
and Chief Marketing Officer,
Old Residency Building,
Bangalore.

(11) ORISSA

Shri R.N. Dwivedi,
Joint Director of Marketing and Ex-Officio
Controller of Weights & Measures,
Orissa,
Bhubaneswar.

(12) PUNJAB

Shri Kanwar Jit Singh,
Controller of Weights and Measures,
Government of Punjab,
Ambala Cantt.

Near Bhagirath Palace,
Chandni Chowk,
Delhi.

(13) RAJASTHAN

Shri K.N. Mathur,
Superintendent,
Weights & Measures,
Government of Rajasthan,
Jaipur.

(18) HIMACHAL PRADESH

Shri Gobind Sahai Diwan,
Superintendent, Weights & Measures,
Industries Department,
Himachal Pradesh,
Simla-4.

(14) UTTAR PRADESH

Shri S.B. Mathur,
Deputy Secretary to the Government of U.P.,
& Ex-officio Controller of Weights & Measures
Food and Civil Supplies Department,
Lucknow.

(19) LACCADIVE MINICOY & AMINIDIVI ISLANDS

Shri P. Kelukutty Menon,
Secretary to Administrator,
Laccadive Minicoy & Aminidivi Islands,
Kozhikode.

(15) WEST BENGAL

Shri J.B. Sen,
Controller of Weights & Measures,
Government of West Bengal,
45, Ganesh Chandra Avenue,
3rd Floor, Calcutta-12.

(20) MANIPUR

Shri Pratap Singh,
Controller of Weights & Measures,
Manipur Administration,
Imphal.

(16) ANDAMAN & NICOBAR ISLANDS

Shri Puran Singh,
Secretary to the Chief Commissioner,
Andaman and Nicobar Islands,
Port Blair.

(21) PONDICHERRY

Shri J. Arlanda,
Controller of Weights and Measures,
Government of Pondicherry,
Pondicherry.

(17) DELHI

Shri H.L. Mehandru,
Controller of Weights & Measures,

(22) TRIPURA

Shri P. C. Banerjee,
Superintendent, Weights & Measures,
Tripura Administration,
Agartala.

Licensed Manufacturers, Dealers and Repairers of Weights and Measures (11)

Metric Measures has been publishing a series of lists of manufacturers, dealers and repairers of weights and measures, weighing and measuring instruments licensed by the Governments in the various States and Union Territories under their Weights and Measures (Enforcement) Act in their respective jurisdiction. This is the eleventh list. The first list appeared in the March 1959 issue.

Progressively, steps are being taken for licensing manufacturers, dealers and repairers in all States and further lists of licensees would be published in *Metric Measures* as this work progresses.

The number in brackets against the name of the State or Union Territory indicates the particular instalment number of the list of that State or Union Territory. The issues of *Metric Measures* in which previous lists appear are also shown suitably.

An analysis of the licensees, including the present list, shows that the total number of licensees, in 12 States and 3 Union Territories is 478 manufacturers, 1,645 dealers, 406 repairers. The details of published information are as follows :

Serial No.	State/ Union Territory	Licensees		
		Manu- fact- urers	Dealers	Re- pairers
(1)	Andhra Pradesh.	44	67	37
(2)	Bihar ..	20	69	34
(3)	Delhi ..	22	76	19
(4)	Himachal Pradesh.	1	3	0
(5)	Kerala ..	9	219	12
(6)	Madhya Pradesh	3	160	4
(7)	Madras ..	79	210	37
(8)	Maharashtra	60	162	106
(9)	Mysore ..	37	232	27
(10)	Orissa ..	8	13	0
(11)	Punjab ..	23	81	19
(12)	Rajasthan ..	16	69	18
(13)	Tripura ..	0	12	0
(14)	Uttar Pradesh	76	126	42
(15)	West Bengal	50	146	51
		478	1,645	406

ANDHRA PRADESH

In the July 1959 and January 1960 issues of *Metric Measures* lists of manufacturers, dealers and repairers of weights and measures in Andhra Pradesh were published. The following is a list of manufac-

turers, dealers and repairers subsequently licensed by the Government of Andhra Pradesh under the Andhra Pradesh Weights & Measures Enforcement Act 1958.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Anantrai Hirachand Doshi, Manufacturers of Scales, Savarkundla, Saurashtra.	Beam Scales
(2)	Bhagvannarayana Iron Balance Works, Dowleshwaram, East Godavari.	Beam Scales
(3)	Bihar Agricultural Industries Regd., Cantt Road, Khagaul (BATNA).	Weights
(4)	Deccan Moulding Factory, University Road, Hyderabad	Weights
(5)	Jaya Krishna Iron Industrial Works, Dowleshwaram ..	Beam Scales
(6)	Krishna Iron Works, Dowleshwaram	Beam Scales
(7)	Lucky Weights Works, Manufacturers of Brass Weights, Charkaman, Hyderabad-Dn.	Weights
(8)	National Moulding Factory, Manufacturers of Weights, Mushirabad, Hyderabad.	Weights
(9)	Om Industries, Industrial Area, Azomabad, Hyderabad	Weights
(10)	Panduranga Engineering Works, Tadepatri., East Godavari	Weights
(11)	Production-cum-Training Centre for Moulders Industrial Estates, Vijayawada.	Weights
(12)	Rajkamal Scale Co., Kumarwada, 4th Lane, Bombay-4	Beam Scales
(13)	Riaz & Bros., 134-138, Near Post Office, Sadar Bazar, Delhi-6.	Brass Weights, Scales, Platform machines, Counter Scales.
(14)	Sarfarazkhan (Prop: Central Metal Works, Manufacturers of Measures, Feelkhana, Hyderabad.	Measures
(15)	Seetarama Engineering Works, Manufacturers of Beam Scales, Dowlaishwaram.	Beam Scales
(16)	Surya Engineering Works, Warangal	Weights
(17)	Swamy Akvolu Industries, Lakkavaram post, Razola, East Godavari.	Weights
(18)	Watan Weights Works, Manufacturers of Weights, 22-6-118, Machilikaman, Hyderabad.	Weights

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Abdul Kareem Manyar, Iron Fabricator & Hardware Merchant, Adhoni.	Weights, Measures, Weighing and Measuring Instruments.
(2)	Adavala Satyanarayana & Sons, Dowlaishwaram	Weights, Measures, Weighing and Measuring Instruments.
(3)	Anjanaya W & M Depot, Vinayak Street, Tanali, Guntur Distt.	Weights, Measures, Weighing and Measuring Instruments.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(4)	Bhagwanarayana, Iron Balance Works, Dowlaishwaram	Weights, Measures, Weighing and Measuring Instruments.
(5)	Bombay Hardware Stores, 15-1-511, Siddiamber Bazar, Hyderabad.	Weights, Measures, Weighing and Measuring Instruments.
(6)	Bombay Scale Works, Barkatpura, Nizamabad	Weights, Measures, Weighing and Measuring Instruments.
(7)	Central Metal Works, 15-1-457, Feelkhana Camp Hyderabad.	Weights, Measures, Weighing and Measuring Instruments.
(8)	Chunduri Simbaiah, Pachipulusu Vari Lane, Guntur	Weights, Measures, Weighing and Measuring Instruments.
(9)	Everest Co., (Prop: Harigopal Munda,) Nizamabad ..	Weights, Measures, Weighing and Measuring Instruments.
(10)	Favourite French Polish Centre, Murlidhar Bagh, Hyderabad.	Weights, Measures, Weighing and Measuring Instruments.
(11)	Gelli Krishnamurthy Firm, Main Road, Vijayawada ..	Weights, Measures, Weighing and Measuring Instruments.
(12)	General Engineering Store, 5/308, Bellary Road, Ananthapur	Weights, Measures, Weighing and Measuring Instruments.
(13)	K. Jaggannadha Rao, 11/100, Main Road Vishakapatnam	Weights, Measures, Weighing and Measuring Instruments.
(14)	Jaya Krishna Iron Industrial Works, Dowlaishwaram ..	Weights, Measures, Weighing and Measuring Instruments.
(15)	Krishna Iron Works, Dowlaishwaram	Weights, Measures, Weighing and Measuring Instruments.
(16)	K. Maslahuddin, Old Beat Bazar, Warangal	Weights, Measures, Weighing and Measuring Instruments.
(17)	R. Mohan Brothers, Purane Haveli, Hyderabad	Weights, Measures, Weighing and Measuring Instruments.
(18)	Mohd Taqui Hussian, W & M Dealer, Secunderabad ..	Weights, Measures, Weighing and Measuring Instruments.
(19)	National Molding Factory, Maishirabad, Hyderabad ..	Weights, Measures, Weighing and Measuring Instruments.
(20)	Pappu Weerana, Dowlaishwaram	Weights, Measures, Weighing and Measuring Instruments.
(21)	Pullakhandam Puliah Son Form, Kaman Bazar, Khammam	Weights, Measures, Weighing and Measuring Instruments.
(22)	V. Pulliah Setty, Gandhi Bazar, Ananthapur	Weights, Measures, Weighing and Measuring Instruments.
(23)	Ragi Lingamurthy, Hardware Merchant, Osmangunj, Karimnagar.	Weights, Measures, Weighing and Measuring Instruments.
(24)	Rameshchandra Amurt Lal, Shroff Bazar, Ward 13, Door No. 640, Adhoni.	Weights, Measures, Weighing and Measuring Instruments.
(25)	Ranganayaka Iron Works, Dowlaishwaram	Weights, Measures, Weighing and Measuring Instruments.
(26)	Sanyasiah & Co., Main Road, Vishakapatnam	Weights, Measures, Weighing and Measuring Instruments.
(27)	Sadrudin John Mohammad, Hardware and General Merchant, Gandhi Road, Adilabad.	Weights, Measures, Weighing and Measuring Instruments.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(28)	Saraswathi Iron Balance Works, Dowlaishwaram	Weights, Measures, Weighing and Measuring Instruments.
(29)	C. Satyanarayana Murthy & Co., Vellabhai Road, Kakinada	Weights, Measures, Weighing and Measuring Instruments.
(30)	Shaik Abdul Wahab, Wahab Chowk, Tenali	Weights, Measures, Weighing and Measuring Instruments.
(31)	Shaik Aziz Mohiuddin, Ongole, Guntur District	Weights, Measures, Weighing and Measuring Instruments.
(32)	Star Scale Service, Khasba Bazar, Khammam	Weights, Measures, Weighing and Measuring Instruments.
(33)	Swamy Alvelu Industries, Razole Taluk, East Godavari	Weights, Measures, Weighing and Measuring Instruments.
(34)	Syed Hussian Scale Centre, Mahboobnagar	Weights, Measures, Weighing and Measuring Instruments.
(35)	Syed Mohiuddin, W & M Dealers, Mahboobnagar	Weights, Measures, Weighing and Measuring Instruments.
(36)	Syed Nadeem, W & M Dealer, Bakaram, Mushirabad, Hyderabad.	Weights, Measures, Weighing and Measuring Instruments.
(37)	Union Agency, 4-Vulugundamvari street, Kothapet, Guntur.	Weights, Measures, Weighing and Measuring Instruments.
(38)	S.K. Veeriah, Afzal Gunj, Hyderabad	Weights, Measures, Weighing and Measuring Instruments.
(39)	Venkateshwara Weights & Measures Karkhana, Gajulavari street, Salepata, Kakinada.	Weights, Measures, Weighing and Measuring Instruments.
(40)	Vijaya Iron Mart, Main Bazar, Adhoni	Weights, Measures, Weighing and Measuring Instruments.
(41)	T.L. Vishwanathiah & Bros., General Merchant, P.B. No. 4, Hindpur, Ananthapur Dist.	Weights, Measures, Weighing and Measuring Instruments.
(42)	Ch. Yegnaiah & Sons, Park Road, 10/363, Vijayawada	Weights, Measures, Weighing and Measuring Instruments.

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	Chunduri Sambaiah, Pachipulusu, Vari Lane, Guntur ..	Weights, Measures, Weighing and Measuring Instruments.
(2)	Crescent Scale Centre, (Prop. Syed Mohiuddin), Market Road, Mahboobnagar.	Weights, Measures, Weighing and Measuring Instruments.
(3)	Everest Co. (Prop. Harigopal Mundra), Ahmed Bazar, Nizamabad.	Weights, Measures, Weighing and Measuring Instruments.
(4)	D.R. Herman & Mohatta (India) Private Ltd., People's Building, Sir P.M. Road, Fort, Bombay-1.	Weights, Measures, Weighing and Measuring Instruments.
(5)	Hyderabad Dominion Scale Centre, W&M Repairer, Nirmal.	Weights, Measures, Weighing and Measuring Instruments.
(6)	Jamsheed Iron & Steel Co., Siddiambar Bazar, Hyderabad	Weights, Measures, Weighing and Measuring Instruments.

LICENSED MANUFACTURERS, DEALERS & REPAIRERS OF WEIGHTS & MEASURES (11)

Repairers (contd.)

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(7)	Kadambari Appa Swami, Gagulavari Street, Kakinada ..	Weights, Measures, Weighing and Measuring Instruments.
(8)	Khan & Co. (Prop: Mohd Muzaffer Khan, Station Road, Peddapalli	Weights, Measures, Weighing and Measuring Instruments.
(9)	Kojeti Subbiah, (Prop. Anjanya, W & M Depot, Venayaka Street, Tenali, Guntur.	Weights, Measures, Weighing and Measuring Instruments.
(10)	Pappu Veeraniah & Sons, Dowlaishwaram	Weights, Measures, Weighing and Measuring Instruments.
(11)	T.K. D. Prasad Babu & Co. (Prop: T. Suryanarayana Rao) Main Bazar, Mangalagiri, Guntur.	Weights, Measures, Weighing and Measuring Instruments.
(12)	Raja Scale Repairing Shop, Mandi Bazar, Warangal ..	Weights, Measures, Weighing and Measuring Instruments.
(13)	T. Rajesham, Old Beet Bazar, Warangal	Weights, Measures, Weighing and Measuring Instruments.
(14)	Shaik Abdul Wahab, Wahab Chowk Tenali, Guntur District.	Weights, Measures, Weighing and Measuring Instruments.
(15)	Iron Manufacturing Works, Ongole, Dist. Guntur ..	Weights, Measures, Weighing and Measuring Instruments.
(16)	Shaik Aziz Mohiuddin, Sk Meeran Saheb, Bestapalum, Bapatla.	Weights, Measures, Weighing and Measuring Instruments.
(17)	South India Scale Adjusting Centre (Prop: Mohd Taqui Hussian) Secunderabad.	Weights, Measures, Weighing and Measuring Instruments.
(18)	Swamy Alvalu Industries, Razole Taluk East Godavari	Weights, Measures, Weighing and Measuring Instruments.
(19)	Syed Scale Centre, Mahboobnagar	Weights, Measures, Weighing and Measuring Instruments.
(20)	Venkateshwara Scale Adjusting Centre, Karimnagar ..	Weights, Measures, Weighing and Measuring Instruments.
(21)	Yatam Chetty Uppalya, 9/78, Mandi Bazar, Warangal ..	Weights, Measures, Weighing and Measuring Instruments.

DELHI (6)

In the July and September 1959 and March, May and September 1960 issues of *Metric Measures* lists of licensed manufacturers, dealers and repairers of weights and measures in Delhi area were published. The following is a list of manufacturers, dealers and repairers subsequently licensed by the Delhi Administration.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Precision Machinery Co., Delhi, 8681, Partap Singh Building, Integral Parts of Weighing Machines Paharganj, New Delhi.	

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Associated Textile Engineers, Chawri Bazar, Delhi	Weights, Measures, Weighing and Measuring Instruments.
(2)	Delhi Milk & Sweets Merchants Association, Bara Bazar, Kashmere Gate, Delhi.	Weights, Measures, Weighing and Measuring Instruments.
(3)	Precision Machinery Co., 51, G. B. Road, Delhi-6	Weights, Measures, Weighing and Measuring Instruments.

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	Precision Machinery Co., 8681, Partap Singh Building, Paharganj, New Delhi.	Weights and Weighing Instruments.

KERALA (4)

In the November 1959, March and November 1960 issues of *Metric Measures* lists of licensed manufacturers and dealers of weights and measures in Kerala State were published. The following is a list of manufacturers, dealers, and repairers subsequently licensed by the Government of Kerala under the Kerala Weights and Measures (Enforcement) Act 1958.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Associated Industries & Engineering Corporation, Near Alwaye Settlements, U.C. College P. O., Alwaye.	Weights, Weighing and Measuring Instruments.
(2)	K. I. Jacob, Jacob's Engineering Works, Thampanoor, Trivandrum.	Weights and Measures.
(3)	Menco Electricals (P) Ltd., Industrial Estate, Olvakkot, Palghat District.	Weights.
(4)	Oorampallil Engineering Works, Mundakkal West, Quilon	Weights, Measures, Weighing and Measuring Instruments.
(5)	The Electrical & Allied Industries (Trav), Under Government Management, Kundara; Quilon District.	Weights, Measures, Weighing and Measuring Instruments.

Dealers

Sl. No.	Name and Address of Dealers	Details of Articles Sold
(1)	Abdulhussein Abulkader & Co., Iron & Hardware Merchants, Cochin-2.	Weights, Measures, Weighing and Measuring Instruments.
(2)	A. Abdul Khadir & Brothers, General Merchants, Punahur	Weights, Measures, Weighing and Measuring Instruments.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(3)	P.M. Abdul Kader, P.M. Stores, Hardware Merchants, Main Road, Tellicherry.	Weights, Measures, Weighing and Measuring Instruments.
(4)	P. Abdul Khadir, Pazhaya Veedu, Petta, Pathanamthitta	Weights, Measures, Weighing and Measuring Instruments.
(5)	K. Abdurahiman Kutty & C.A. Assoo, Hardware merchants, Big Bazaar, Calicut.	Weights, Measures, Weighing and Measuring Instruments.
(6)	C.P. Aboobacker, News Agent, Hardware Merchants, Big Bazaar, Calicut.	Weights, Measures, Weighing and Measuring Instruments.
(7)	A. K. Ahamed & Sons., Hardware Merchant, M.A. Road, Calicut-1.	Weights, Measures, Weighing and Measuring Instruments.
(8)	P. Alikutty, Hardware Merchant, Quilandy	Weights, Measures, Weighing and Measuring Instruments.
(9)	Badagara Hardware Stores, Court Road, Badagara	Weights, Measures, Weighing and Measuring Instruments.
(10)	A. Balakrishna Iyer & Co., Iron Merchants, Ernakulam	Weights and Measures.
(11)	K.C. Balakrishna Pillai, Hardware Merchant, Pathanapuram.	Weights, Measures, Weighing and Measuring Instruments.
(12)	K.C.V.V. Bank Stores, Kothamangalam	Weights, Measures, Weighing and Measuring Instruments.
(13)	Bharath Hardware Stores, Palace Road, Alwaye	Weights and Measures.
(14)	The Calicut Iron Stores, Moideen Palli Road, Calicut-1	Weights, Measures, Weighing and Measuring Instruments.
(15)	K. Chandrasekhara Pillai, General Merchant, Market Junction, Kottarakara (P.O.)	Weights, Measures, Weighing and Measuring Instruments.
(16)	K. Chidambaram, Sole Proprietor, M/s. General Agencies, Basin Road, Ernakulam.	Weights, Measures, Weighing and Measuring Instruments.
(17)	P.H. Chidambaram Iyer, 70 ft. Road, Ernakulam	Weights, Measures, Weighing and Measuring Instruments.
(18)	A.R. Chockalingam Chettiar Sons, Merchants, Market, Alwaye.	Weights, Measures, Weighing and Measuring Instruments.
(19)	N. Damodara Rao, Goldsmith Tools Merchant, Calicut-1	Weights (Brass).
(20)	K. Daniel, General Merchant, P.O. Puthoor, Kottarakara	Weights, Measures, Weighing and Measuring Instruments.
(21)	V.P. Davis, General Merchant, Mattancherry, Cochin-2	Weights and Measures.
(22)	Devi & Co., Big Bazaar, Calicut-1	Weights, Measures, Weighing and Measuring Instruments.
(23)	T.H. Ebrahim Karim & Co., Hardware Merchants, Perumbavoor.	Weights, Measures, Weighing and Measuring Instrument.
(24)	C.N. Govinda Pai, Merchant, North Parur	Weights, Measures, Weighing and Measuring Instruments.
(25)	A.N. Guna Shenoy & Bros., Hardware Merchants, P.B. No. 167, Cochin-2.	Weights, Measures, Weighing and Measuring Instruments.
(26)	A.N. Guna Shenoy & Sons, Hardware Merchants, Broadway, Ernakulam.	Weights, Measures, Weighing and Measuring Instruments.
(27)	Hajee E. Ebrahim Koya, Paint & Hardware Merchants, Near 2nd Rly. Gate, Calicut.	Weights, Measures, Weighing and Measuring Instruments.

Dealers (contd.)

Serial No.	Name and Address of Dealer	Details of Articles Sold
(28)	Hajee P. Kunhammed, General Merchant 161-162, Thiromana Bazaar, Villiappalli, Via Badagara.	Weights, Measures, Weighing and Measuring Instruments.
(29)	Hajee K. Mammed Koya, Paint & Hardware Merchants, Big Bazaar, Calicut.	Weights, Measures, Weighing and Measuring Instruments.
(30)	C. Hamsu, Janatha Hardwares, Cannanore	Weights and Measures.
(31)	N.R. Hariharan, Hardware Merchant, Big Bazaar, Palghat	Weights, Measures, Weighing and Measuring Instruments.
(32)	Hindusthan, Hardware Merchant, Cloth Bazaar Road, Ernakulam.	Weights, Measures, Weighing and Measuring Instruments.
(33)	Hindusthan Hardware Stores, Mattancherry, Cochin-2	Weights, Measures, Weighing and Measuring Instruments.
(34)	K.T. Joseph, St. Thomas Stores, Mundakkayom	Weights and Measures.
(35)	Kalliyath Hardwares, Main Road, Tirur	Weights, Measures, Weighing and Measuring Instruments.
(36)	Kamath & Co., Tellicherry	Weights, Measures, Weighing and Measuring Instruments.
(37)	Kamath & Co., Hardware Merchants, Swamimatom Road, Cannanore.	Weights, Measures, Weighing and Measuring Instruments.
(38)	Kanaparath Abdulla, Hardware Merchants, Jubilee Tank Road, Badagara.	Weights, Measures, Weighing and Measuring Instruments.
(39)	G. L. Kilikar, (V/1 (B) New Road, Cochin-2	Weights and Measures.
(40)	A. Krishna Bhat, Hardware Merchant, Cloth Bazaar, Ernakulam.	Weights, Measures, Weighing and Measuring Instruments.
(41)	Krishna Hardware Mart, Big Bazaar, Calicut-1	Weights, Measures, Weighing and Measuring Instruments.
(42)	C.P. Krishna Iyer & Sons, Hardware and Paint Merchants, Palayam Road, Calicut-1.	Weights, Measures, Weighing and Measuring Instruments.
(43)	Kulamullathil Kunhammed, Hardware Merchant, Kakka-til P.O., (Via) Nadapuram, Badagara Taluk.	Weights, Measures, Weighing and Measuring Instruments.
(44)	M.P. Kunhikannan, General Merchant, Court Road, Badagara.	Weights and Measures.
(45)	E. Kunhikannan Nair & Brother, Stationery Merchant, Kokkanasseri Bazaar, Payyannur, Cannanore Dist.	Weights, Measures, Weighing and Measuring Instruments.
(46)	K.C. Kuruvilla, Tobacco Merchant, Chengannur	Weights, Measures, Weighing and Measuring Instruments.
(47)	M.A.K. & Ittoli Saydali Koya, Hardware Merchant, Big Bazaar, Calicut.	Weights, Measures, Weighing and Measuring Instruments.
(48)	K.V. Mathew, Proprietor, K.V.M. Metal Works, Vaikom	Weights, Measures, Weighing and Measuring Instruments.
(49)	K.P. G. Menon, Sole Proprietor, M/s. Construction House, Post. Ottapalam.	Weights, Measures, Weighing and Measuring Instruments.
(50)	V.K. Menon & Co., Palayam Road, Calicut-1	Weights and Measures.
(51)	C. Mohammed, Hardware Merchants, Moideen Palli Road, Calicut.	Weights, Measures, Weighing and Measuring Instruments.
(52)	M.K. Mohammed Naina, Vessels Merchant, Chalai, Trivandrum.	Weights, Measures, Weighing and Measuring Instruments.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(53)	C. Mohammed Rashad, Baliapattam, Cannanore Dist. ..	Weights, Measures, Weighing and Measuring Instruments.
(54)	A.S. Money, V.P. Vilas, Parry & Co., Jn., Quilon	Weights, Measures, Weighing and Measuring Instruments.
(55)	Moonjelil Mercantile Trust, Merchants, & Commission Agents, Cheral P. O., Ernakulam Dt.	Weights, Measures, Weighing and Measuring Instruments.
(56)	Mootheden Brothers, Hardware Merchants, Punalur P.O., Quilon Dt.	Weights, Measures, Weighing and Measuring Instruments.
(57)	Mulanthuruthy Iron and Steel Industrial Co-operative Society Ltd., Mulanthuruthy P. O., Tripunithura ..	Weights, Measures, Weighing and Measuring Instruments.
(58)	C.S. Nair, General Merchant, Mylapra	Weights, Measures, Weighing and Measuring Instruments.
(59)	P.K. Narayana Pillai, General Merchant, Kulanada, Pandalam.	Weights, Measures, Weighing and Measuring Instruments.
(60)	K.R. Narayanan, Karippayil House, General Merchant, Market Road, Ernakulam.	Weights, Measures, Weighing and Measuring Instruments.
(61)	P. V. Padmanabha Prabhu, Sreemaruthu Hardware Stores, Broadway, Ernakulam.	Weights and Measures.
(62)	M.S. Pailo, Cochin Stores, Alwaye	Weights and Measures.
(63)	Palliveettil Mammed Koya & Bros., 9/88, Tobacco Street, Calicut.	Weights, Measures, Weighing and Measuring Instruments.
(64)	N.V.P. Philip, Neduvellil Bros., Hardware Merchant, Kanjirapally.	Weights, Measures, Weighing and Measuring Instruments.
(65)	P.K. Poullose, Pattasseril House, Hill Palace Road, Trippunithura.	Weights and Measures.
(66)	P.K. Pylo, Proprietor, Bonny & Co., 7/556, Court Road, Calicut-1.	Weights, Measures, Weighing and Measuring Instruments.
(67)	C.K. Raghavan, Krishna Hardware Stores, Badagara	Weights, Measures, Weighing and Measuring Instruments.
(68)	K.R. Rajan, Ilappam Moottil Veedu, Kannimelcheri, Kili-kolloor P.O., Quilon Dt.	Weights, Measures, Weighing and Measuring Instruments.
(69)	S. Rama Das Shenoy & Bros., General Merchants, Payyan-nur, Cannanore Dist.	Weights, Measures, Weighing and Measuring Instruments.
(70)	K.V. Ramachandra Iyer, Hardware Merchant, Palayam Road, Calicut-1.	Weights, Measures, Weighing and Measuring Instruments.
(71)	K.S. Ramiah Chetty & Brother, Palayam Road, Calicut-1	Weights, Measures, Weighing and Measuring Instruments.
(72)	C.K. Sankunni Nair, Hardware Merchant, Cloth Bazaar Road, Ernakulam.	Weights, Measures, Weighing and Measuring Instruments.
(73)	Saraswath Corporation (P) Ltd., 12/75, Palliarkavu Road, P.B. No. 143, Cochin-2.	Weights, Measures, Weighing and Measuring Instruments.
(74)	D. Sarvayhama Rao, General Merchant, Muttom Bazaar, Shertalai P. O.	Weights, Measures, Weighing and Measuring Instruments.
(75)	Scales & Services, 'Sree Villa', New Road, Calicut-6 ..	Weights, Measures, Weighing and Measuring Instruments.
(76)	Shakthi Metal Depot, 3/213, Mattancherry, Cochin-2	Weights and Measures.
(77)	K.A.V. Sheik Rowther, Hardware Merchant, Big Bazaar, Palghat.	Weights and Measures, Weighing and Measuring Instruments.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(78)	K.H. Shenoy & Co., Hardware Merchant, Main Road, North Parur.	Weights, Measures, Weighing and Measuring Instruments.
(79)	S.S. Sheriff, Sheriff Buildings, Panalur	Weights, Measures, Weighing and Measuring Instruments.
(80)	Sree Venkateswara Stores, Hardware Dealers, Tripunithurai	Weights and Measures.
(81)	K. S. Sukumaran, Hardware Merchant, Market, Road, North Parur.	Weights and Measures.
(82)	Sulaiman, C/o V.M. Ibrahim, Cycle Shop, Ernakulam North.	Weights and Measures.
(83)	K.P. Surendran & Bros., Palayam Road, Calicut	Weights, Measures, Weighing and Measuring Instruments.
(84)	P. Suria Pillai, Proprietor, M/s. The Jayaram Trading Co., Hardware Merchant, Chalai, Trivandrum.	Weights and Measures.
(85)	P.M. Syed Mohammed, Hardware Mart, Munnankulam Village, Adimaly Jn., Kottayam Dist.	Weights and Measures.
(86)	Thomas Chacko & Sons, Hardware Merchants, Thiruvella	Weights, Measures, Weighing and Measuring Instruments.
(87)	United Stores, Main Road, Tellicherry	Weights, Measures, Weighing and Measuring Instruments.
(88)	K.K. Unni, Hardware Merchant, North Parur	Weights and Measures.
(89)	Universal Hardware Stores, 9/615—Big Bazaar, Calicut	Weights, Measures, Weighing and Measuring Instruments.
(90)	Vadiyil Moideen Kutty Sons, Mohd. Abdul Rahiman Road, Calicut-1.	Weights, Measures, Weighing and Measuring Instruments.
(91)	C.M. Varieth & C. I. Iyyukutty, Hardware & Metal Merchants, Kunnamkulam, Trichur Dt.	Weights, Measures, Weighing and Measuring Instruments.
(92)	M. Veerannan Chettiar, Hardware Merchant, Main Road, Vellanghy, Nemmara.	Weights, Measures, Weighing and Measuring Instruments.
(93)	S. Velayudhan Pillai, "Mavelil", Chavara P.O., Quilon Dist.	Weights, Measures, Weighing and Measuring Instruments.
(94)	N. Vittala Pai, Hardware Merchant, East Bazaar, Kaya-mkulam.	Weights and Measures.

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	N. Appukuttan, Kulathil Purayidom, Vadayattukotta Ward, Quilon.	Weights, Measures, Weighing and Measuring Instruments.
(2)	Balakrishnan Asari, Kettungassery, Thekkethil Kottachachakom, Quilon.	Weights, Measures, Weighing and Measuring Instruments.
(3)	R. Bhaskaran Nair, Radhakrishna Motor Works, Quilon	Weights, Measures, Weighing and Measuring Instruments.
(4)	M.M. George, Kulathil Purayidom, Vadayattukotta, Quilon.	Weights, Measures, Weighing and Measuring Instruments.
(5)	* P.A. Hassan Kani, Proprietor, Kerala Mechanical Works, Near Power House, Changanacherry.	Balances.

Repairers (contd.)

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(6)	C.T. Joseph, Cheevalli House, Bolghatty, Ernakulam	Weights, Measures, Weighing and Measuring Instruments.
(7)	V. Krishna Prabhu, Scales Merchant, Edakattil House, 33/12/Alwaye.	Weights, Measures, Weighing and Measuring Instruments.
(8)	E.F. Mathew, Edathil House, Pezhala, Kadamakudi P.O., Ernakulam.	Weights, Measures, Weighing and Measuring Instruments.
(9)	Mighty Scale Co., Kurancherry	Weights, Measures, Weighing and Measuring Instruments.
(10)	A.S. Money, V.P. Vilas, Parry & Co., Jn., Quilon	Weights, Measures, Weighing and Measuring Instruments.
(11)	K.R. Rajan, Ilappamootil Veedu, Kunnimel Cheriyl, Kilikollor, Quilon.	Weights, Measures, Weighing and Measuring Instruments.
(12)	Sulaiman Vadakkath, Kalathuparathu House, Kallor, Ernakulam.	Weights, Measures, and Beam Scales.

MADHYA PRADESH (3)

In the May 1960 and July 1960 issues of *Metric Measures* lists of manufacturers and dealers of weights and measures in Madhya Pradesh State were published. The following is a list of manufacturers, dealers and repairers subsequently licensed under the Madhya Pradesh Weights and Measures (Enforcement Act, 1958).

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Agrawal Engineering Corporation, Gondapara, Bilaspur	Cast Iron Weights.
(2)	Agrawal Metal Works, Morar, Lashkar	Weights.
(3)	Arun Brothers, Opposite Bharat Talkies, Bhopal	Measures and Measuring Instruments.
(4)	Bharat Metal Works, 1115, Netaji Subhas Road, Andherdeo, Jabalpur.	Brass Weights & Measures.
(5)	Bharat Brush Traders, Lane Gaushala, Belanganj, Agra	Weights & Measures.
(6)	Bharat Metric Industries, 20-Jain Mandir Road, Chowk, Bhopal.	Weights.
(7)	Bhupendra Iron & Metal Works, Binod Mills Ltd., Ujjain	Weights.
(8)	Bombay Metal Works, Gous Darwaja, H. No. 1326, Near Bori Jamatkhana, Ujjain.	Brass & Cast Iron Weights.
(9)	Girwarlal Pyarelal, Sarafa Bazar, Morena	Weights.
(10)	Gwalior Metal Goods Producer Corporation, Danaoli, Lashkar (Gwalior).	Brass Weights.
(11)	Gulabchand Chhotey Lal, Freeganj, Agra	Weights.
(12)	Ice Machinery Mart, Barafkhana, Gwalior	Weights.
(13)	S. K. Iron Foundry & Engineering Co., Rambagh, Agra	Weights.
(14)	Jagdamba Iron Foundry, Belanganj, Agra	Weights.

Manufacturers (contd.)

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(15)	Malav Metal Industries, Bhindi Khow, Indore	Brass & Cast Iron Weights.
(16)	Mallomal Ram Pershad, Iron Brass Foundry & Engineering Works, Belanganj, Agra.	Weights.
(17)	Manohar Metal Works, Damoh	Brass & Cast Iron Weights.
(18)	Prabhat Iron Foundry, Freeganj, Agra	Weights.
(19)	Prakash Iron Industries, Venkat Road, Rewa	Cast Iron Weights.
(20)	Radhes Patra Udyog, Nai Sadak, Lashkar, Gwalior ..	Brass Weights.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
Indore Division		
(1)	R. R. Contractor & Co., Mahatma Gandhi Road, Mhow	Weights.
(2)	M. Fida Ali Mohammad Ali, Joara (District Ratlam)	Weights.
(3)	Hemchandra Dey & Co., Syaganj, Indore	Weights & Measures.
(4)	Jagannath Agrawal, Agrawal Book Depot, Mhow ..	Weights.
(5)	Jagdish Chandra Chandmal, Garg Niwas, Naya Bazar, Neemach City.	Weights and Measures.
(6)	M. M. Mantri & Co., Tijorigali, Siyaganj, Indore ..	Weights & Measures.
(7)	Modi Ramlal Balbhadra, Chhota Bazar, Mhow	Weights.
(8)	Ramesh Iron Works, 41, Malhar Ganj, Lohar Patti, Indore	Weights & Weighing Instruments.
Jabalpur Division		
(1)	Amratlal Brothers, Jabalpur	Weights, Measures, Weighing and Measuring Instruments.
(2)	Balkrishna Foolchand Kothari, Itwari Bazar, Chhindwara	Weights & Measures.
(3)	Birdichana Kanchhedilal, Kamanigate, Jabalpur ..	Weights, Measures, Weighing and Measuring Instruments.
(4)	Damoh District Regional Co-operative Marketing Society, Damoh.	Weights, Measures, Weighing and Measuring Instruments.
(5)	Gujarat Hardware Stores, Jabalpur	Weights, Measures, Weighing and Measuring Instruments.
(6)	Hathiwala Company, 33, Marhatal, Jabalpur	Weights & Measures.
(7)	Kunj Beharilal Ganeshprasad, Katni	Weights & Measures.
(8)	M. P. State Cooperative Marketing Society Ltd., 626, Wright Town, Jabalpur.	Weights & Measures.
(9)	Mediwala & Company, Jabalpur	Weights, Measures, Weighing and Measuring Instruments.
(10)	Mohammadali Badruddin, Sconi (Eastern Rly.)	Weights & Measures.
(11)	Moolchand Jain, Jain Store, Nainpur	Weights, Measures, Weighing and Measuring Instruments.
(12)	Swarnakar Vastra Bhandar, 775, Sarafa Bazar, Jabalpur	Weights, Measures, Weighing and Measuring Instruments.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
Bhopal Division		
(1)	Akbarali Mousinali & Bros., Shop No. 655, Maçhali Bazar, Sehore.	Weights, Measures and Weighing Instruments.
(2)	Ashta Cooperative Marketing Society Ltd., Ashta District, Sehore.	Weights & Measures.
(3)	Bapulal Gulab Chand Shujalpur, Mandi	Weights and Measures and Weighing Instruments.
(4)	Chairman Marketing Society Berasia, District, Sehore	Weights and Measures.
(5)	Chunnilal Munnalal, Pachore, (District Rajgarh) ..	Weights, Measures and Weighing Instruments.
(6)	Cooperative Marketing Society Seoni, Malwa	Weights, Measures and Weighing Instruments.
(7)	Dharam Prakash Iron Stores, Bus Stand, Bairagarh (Distt. Sehore.	Weights, Measures and Weighing Instruments.
(8)	Gowri Shankar Phoolchand, Namak Chowraha, Sehore	Weights, Measures and Weighing Instruments.
(9)	Haidarali Mulla Abdul Hussain, 4/5, Gandhi Road, Sehore.	Weights, Measures, Weighing and Measuring Instruments.
(10)	Hind Hardware Stores, Bhopal Road, Sehore	Weights, Measures, Weighing and Measuring Instruments.
(11)	Inder Stores Station Road, Bairagarh, Bhopal	Weights, Measures, Weighing and Measuring Instruments.
(12)	Kastoorchand Komal Chand, Near Police Station Rathi, Tahsil Budhani, District Sehore.	Weights, Measures and Weighing Instruments.
(13)	Krishna Das Jeewan Das Sarraf, 72 Sarrafa Bazar, Bhopal	Weights, Measures, Weighing and Measuring Instruments.
(14)	Kunjilal Ratanlal Agrawal, Gadarpura Chowk, Seoni-Malwa.	Weights, Measures and Weighing Instruments.
(15)	Manak Chand Gulab Chand Agrawal, Timarni Mandi, Distt. Hoshangabad.	Weights and Weighing Instruments.
(16)	Nanailal Brindawandas, Jawahar Chowk, H. No. 341-344, Bhopal.	Weights, Measures, Weighing and Measuring Instruments.
(17)	Shrikishan Das Rameshwar Prasad, General Cloth Merchant, Ashta, Distt. Sehore.	Weights, Measures and Weighing and Measuring Instruments.
(18)	Tapti Cooperative Marketing Society Multai District, Betul.	Weights.
(19)	Thanaram S/o Jawala Singh, Bagga, Bhopal Road, Sehore	Weights, Measures, Weighing and Measuring Instruments.
(20)	Zamin Hussain M. Kamalali, Chhopad Bazar, Barasia ..	Weights, Measures and Weighing Instruments.
Gwalior Division		
(1)	Abdul Rasool Fakroddin & Co., Seopur Kalan, District Morena.	Weights, Measures, Weighing and Measuring Instruments.
(2)	Bansidhar Vimal Chand Jain, Lohia Bazar, Laskar (Gwalior)	Weights, Measures and Weighing Instruments.
(3)	Betal Singh Chhatri Bazar, Lashkar	Weighing and Measuring Instruments.
(4)	Kisar Mohammed Khan Khurjawalan, Daulatganj, Lashkar	Weights, Measures, Weighing and Measuring Instruments.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(5)	Kumar Traders, Inderganj, Lashkar	Weights and Measures.
(6)	Lashkar Coop. Marketing Society Ltd. Lashkar	Weights, Measures and Weighing Instruments.
(7)	Mareshwari Iron Stores, Dabra	Weighing and Measuring Instruments.
(8)	Narendra Kumar Dharampal, Shivpuri	Weighing and Measuring Instruments.
(9)	National Engineering Works, Sindeki Chhawani, Lashkar	Weights.
(10)	Nehnamal Rajaram Iron Merchant, Lohia Bazar, Lashkar (Gwalior).	Weights.
(11)	Parasram Bhagwandas, Sadar Bazar, Morar Gwalior	Weights & Measures.
(12)	Ram Singh Dandotia, Morena	Weighing and Measuring Instruments.
(13)	Shyamlal Gupta C/o. Prem Sadan, Naisarak, Lashkar, Gwalior.	Weights, Measures, Weighing and Measuring Instruments.
(14)	Tambat Nib Factory, Maharani Laxmibai Road, Lashkar, (Gwalior).	Weights.
Raipur Division		
(1)	Anandilal Vishnuprasad Sharma, General Merchant, Ramdin Marg, Rajnandgaon.	Weights and Measures, Weighing and Measuring Instruments.
(2)	Hiralal & Bros, Station Road, Ganjpara, Raipur	Weights and Measures.
(3)	Madhya Pradesh Industries Private Ltd., Raipur	Weights and Measures.
(4)	National Mills and Electric Stores, Station Road, Raipur	Weights and Measures.
(5)	Natwarlal Dulabhadas, Dhantari	Weights and Measures, Weighing and Measuring Instruments.
(6)	New M. P. Mechanical Industries, Station Road, Drug	Weights and Measures.
(7)	Saligram Laxmi Narain Nathani, Sadar Bazar, Raipur	Weights and Measures.
(8)	Santosh Kumar Garg & Co., Mahatma Gandhi Road, Raipur.	Weights and Measures.
Rewa Division		
(1)	Baldeo Prasad Ishwardeen, 18/7, Fort Road, Rewa	Weights and Measures.
(2)	Balkrishna Mohanlal, Galla Mandi, Chhatarpur	Weights and Measures, and Weighing Instruments.
(3)	Dwarka Prasad Raghunandan Prasad, 29/7, Fort Road, Rewa.	Weights and Measures.
(4)	Ganesh Prasad Dwarka Prasad Agarwal, Gandhi Chowk Bazar, Chhataur.	Weights, Measures and Weighing Instruments.
(5)	Hanumana Cooperative Marketing Society, Ltd., Hanumana, Distt. Rewa.	Weights and Measures.
(6)	Jain Bros. Chowk Bazar, Satna	Weights, Measures and Weighing Instruments.
(7)	Janki Prasad Khairha, Bada Bazar Tikuria Mohalla, Panna.	Weights and Measures.
(8)	Kamta Prasad Sarjuprasad Bisati, 16/2 Fort Road, Rewa	Weights and Measures.
(9)	G. D. Khanna & Sons Co., Behariji Chowk, Satna	Weights and Measures.
(10)	Kamta Prasad Surgriva Prasad, Opposite Bank of Baghel Khand, Rewa.	Weights and Measures.
(11)	Kunj Behari Ram Manohar Saraf, Panna	Weights, Measures and Weighing Instruments.
(12)	Radhakrishnan Kamta Prasad, Fort Road, Rewa	Weights and Measures.
(13)	Ramdayal Chhakaodilal Gupta, Chawahatta Bazar, Rewa	Weights and Measures.
(14)	Wazir Chand Shyam Sunder, Chowk Bazar, Satna	Weights and Measures.

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	Hiralal Brothers Station Road, Gunjpara, Raipur	Weights and Measures, Weighing and Measuring Instruments.
(2)	G. D. Khanna & Company, Satna	Weights and Measures.
(3)	Swastik Engineering & Scientific Co., 257, Jawahargani, Garhafatak, Jabalpur.	Weights, Measures, Weighing and Measuring Instruments.
(4)	Wazir Chand Shyam Sunder, Satna	Weights, Measures, Weighing and Measuring Instruments.

MADRAS (5)

In the November 1959 and March, September and November 1960 issues of *Metric Measures* lists of licensed manufacturers, dealers and repairers of weights and measures were published. The following is a list of manufacturers, dealers and repairers subsequently licensed by the Government of Madras under the Madras Weights and Measures (Enforcement) Act, 1958.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Anandan Foundry, 5/7, Vadaagraram, Aminjikarai	Weights and Measures.
(2)	C. R. Bhoopathy Naicker, 9, Errabalu Chetty Street, Madras-1.	Conical Measures (litres).
(3)	Dilawar-Akbar Industrial Works (State aided), 1/126, Moore Street, Madras-1.	Weights and Measures
(4)	Dharaniraj Cottage Industries, R. C. M. Lay Out, Petal Road, Coimbatore-9.	Litres.
(5)	Everest Engineering Works, 169, Waltax Road, Madras-1	Weights and Measures
(6)	P. Kannappa Naicker, No. C. 60, Adam Sahib Street, Royapuram, Madras.	Conical type Measures.
(7)	Kitabi Hardware Stores, Hardware & Tools Merchants, 12-13, Devaraja Mudali Street, Madras-3.	Measures (litres).
(8)	V. K. Kuppuswamy Pillai, 54, Gandhi Road, Vellore, N. Arcot Dt.	Weights.
(9)	Krishna Brass Foundry, 17/4, Nelson Manicka Mudali Road, Aminjikarai, Madras-29.	Weights and Measures.
(10)	A. Kurban & Co., 21-A, Errabalu Chetty Street, Madras-1	Measures (litres).
(11)	Madras Weights Manufacturing Company, 226, Govindappa Naicken Street, Madras-1.	Bullion Weights.
(12)	N. Mohamed Kasim, Hayath Industries, 7, Kandappa Chetty Street, Madras-1.	Weights, Measures and Measuring Instruments.
(13)	New Royal Engineering Works, 32/6 Katpadi Road, N. Arcot Dt.	Weights and Measures.
(14)	Shanmugam Industries, 64/65, Nainappa Naicken Street, Madras-3.	Weights and Measures.
(15)	South India, Gold Weights Works, 10, Yegappa Chettiar Lane, Karaiduki-1.	Bullion Weights.
(16)	S. Srinivasan, 65, Janadranar Street, Madras-19	Weights.
(17)	P. E. Thanikachalam, 121, Waltax Road, Jattapuram, Madras-1.	Weights and Measures.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	K. A. Abdul Hameed Khan, 9, Bazar Street, Chidambaram, South Arcot District.	Weights and Measures.
(2)	A. M. Abdul Malik, Bharath Hardware Stores, 10, Eda Street, Tiruvannamalai, North Arcot District.	Weights and Measures.
(3)	Anandan alias Krishnamurthi Chetty, 10, Eda Street, Tiruvannamalai, North Arcot, District.	Weights and Measures.
(4)	A. K. Arunachalan Chetty, 2/73, Bazar Street, Uthukottai Trivellore Taluk, Chingleput, District.	Weights and Measures, Scales and Balances.
(5)	Assiya Khanam, Prop. The Eastern Trading Co., 5, Linghi Chetty Street, Madras-1.	Weights and Measures.
(6)	V. P. Bala Krishnan Chettiar, 7, Bazar Street, Kallakurichi, South Arcot District.	Weights and Measures.
(7)	C. S. Balakrishnan, Opp. National Medical Stores, Gandhi Road, Arkonon, N. Arcot District.	Weights and Measures.
(8)	C. R. Bhoopathy Naicker, 9, Errabalu Chetty Street, Madras-1.	Conical Measures (Litres).
(9)	Dawood Ali & Co., 1/34, Errabalu Chetty Street, Madras-1.	Measures.
(10)	Deen Stores, 117, Bazar Street, Vridhachalam, South Arcot District.	Weights and Measures.
(11)	Dharaniraj Cottage Industries, 25/585, Range Gowder St., Coimbatore-1.	Litre.
(12)	Dhanalakshmi Coffee Works, 41, Old Taluk Office Street, Tirukoilur, South Arcot District.	Weights and Measures.
(13)	P. T. Doraiswamy Chettiar, 212, Gandhi Road, Kancheepuram, Chingleput District.	Weights and Measures.
(14)	S. Ekambaram, M/s. India Scales, 45, E. H. Road, Vysarpady, Madras-12.	Weights, Measures and Scales.
(15)	T. S. Fidaally & Co., 344, Rasappa Chetty Street, Madras-3	Weights and Measures.
(16)	M. Govindarajan, 1/61, Rasappa Chetty Street, Madras-3	Weights and Measures.
(17)	M. E. Govindarajulu Chetty, 116, Bazar Street, Chingleput	Weights and Measures.
(18)	India Hardware Stores, Bazar Street, Chidambaram, South Arcot District.	Weights and Measures.
(19)	Kaliappa Nadar & Sons, 195 & 296, Big Bazar Street, Dindigul, Madurai District.	Weights and Measures.
(20)	A. Kandaswamy Sons, Hardware Merchants, 18, West Sannadhi, Chidambaram, South Arcot Dt.	Weights.
(21)	P. Kaniappa Naicker, 60, Adam Sahib Street, Royapuram, Madras.	Conical Measures.
(22)	Krishna Brass Foundry, 17/4, Nelson Manickar Mudaly Road, Aminjikarai, Madras-29.	Weights and Measures.
(23)	Pooshnam Bros., 153-154, Market, West Tambaram, Madras.	Weights and Measures.
(24)	B.M. Krishnan, 31, Thana Street, Purasawalkam, Madras-7	Weights and Measures.
(25)	V. K. Kuppuswamy Pillai, 54, Gandhi Road, Vellore, N. Arcot.	Weights and Measures.
(26)	A. Kurban & Company, 21-A, Errabalu Chetty Street, Madras-1.	Litres.
(27)	K.A. Madhar, 2/93, Moore Street, Madras-1	Weights.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(28)	K.K. Manicka Achary, 65, Tennamaram Street, Vellore, N. Arcot.	Weights.
(29)	M. K. Mohamed Abdul Khadar, 89, Linghi Chetty St., Madras-1.	Weights.
(30)	N. Mohamed Industries, Huyath Industries, 7, Kandappa Chetty Street, Madras-1.	Weights & Measures.
(31)	K. M. Mohamed Sheik Dawood, No. 12-A, Dr. Naimathullah Sahib Street, Triplicane, Madras-5.	Weights.
(32)	Myers Sales Corporation, 9/22-C, Broadway, Madras-1	Weights & Measures.
(33)	Mysore Engineering Corporation, 79/10, Sembudoss Street, Madras-1.	Weights & Measures.
(34)	R. M. Nagappa Thevar and G. V. Sankarasubbu, 6/105, Panchayat Board Road, Sulur P.O., Coimbatore Dt.	Iron Weights.
(35)	P. E. Nataraju Chetty, 181, Nianiappa Naicker Street, Madras-1.	Weights, Measures & Scales.
(36)	K. Natesa Chetty, 279, Rasappa Chetty Street, Opp. Kandaswamy Temple, Madras-3.	Weights & Measures.
(37)	New Royal Engineering Works, 32/6, Katpadi Road, Vellore.	Weights & Measures.
(38)	New Weights Company, 24, Errukkancheri High Road, Madras-11.	Weights & Measures.
(39)	Pachiappa Mudaliar & Sons, Maligai, 62, Bazaar Street, Wandiwash, South Arcot Dt.	Weights, Measures and beam scales.
(40)	V. R. Rajamanicka Chettiar, Iron Merchant, 175, Bazaar Street, Vridhachalam.	Weights & Measures.
(41)	A. S. S. Prakasam, 31, Market Street, St. Thomas Mount, Madras-16.	Weights, Measures, Weighing and Measuring Instruments.
(42)	M. K. Rajanna Chetty, 194-A, Nianiappa Naicken St., Madras-3.	Weights & Measures.
(43)	T. P. Rajamanickam, 60, Chetty Street, Tirupathur, North Arcot Dt.	Weights & Measures.
(44)	Rao Sahib K. A. MAA. Kaliappa Nadar & Company, 80/81, Clock Tower, Tiruchirapalli-8.	Weights & Measures, Weighing and Measuring Instruments.
(45)	Rao Sahib KAMA Kaliappa Nadar & Sons, 78/79, High Road, Tirunelveli.	Weights & Measures.
(46)	V. Rathakrishna Chetty, 194, Santhapet, Gudiyatham, North Arcot Dt.	Weights, Measures, Weighing & Measuring Instruments.
(47)	A. Rathinam Chettiar, Iron Merchant, 108, Bazar Street, Wandiwash.	Weights, Measures & Measuring Instruments.
(48)	P. E. Rubalinga Chetty, 103, Rasappa Chetty Street, Madras-2.	Weights & Measures.
(49)	C. S. Sambanda Mudaliar, Kanakam Stores, 9, Cutcheri Road, Kattumannarkoil.	Weights & Measures.
(50)	Service Industrial Works, 33/2, Katpadi Road, Vellore, N. Arcot Dt. Branch :-278, Waltax Road, Madras-3.	Weights.
(51)	A. P. M. Shahul Hameed Marakayar & Sons, Exporters & Importers, 52, Lebbai Street, Pudupet, Mount Road, Madras-2.	Weights.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(52)	Shanmugham Industries, 64/65, Nainiappa Naicken Street, Madras-3.	Weights & Measures.
(53)	S. O. Shemsudeen Sahib, Hardware Merchant, 74-75, West Car Street, Chidambaram, South Arcot Dt.	Weights & Measures.
(54)	S. Srinivasan, 62, Jandranar Street, Madras-19	Weights.
(55)	K. M. Thambu Reddy, 59, Gandhi Road, Arkonam, N. Arcot Dt.	Weights & Measures.
(56)	S. M. Thandavamurthi Nayagar, 61, Chinna Amman Koil Street, Chingleput.	Weights & Measures.
(57)	P. E. Thanickachalam, 118, Rasappa Chetty Street, Madras-3.	Weights & Measures.
(58)	Tiherbhai, Kitabi Hardware Stores, 12-13, Devaraja Mudali Street, Madras-3.	Litres.
(59)	Venkateswara Hardware Stores, 25/48, Fort Main Road, Shevapet, Salem.	Weights & Measures.
(60)	G. Venugopal Chetty, G.N.T. Road, Gumudipoondy, Chingleput Dt.	Weights & Measures.
(61)	Vummidi Bangaru Chetty Sons, 28, China Bazaar, Madras-1	Bullion Weights.
(62)	Zainulabudeen, 128/2, Manicka Maistry Street, Madras-14	Weights,
(63)	Zakindin, Badar Bros., 28, Perianna Maistry Street, Madras-1.	Weights, Measures (Litres) and Platform Scales.

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	A. Hirudayaswamy Pillai, 6/6, Abbaswami Naidu Street, Redfields, Coimbatore.	Scales and Weighing machines.
(2)	C. M. Joseph, 3rd Lane, Portuguese Church Street, Madras-1.	Platform Scales and Weighing Instruments.

MAHARASHTRA (2)

In the list published in November 1960 issued of *Metric Measures* the first instalment of licensed manufacturers, dealers and repairers was given. This list contains licensed manufacturers and repairers subsequently licensed under the Bombay Weights and Measures (Enforcement) Act, 1958. Separate list for Gujarat is not yet available and it is hoped to publish it in the next issue.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Adarsh Engineering P. Ltd., Shivaji Road, P.O. Shri Ram-pur, Dist. Ahmednagar.	Weights.
(2)	Arvind & Suresh Engg. Works, Near Agaram Devi, Subhash Road, Nagpur-2.	Cast Iron Weights.

Manufacturers (contd.)

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(3)	Avery Company of India (Private) Ltd., 16, Dougal Road, Ballard Estate, Bombay-1.	Weights, Measures, Weighing and Measuring Instruments.
(4)	Bajarang Metal Works, Itwari Bazar, Nagpur-2	Brass Weights.
(5)	Bharat Home Industries, C/o United Casting, E. 2131, Vikram Nagar, Kolhapur.	Cast Iron Weights.
(6)	Bharat Litre Mfg. Works, 43, Suleman Kasam Mitha Chawl, Round Gate, Duncan Road, Bombay-8.	Conical Capacity Measures.
(7)	Behre Mullaji Shop, 'Street Lamp Works' Bhandara Road, Itwari, Nagpur.	Conical Capacity Measures.
(8)	Central Metal & Wire Products, 60, Lamington Road, Opp. Maratha Mandir, Bombay-8.	Weights.
(9)	Fakruddin Abdulhusain, 72, Bapti Road, Mirza Chawl, Bombay-3.	Conical Capacity Measures.
(10)	Gothi Iron & Metal Works, Ltd., Shingada Tank, Nasik.	Weights.
(11)	M.K. Chavan & Sons, 1905, Tiwandha, Nasik	Weights.
(12)	Imperial Iron Works, 6th Kumbharwada, Kharwa Galley, Bombay-4.	Weights.
(13)	I.C.A. Scale Manufacturing Co., 13, Shri Niketan, Queen's Road, Bombay-1.	Weighing Instruments.
(14)	Y.M.C. Industrial Works, 2015, Yeshpushp 'Rajarampuri, 6th Lane, Kolhapur.	Cast Iron Weights.
(15)	Jayashree Metal Corporation, Kumbharwada Cross Lane, D'Souza Street, Vadgadi, Bombay-3.	Weights.
(16)	Kolte Engineering Works, Shop, Bargaon Road, Wardha.	Weights.
(17)	Krishna Co., 738, Shukrawar Peth, Poona-2.	Weights.
(18)	Laxmi Engineering Works, 197, Corner of Grant Road, Bombay-8.	Weights.
(19)	Luhar Rana Trikam Makwana, Kumbharwada 4th Lane, Dadabhai Parsi Bldg., Bombay-4.	Beam Scales.
(20)	Modern Foundry & Machine Works Ltd., Station Road, Ahmednagar.	Weights.
(21)	Mohamed Ismail Tin Factory, Near O.S. Mills, Compound, Water Tank, Nanded.	Conical Measures.
(22)	Mercury Iron & Steel Co., Pvt., Ltd. Engineers Founders, and Contractors, Globe Mills Passage, Cross Lane, Bombay-13.	Cast Iron Weights.
(23)	Nadirshaw & Bros., Silver Talkies Bldg., Khetwadi Back Road, Bombay-4.	Cast Iron Weights.
(24)	M.M. Nasib, 18/2, Kamathipura, Bombay-3.	Conical Capacity Measures.
(25)	M. Nazir & Sons, Haji Kasam Chawl, Duncan Road, X Lane, Bombay.	Weights and Weighing Instruments.
(26)	Parvat Revji Mistry, Malegaon Motor Stand, Panchavati, Nasik.	Beam Scales.
(27)	Patil Iron & Brass Works, Panchavati, Nasik	Weights.
(28)	Pimple Mechanical Works, Bassim Motor Stand, Akola (M.S.).	Cast Iron Weights.

Manufacturers (contd.)

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(29)	Prabhat Foundry, 689, Sadashiv Peth, Poona-2 ..	Cast Iron Weights.
(30)	Reliable Iron & Mechanical Works, Pipe Line, Vakola, Santacruz, Bombay-55.	Weights.
(31)	Ripon Road Iron Foundry, Lamington Road, North Alana, Compound, Opp: Agripada Police Station, Bombay-11.	Weights.
(32)	Saple's Scale Manufacturing Co. (Pr.) Ltd., 180-B, Gaiwadi, Girgaum Road, Bombay-4.	Weights and Weighing Instruments.
(33)	B.G. Shinde & Co., 735, Shukrawar Peth, Poona-2 ..	Weights.
(34)	Siesta Industrial & Tracing Corpn., Bail Bazar, North Kurla, Bombay-70.	Cast Iron Weights.
(35)	Standard Mechanical Works, Jetha Street, Patel Compound, Lamington Road, Bombay-8.	Weights.
(36)	Union Metal Works, 28/30 A, Dhaku Prabhu Wadi, Ghorupdeo, Bombay-10.	Weights.
(37)	D.L. Vaid, 202, Cutlery Bazar, Bombay-3	Bullion & Brass Weights.

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	Abdul Rehman Chikte, C/o Industries Chemicals & Adhesives, 10, Sussex Rd. Byculla, Bombay-27.	Weights Measures and Weighing Instruments.
(2)	Arkay Traders No. 5, Gustad Chambers, Jail Rd. (North), Opp. J.J. Hospital Gate No. 6, Bombay-9.	Weights, Measures and Weighing Instruments.
(3)	Asgarally Akberally Kantawalla Hakim, 448, Madhavrao, Rokde Rd., Bombay.	Weights, Measures and Weighing Instruments.
(4)	Asia Engineering Corporation No. 4, Gustad Chambers, Jail Rd., Opp. J.J. Hospital Gate No. 6, Bombay-9.	Weights, Measures and Weighing Instruments.
(5)	D. H. Bagamkar, Karnal Chowki, Namdeo Mandir, Sangli.	Weights, Measures and Weighing Instruments.
(6)	Bansilal & Co., Main Road, Nasik City	Weights and Measures and Weighing Instruments.
(7)	B.A., & Brothers, 175, Kazi Syed St., Dhoble Bldg., Mandvi, Kolwada, Bombay-3.	Weights, Measures & Weighing Instruments.
(8)	M.C. Brothers, 2nd Bhoiwada Lane, Bhuleswar, Bombay-2	Weights, Measures & Weighing Instruments.
(9)	Crown Engineering Corporation, Shop No. 39, 1st Ghogari, Mohalla, Near Paydhuni, Bombay-3.	Weights Measures, and Weighing Instruments.
(10)	Damodar Bhikabhai Kantawalla, 4-A, Masjid Siding Rd., Dana Bunder, Opp: Sailors' Home, Bombay-9	Weights, Measures and Weighing Instruments.
(11)	Fidaali Gulamali, 163, Janjkar Street, Bombay-3 ..	Weights, Measures and Weighing Instruments.
(12)	B.T. Ghatse Hattimahal Road, Medhi Building, Kolhapur	Weights, Measures and Weighing Instruments.
(13)	Gold Star Engineering Co., Sherir Baug, B' Block, Shop No. 10, Babula Tank Road, Opp. J.J. Hospital Gate, No. 5, Bombay-9.	Weights, Measures and Weighing Instruments.
(14)	Gurudatta Workshop, 79, Sidheshwar Peth, Sholapur.	Weights, Measures and Weighing Instruments.

Repairers (contd.)

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(15)	Ibrahim Mulla Abdual Tayeb, 69, Sarang, Street, Bombay-2	Weights, Measures and Weighing Instruments.
(16)	G.A. Kantawala, 254, Ripon Rd., Sajan Bldg., Bombay-8	Weights, Measures and Weighing Instruments.
(17)	A.R. Kantawalla, Dhobi Galli, Mohmadi House, Bombay-3	Weights, Measures and Weighing Instruments.
(18)	N.S. Kantawalla, 175, Dimtimkkur Rd., Shop No. D-2, Bombay-8.	Weights, Measures and Weighing Instruments.
(19)	M.G. Kotekar, Somwar Peth, Hattimahal Road, "C" Ward, Kolhapur.	Weights, Measures, and Weighing Instruments.
(20)	H.R. Khan (Chopdkar), Repairing Workshop, Karvand Road, Shirpur, (Dist. W. Khandesh).	Weights, Measures and Weighing Instruments.
(21)	Krishna Company, 738, Shukrawar Peth, Poona-2 ..	Weights, Measures and Weighing Instruments.
(22)	Manohar Co., 736, Shukrawar Peth, Poona-2	Weights, Measures and Weighing Instruments.
(23)	Markanday Workshop, 79, Sidheshwar Peth, Sholapur ..	Weights, Measures and Weighing Instruments.
(24)	A.M. Master & Co., Haiderali Kasamji Chawl, 179/81, Janjkar Street, Bombay-3.	Weights, Measures and Weighing Instruments.
(25)	N. J. Mehta & Co., 10, Keshavji Naik Road, Laxmi Niwas, Bombay-9.	Weights, Measures and Weighing Instruments.
(26)	Misrilal Motilal, 71, Sarang Street, Bombay-3	Weights, Measures and Weighing Instruments.
(27)	Mohamed Ibrahim Fakirsaheb, Chowdhari, 79, Sidheshwar Peth, Sholapur.	Weights, Measures and Weighing Instruments.
(28)	Mulji Laxmidas & Co., 350, Samuel Street, Bombay-3 ..	Weights, Measures and Weighing Instruments.
(29)	National Scale Co., Gokuldas Pasta Road, Dadar, Bombay-14.	Weights, Measures and Weighing Instruments.
(30)	Nobval Scale Works & Co., Farida Manzil, Shop No. 7, 26, Byculla Station Rd., Bombay-41.	Weights, Measures, and Weighing Instruments.
(31)	Ostwal Brothers, 124, Vakhar Bhag, Santli	Weights, Measures and Weighing Instruments.
(32)	Pandurang Workshop, 1309, Tangastand, Pandharpur ..	Weights, Measures and Weighing Instruments.
(33)	H.Z. Parbatani Kantawalla, Gokuldas Pasta Road, Dadar, Bombay-14.	Weights, Measures and Weighing Instruments.
(34)	J.M. Parbatani Kantawalla, 3, Gokuldas Pasta Road, Dadar Bombay.	Weights, Measures and Weighing Instruments.
(35)	Prakash Co., 65, Vetal Peth, Poona	Weights, Measures and Weighing Instruments.
(36)	Ram Samartha Workshop, Kandajiwadi, Opp. J.R. City High School, Sakri Rd., Dhulia, (West Khandesh).	Weights, Measures and Weighing Instruments.
(37)	Ram & Co., 88/90, Yateem Manzil, Dadasaheb Phalke Rd., Dadar, Bombay-14.	Weights, Measures and Weighing Instruments.
(38)	Ravji Ramchandra & Co., Shop No. 56, Surat Street, Dana Bunder, Bombay-9.	Weights, Measures and Weighing Instruments.

Repairers (contd.)

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(39)	Repon Road Iron Foundry, Lamington Road (North) Allana Comp. Opp. Agripada Police Station, Bombay-11.	Weights.
(40)	Saple's Scales Mfg. Co. (P) Ltd., 180, B, Gaiwadi, Girgaum, Road, Bombay-4.	Weights, Measures and Weighing Instruments.
(41)	Shankar Bala Dusane's Workshop, Premises of Pophale Ginning & Pressing Factory, Mosum Bridge, Malegaon, Dist. Nasik.	Weights, Measures and Weighing Instruments.
(42)	S.F. & Company, 1481, Shukarwar Peth, Poona-2	Weights, Measures and Weighing Instruments.
(43)	Union Metal Works, 28/30, A, Dhaku Prabhu Wadi, Ghorapadeo, Bombay-10.	Weights, Measures and Weighing Instruments.
(44)	D.L. Vaid, 202, Cutlery Bazar, Bombay-3	Weights, Measures and Weighing Instruments.
(45)	Vasani Devji Rajani, 142, Upper Duncan Rd., Bombay-8	Weights, Measures and Weighing Instruments.
(46)	Vishwas Company, 757, Shukrawar Peth, Poona	Weights, Measures and Weighing Instruments.

PUNJAB (7)

In the July and September 1959, March, May, July and September 1960 issues of *Metric Measures* lists of manufacturers, dealers and repairers of weights and measures in the Punjab State were published. The following is a list of manufacturers, dealers and repairers subsequently licensed by the Government of Punjab under the Punjab Weights and Measures (Enforcement) Act, 1958.

Serial No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Bharat Metal Industries, Near Railway Station, Bhiwani	Cast Iron Weights
(2)	S.C. Engineering Company, Miran Kot Road, Amritsar	50 kg to 100 g.
(3)	Fort Industrial Corporation, G.T. Road, Ludhiana	Weighing instruments of specified capacities and type. Weigh-bridge capacity 20 tonnes. Platform machines capacity 500 kg. Counter machines up to 10 kg.
(4)	Indian Scale Industries, Kali Bari Road, Ambala Cantt.	Measuring tapes
(5)	Krishan Kishore Kamal Kishore, Saban Bazar, Ludhiana	Spring balance capacity 100 kg circular dial type.
(6)	Mukanda Mal Ram Ditta Mal, Industrial Area, Yamuna Nagar.	Beamscales : Class C up to 5 kg. Class D upto 100 kg. Cast Iron Weights 100 g to 50 kg.

LICENSED MANUFACTURERS, DEALERS & REPAIRERS OF WEIGHTS & MEASURES (11)

Manufacturers (contd.)

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(7)	Sansar Engineering Company, Aliwal Road, Batala	Cast Iron Weights 50 kg to 100 g.
(8)	Sharman Steel Works, Ambala City	Cast Iron Weights 100 g to 50 kg.
(9)	Thapar Industries, Phulahi Bazar, Ludhiana	Measuring tapes

Dealers

Serial No.	Name and Address of Dealer	Details of Articles Sold
(1)	Ashoka Cottage Industries, Saptu Road, Ambala City	Weights, Measures, Weighing and Measuring Instruments.
(2)	Bansal Iron and Mill Stores, Hospital Road, Nabha (Patiala)	Weights and Measures.
(3)	Behari Lal & Sons, G.T. Road, Mandi Gobindgarh	Weights, Measures, Weighing and Measuring Instruments.
(4)	Des Raj Roshan Lal, Commission Agent, Shahzadpur	Weights, Measures, Weighing and Measuring Instruments.
(5)	Dev Raj Trunk House, Mandi Road, Jullundur City	Weights, Measures and Beam scales.
(6)	General Hardware Stores, Kasera Bazar, Jullundur City	Weights, Measures and Beam scales.
(7)	Ishwar Dayal Bant Ram, Iron Merchants, Bareta Mandi	Weights, Measures, Weighing and Measuring Instruments.
(8)	Nathu Mal Kishori Lal, Tohana, Distt. Hissar	Weights, Measures and Beam scales.
(9)	Naurata Ram Babu Ram, Naraingarh	Weights, Measures, Weighing and Measuring Instruments.
(10)	Ram Ditta Mal Mukanda Mal, Yumana Nagar	Cast Iron Weights. 100 g to 50 kg.
(11)	Ram Labhaya Inder Mohan, Bazar Banawala, Nakodar, Jullundur.	Weights, Measures and Beam scales.
(12)	Subash Machinery & Oil Stores, G.T. Road, Jullundur City	Weights, Measures and Beam scales.

Repairers

Serial No.	Name and address of Repairer	Details of Articles repaired
(1)	Gokal Chand, Maur Mandi, Distt. Bhatinda	Weights and Measures of Length and Capacity.

UTTAR PRADESH (4)

In the July, September and November 1960 issues of *Metric Measures* lists of manufacturers, dealers and repairers of weights and measures in Uttar Pradesh were published. The following is a list of manufacturers, Manufacturers

dealers and repairers subsequently licensed by the Government of Uttar Pradesh under the Uttar Pradesh Weights and Measures (Enforcement) Act, 1959.

Serial No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Agrawal Iron Works, Moti Lal Nehru Road, Agra	Weights, Measures and Weighing Instruments.
(2)	Balance Works Private Ltd., D35/66-B, Jangamban, Varanasi	Brass Weights from 1 mm. to 10 kg. and Liquor Measures.
(3)	S. Iron Foundry and Engineering Works, Ram Bagh, P.O. Jamuna Bridge, Agra.	Iron Weights 50 kg., 10 kg., 5 kg., 2 kg., 1 kg.
(4)	Kailash Foundry and Engineering Works, Delhi Road, Meerut.	Weights and Measures.
(5)	Kerey Private Ltd., 335, Nadaswar, Varanasi Cantt.	Weights and Weighing Instruments.
(6)	Madau Cottage Industries, Near Kumar Ashram Outside Saorab Gate, Meerut.	Weights and Measures.
(7)	Mahabir Rolling Mills, Factory Area, Fazalganj, Kanpur	Weights and Measures, Weighing Instruments.
(8)	Millsko Iron and Steel Foundry, 359, Civil Line, Jhansi	Weights.
(9)	Narain Pur Iron Works, Station Road, Moradabad	Weights and Measures of all Denominations.
(10)	New India Brass & Steel Industries, Khari Kuwan, Hospital Road, Agra.	Weights and Measures.
(11)	Singhal Iron Foundry, Opposite Bus Stand, Farah, Mathura	Brass and Cast Iron and Bronze Weights
(12)	Navin Engineering Works, 2A/Tripolia (Mira Gunj), Allahabad.	Cast Iron Weights.
(13)	B.L. Sinha & Sons, Jhutha Ram Ka Pathak, Kinari Bazar, Agra.	Weights and Weighing Instruments.
(14)	Vijai Iron Industries, 114/44, Brahma Nagar, Kanpur	Weights and Measures.

Dealers

Serial No.	Name and Address of Dealer	Details of Articles Sold
(1)	Abdur Rehman Wajahat Husain, Shahganj, Lucknow	Weights, Measures, Weighing and Measuring Instruments.
(2)	Agrawal and Sons, Dron Merchant, Lakhimpur, Khivi	Weights.
(3)	R.P. Agarwal & Sons, Sri Ram Road, Lucknow	Weights & Measures.
(4)	Ali Bux Batiwaris Ali & Sons, No. 16, Thathari Bazar, Allahabad.	Weights, Measures, Weighing and Measuring Instruments.
(5)	Allahabad Iron Stores, 70, Bahadurganj, Allahabad	Weights, Measures and Weighing Instruments.
(6)	Assaram Subash Chand, 75, Kaishan Gunj Road, Meerut	Weights & Measures.
(7)	Badri Prasad, K. 66/71, Lohatia, Baraganesh, Varanasi	Weights, Measures and Weighing Instruments.
(8)	Bankey Bihari & Co., K 58/13, Baranganesh, Varanasi	Weights, Measures, Weighing and Measuring Instruments.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(9)	Banar Lal Ram Swarup, 604, Muthiganj, Allahabad	Weights, Measures, Weighing and Measuring Instruments.
(10)	Balance Works Private Ltd. D 35/74, Jangam Bari, Varanasi	Weights, Measures and Weighing Instruments.
(11)	Bhagwandas Hiralal Iron Merchant, K58/2, Bara Ganesh, Varanasi.	Weights, Measures and Weighing Instruments.
(12)	Bharat Industries, Debipura, Chamdi Mandi Road, Hapur (Meerut).	Weights and Measures.
(13)	Calcutta Satyendro Scale Works, Halse Road, Kanpur	Weights and Weighing Instruments.
(14)	Chhittarmal Purshottam Dass, Iron Merchant, Ghiya Mandi, Mathura.	Weights, Measures, Weighing and Measuring Instruments.
(15)	Dayal & Company, Thaparanagar, Meerut	Weights, Measures, Weighing and Measuring Instruments.
(16)	Garg & Company, Balanganj, Agra	Weights, Measures, Weighing and Measuring Instruments.
(17)	Goyal Industries, Man Bhavan, 3681, Sultanganj, Agra	Weights, Measures, Weighing and Measuring Instruments.
(18)	Govind Prasad, C/o Calico Cloth House, Golghar, Gorakhpur.	Weights and Measures.
(19)	Gulab Chand Kishan Lal, Hardi Ganj, Jhansi	Weights, Measures, Weighing and Measuring Instruments.
(20)	R.N. Gupta & Bros., S-17/319, Nadesar, Varanasi	Weights and Measures.
(21)	Hardeo Prasad & Sons, 13, Niharpur, Allahabad	Weights, Measures, Weighing and Measuring Instruments.
(22)	Bari Trading Company, Biseshwar Ganj, Varanasi	Weights and Measures.
(23)	Hasan Abbas and Bros., Bazar Qilla, Bareilly	Weights, Measures, Weighing and Measuring Instruments.
(24)	India Steel Industries, Baraganesh, Varanasi	Weights, Measures, Weighing and Measuring Instruments.
(25)	S.S. Iron Foundry & Engg. Agra Works, Rambagh, P.O. Jamuna Bridge, Agra.	Weights, Measures, Weighing and Measuring Instruments.
(26)	Iswari Prasad Ram Nath, Lohia Mandi, Agra	Weights, Measures, Weighing, and Measuring Instruments.
(27)	Iswaridas Khurana & Engg. Works, Delhi Road, Meerut	Weights and Measures.
(28)	Jagdish Prasad Agrawal, Gali Bhatan, Bareilly	Weights, Measures, Weighing Instruments.
(29)	Jadish Saran Bartan Bhandar, Bazar Darzi Chowk, Bareilly	Weights, Measures, Weighing Instruments.
(30)	Keshi Iron Foundry, Freeganj, Agra	Weights and Measures.
(31)	Ralkoo Prasad, K66/71, Lohatia, Baraganesh, Varanasi	Weights and Weighing Instruments.
(32)	Kanal Lal Karmokar, 107/68A, Jawahar Nagar, Kanpur	Weights and Weighing Instruments.
(33)	Keroy Private Ltd., 335, Nadeswar, Varanasi Cantt.	Weights and Weighing Instruments.
(34)	Krishna Meharotra, Secretary, Halwai Sudharak Association, Sahukaru, Bareilly.	Weights, Measures, Weighing and Measuring Instruments.
(35)	Kailash Foundry & Engg. Works, Delhi Road, Meerut	Weights and Measures.
(36)	Lal Chand Ganga Sahai, 4/349, Big Mandi, Hawana, Meerut	Weights and Measures.
(37)	Lal Chand Ganga Sahai, Sadar Bazar, Anaj Mandi, Meerut	Weights and Measures.
(38)	Madho Prasad Kanhaiya Lal, K 58/1, Lehatia, Baraganesh, Varanasi.	Weights, Measures, Weighing and Measuring Instruments.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(39)	Madhu Cottage Industries, Durganagar, Near Kumar Ashram, Outside Shohrab Gate, Meerut.	Weights and Measures.
(40)	Maya Das S/o Diwan Chand, H. No. ED 7/127, Brahman Pura Opposite Chameli Baghia, Bareilly.	Weights, Measures, Weighing and Measuring Instruments.
(41)	Mahavir Rolling Mills, 73 Factory Area, Fazalganj, Kanpur.	Weights, Measures, Weighing and Measuring Instruments.
(42)	Maikoolal Sangam Lal, Chowk Lunai Bazar, Allahabad ..	Weights, Measures, Weighing and Measuring Instruments.
(43)	Matin and Company, 9, Khairnagar, Meerut ..	Weights, Measures, Weighing and Measuring Instruments.
(44)	Modern Agricultural Implements Mfg. Co., Mankar Khera, Meerut.	Weights, Measures, Weighing and Measuring Instruments.
(45)	Mohd. Ahmad Mohd. Yunus, Chaumak-Ka-Pul, Moradabad.	Weights, Measures, Weighing and Measuring Instruments.
(46)	Moradabad Mills Stores, Station Road, Moradabad ..	Weights, Measures, Weighing and Measuring Instruments.
(47)	Neur Ram Bhoti Ram, K 63/170, Iohatia, Bara Genesh, Varanasi.	Weights and Weighing Instruments.
(48)	Nisar Mohammed Khan, 147, Civil Lines, Bareilly ..	Weights and Measures.
(49)	Post-War Industrial Institute, Sarojininagar, Lucknow ..	Weights, Measures and Weighing Instruments.
(50)	Roop Kamal Industries, 91/139, Gurdwara Road, Kanpur	Weights, Measures, Weighing and Measuring Instruments.
(51)	Prakash Engineering Co. and Rolling Mills, Freeganj, Agra	Weights.
(52)	Raj Narain Bagwari, 35/24, Bangali Mohal, Kanpur ..	Weights, Measures, Weighing and Measuring Instruments.
(53)	Rajendra Prasad & Sons, 17, Thadheri Bazar, Allahabad ..	Weights, Measures, Weighing and Measuring Instruments.
(54)	Ram Gopal Jaiswal, K 53/9, Shop No. 3, Raja Darwaja, Varanasi.	Weights, Measures and Weighing Instruments.
(55)	Ram Iron Stores, Koshi Kalan, Mathura ..	Weights, Measures, Weighing and Measuring Instruments.
(56)	Ram Krishan Iron Foundry, Sultanganj, Agra ..	Weights, Measures, Weighing and Measuring Instruments.
(57)	Singhal Hardware Stores, Pathwari, Agra ..	Weights and Measures.
(58)	Sayyed Kazim Husain, Hatta Mirza Ali Khan, Thakur Ganj, Lucknow.	Weights, Measures, Weighing and Measuring Instruments.
(59)	R.C. Samitary Stores, Bara Bazar, Galinwaban, Bareilly ..	Weights, Measures, Weighing and Measuring Instruments.
(60)	Shadi Ram & Sons, 33, Gautam Budha Marg, Lucknow ..	Cast Iron Weights and Weighing Instruments.
(61)	Shafiq Ahmad Khan Ghaffar Ahmad, 659, Civil Lines, Beharipur, Bareilly.	Weights, Measures, Weighing and Measuring Instruments.
(62)	Shanti Swaroop Raj Kumar, Near Katra Anaj, Moradabad	Weights, Measures, Weighing and Measuring Instruments.
(63)	Sharda Prasad Umesh Chandra, 74/21, Collector Ganj, Kanpur.	Weights and Measures.
(64)	Shiva Kumar Maheswari, Chaumukha Pul, Moradabad ..	Weights, Measures, Weighing and Measuring Instruments.

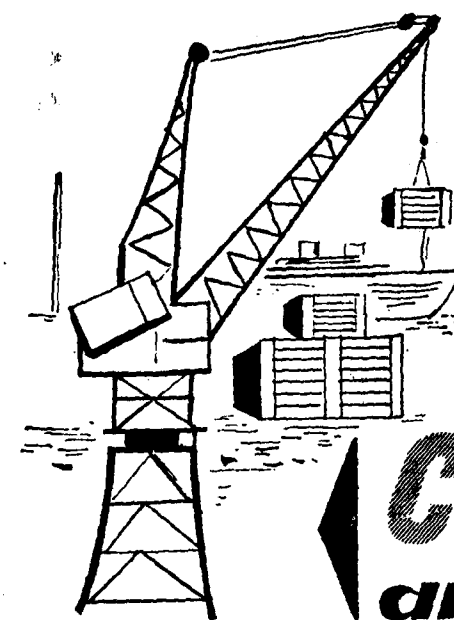
Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(65)	Standard Steel and Iron Foundry, Jeoni Mandi, Agra ..	Weights.
(66)	Singh Iron Works, K 66/71, Marharpura, Lohatia, Varanasi	Weights, Measures and Weighing Instruments.
(67)	B.L. Sinha & Sons, Jhutha Ram Ka Phathak, Kinari Bazar, Agra.	Weights and Weighing Instruments.
(68)	Sita Ram S/o Seth Phali Ram, Shop No. 10, Hospital Compound, Bareilly.	Weights, Measures, Weighing and Measuring Instruments.
(69)	Varanasi Sarkarigalla Vikreta Sangh, C.K. 58/55, Chowk, Varanasi.	Weights and Measures.
(70)	Vijai Iron Industries, 114/44, Brahm Nagar, Kanpur ..	Weights, Measures, Weighing and Measuring Instruments.
(71)	M. Yali Nashtar Shooters, Army, Arms and Ammunition dealer, 17, Town Hall, Bareilly.	Weights, Measures, Weighing and Measuring Instruments.

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	Abdul Samad, Chamock-Ka-Pul, Moradabad ..	Weights.
(2)	Arya Vert Engineering Works, Khair Nagar, Meerut ..	Cast Iron and Brass Weights, and Measures, Weighing Instruments and Measuring Instruments.
(3)	Balance Works Private Ltd., D 35/74, Jangambari, Varanasi	Weights and Weighing Instruments.
(4)	Bansal Iron Foundry, Near Railway Goods Shed, Balanganj, Agra.	Cast Iron and Brass Weights.
(5)	Bharat Industries, Debipur Chandi Mandi Road, Hapur (Meerut).	Weights and Measures.
(6)	Hindustan Balance Works, D 29/18, Dibrothpura, Varanasi	Weighing Instruments.
(7)	Calcutta Satyendra Scale Works, Helse Road, Kanpur ..	Weights and Weighing Instruments.
(8)	Chandra Metal Company, 27, Gautam Budh Marg, Lucknow.	Weights and Measures etc.
(9)	Hardeo Prasad & Sons, 13, Nihalpur, Allahabad ..	Weights, Measures, Weighing and Measuring Instruments.
(10)	Hari Krishan Lal M/s. Agrawal Tin Manufacturing Works, Makhania Mohal, Sadar Bazar, Lucknow.	Weights and Measuring Instruments.
(11)	S.S. Iron Foundry and Engineering Works, Ram Bagh, P.O. Jamuna Bridge, Agra.	Weights, Measures, Weighing and Measuring Instruments.
(12)	Kanai Lal Karmokar, 107/68A, Jawahar Nagar, Kanpur	Weights and Weighing Instruments.
(13)	Madhu Cottage Industries, Durga Nagar, Near Kumar Ashram, Outside Shohrab Gate, Meerut	Weights, Measures, Weighing Instruments.
(14)	Modern Agricultural Implements Mfg. Co., Kankar Khera, Meerut.	Weights and Weighing Instruments.
(15)	Society Iron Industries, Hirhana Road, Kanpur ..	Weights and Measures.

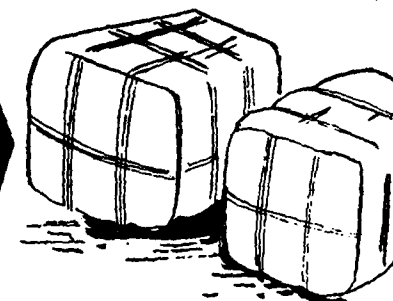
METRIC WEIGHTS : Conversion Table				
(KILOGRAM TO SEER)				
GRAMS	TOLAS	MASHAS (¹ / ₂ of a tola) (to nearest masha)	KILOGRAMS MAUNDS SEERS	TOLAS (to nearest tola)
1	—	1	1	6
2	—	2	2	11
3	—	3	3	17
4	—	4	4	23
5	—	5	5	29
6	—	6	6	34
7	—	7	7	40
8	—	8	8	46
9	—	9	9	52
10	—	10	10	57
20	1	9	21	35
30	2	7	32	12
40	3	5	2	62
50	4	3	13	47
60	5	2	24	24
70	6	—	35	1
80	6	10	5	59
90	7	9	16	36
100	8	7	1	27
200	17	2	2	14
300	25	9	3	2
400	34	4	4	29
500	42	10	5	16
600	51	5	13	3
700	60	—	16	30
800	68	7	18	17
900	77	2	21	5
1000 (=1 kg)	85	9	24	32
			10(= 1Metric tonne)	26



METRIC SYSTEM

in

CUSTOMS and CENTRAL EXCISE



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The rates have been converted to their nearest practicable equivalents in metric units.

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Repairers (contd.)

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(16)	Narain Pur Iron Works, Station Road, Moradabad ..	Weights, Measures and Scales etc.
(17)	Post-war Industries Institute, Sarojininagar, Lucknow ..	Weights and Measures.
(18)	Roop Kamal Industries, 91/139, Gurdwara Road, Kanpur ..	Weights and Measures.
(19)	Shiva Kumar Maheswari, Chaumukha Pul, Moradabad ..	Weights and Measures etc.
(20)	Society Iron Industries, Hirhana Road, Kanpur ..	Weights and Measures.
(21)	Technical Corporation, Private Ltd., Sarojininagar, Lucknow ..	Weights and Measures.

CORRECTION

In September 1960 issue of *Metric Measures* under *Uttar Pradesh* (2).

(i) On page 39 against serial No. 24 in 'Manufacturers' for *Brass Weights from 20 kg to 1 g*, read *Brass weights from 20 kg to 1 kg*.

(ii) On page 40 against serial No. 19 in 'Repairers' for *Normal Engineering Corporation* read *Nirmal Engineering Corporation*.

For the existing words against serial No. 20 under *Manufacturers* list in *Maharashtra* (I) on page 29 of November issue please substitute.

Shree Ram Mills Ltd.,
Fergusson Road

Lower Parel, Bombay-13

METRIC CAPACITY MEASURES : Conversion Tables

Fl. ounce		Millilitres (ml) (to nearest ml)	Gallons		Litres	Milliliters (to nearest 10 ml)
1		28	1		4	550
2		57	2		9	90
3		85	3		13	640
4		114	4		18	180
5 (=1 Gill)		142	5		22	730
Gills		Millilitres (ml) (to nearest ml)	6		27	280
1		142	7		31	820
2		284	8		36	370
3		426	9		40	910
4 (=1 Pint)		568	10		45	460
Pints		Millilitres (to nearest ml)	Gallons		Litres	Millilitres (to nearest 100 ml)
1		568	20		90	900
2 (=1 Quart)	1	136	30		136	400
Quarts		(Millilitres ml) (to nearest ml)	40		181	800
1	1	136	50		227	300
1	2	273	60		272	800
3	3	409	70		318	200
4 (= 1 Gallon)	4	546	80		363	700
			90		409	100
			100		454	600

Millilitres		Fl. ounce (to nearest 1/4 fl. oz.)	Gills				
Millilitres		Fl. ounce (to nearest 1/4 fl. oz.)	Litres	Gallons	Quarts	Pints (to nearest gill)	
10		1/4	1	—	—	1	
20		1/2	2	—	1	2	
30		3/4	3	—	2	3	
40		1	4	—	3	4	
50		1 1/4	5	1	—	5	
60		1 1/2	6	1	1	6	
70		1 3/4	7	1	2	7	
80		2	8	1	3	8	
90		2 1/4	9	1	3	9	
100		2 1/2					
Millilitres		Fl. ounce (to nearest 1/2 fl. oz.)	Pints				
Millilitres		Fl. ounce (to nearest 1/2 fl. oz.)	Litres	Gallons	Quarts	(to nearest pint)	
200	—	1	10	2	1	—	
300	—	2	20	4	1	1	
400	—	3	30	6	2	1	
500	—	4	40	8	3	—	
600	1	—	50	11	—	—	
700	1	0	60	13	1	—	
800	1	1	70	15	1	1	
900	1	2	80	17	2	1	
1000 (=1 litre)	1	3	90	19	3	—	
			100	22	—	—	

1 GALLON=4 1/2 LITRES Approx : 1 LITRE=1,000 MILLILITRES

PRICE CONVERSION TABLE (Maunds to Quintals)

TABLE A

Conversion of Prices from Maund to Quintal (100 kg)

(Factor used : 1 quintal = 2.6792269 maunds)

Naye Paise per maund to Rupees and Naye Paise per quintal

nP/Md	0	1	2	3	4	5	6	7	8	9
	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q
0	0	0.03	0.05	0.08	0.11	0.13	0.16	0.19	0.21	0.24
10	0.27	0.29	0.32	0.35	0.38	0.40	0.43	0.46	0.48	0.51
20	0.54	0.56	0.59	0.62	0.64	0.67	0.70	0.72	0.75	0.78
30	0.80	0.83	0.86	0.88	0.91	0.94	0.96	0.99	1.02	1.04
40	1.07	1.10	1.13	1.15	1.18	1.21	1.23	1.26	1.29	1.31
50	1.34	1.37	1.39	1.42	1.45	1.47	1.50	1.53	1.55	1.58
60	1.61	1.63	1.66	1.68	1.71	1.74	1.77	1.80	1.82	1.85
70	1.88	1.90	1.93	1.96	1.98	2.01	2.04	2.06	2.09	2.12
80	2.14	2.17	2.20	2.22	2.25	2.28	2.30	2.33	2.36	2.38
90	2.41	2.44	2.46	2.49	2.52	2.55	2.57	2.60	2.63	2.65
100	2.68	..	..	..	..	..	..	..	..	..

TABLE B

(Factor used : 1 quintal = 2.6792269 maunds)

Rupees per maund to Rupees and Naye Paise per quintal (q)

Rs/Md	0	1	2	3	4	5	6	7	8	9
	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q
0	0	2.68	5.36	8.04	10.72	13.40	16.08	18.75	21.43	24.11
10	26.79	29.47	32.15	34.83	37.51	40.19	42.87	45.55	48.23	50.91
20	53.58	56.26	58.94	61.62	64.30	66.98	69.66	72.34	75.02	77.70
30	80.38	83.06	85.74	88.41	91.09	93.77	96.45	99.13	101.81	104.49
40	107.17	109.85	112.53	115.21	117.89	120.57	123.24	125.92	128.60	131.28
50	133.96	136.64	139.32	142.00	144.68	147.36	150.04	152.72	155.40	158.07
60	160.75	163.43	166.11	168.79	171.47	174.15	176.83	179.51	182.19	184.87
70	187.55	190.23	192.90	195.58	198.26	200.94	203.62	206.30	208.98	211.66
80	214.34	217.02	219.70	222.38	225.06	227.73	230.41	233.09	235.77	238.45
90	241.13	243.81	246.49	249.17	251.85	254.53	257.21	259.89	262.56	265.24
100	267.92	..	..	..	..	..	..	..	..	..

How to use the Tables :

Suppose a commodity is priced at Rs. 30.50 per maund. To find the price per quintal look up Table B against Rs. 30/maund. The value is Rs. 80.38/(q). Look up Table A against 50 nP/maund. The value is 1.34/(q). Add up the two (Rs. 80.38 + 1.34 = Rs. 81.72). The price per quintal (q) is, therefore, Rs. 81.72.

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metric measures

THE PUBLICATIONS DIVISION

CONVERSION TABLE FOR PRICES (Yard To Metre)

(Conversion Factor used: 1 m = 1.09361 yard)

nP/Yard nP/m	nP/Yard nP/m	nP/Yard nP/m	nP/Yard nP/m	nP/Yard nP/m	nP/Yard nP/m
1	21	23	41	45	81
2	22	24	42	46	82
3	23	25	43	47	83
4	24	26	44	48	84
5	25	27	45	49	85
6	26	28	46	50	86
7	27	29	47	51	87
8	28	30	48	52	88
9	29	31	49	53	89
10	30	32	50	54	90
11	31	33	51	55	91
12	32	34	52	56	92
13	33	35	53	57	93
14	34	36	54	58	94
15	35	37	55	59	95
16	36	38	56	60	96
17	37	39	57	61	97
18	38	40	58	62	98
19	39	41	59	63	99
20	40	42	60	64	100
		43		65	
		44		66	

NAYE PAISE
PER YARD
TO
NAYE PAISE
PER
METRE

RUPEES
PER YARD
TO
RUPEES
PER
METER

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STANDING METRIC COMMITTEE
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metric measures

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The opinions expressed by authors are not necessarily those of the Government.

Metric System in Post-offices

N. CHIDAMBARAM

Director, Postal Technical,
Directorate General of Posts & Telegraphs,
New Delhi

THE change over in post-offices, with effect from 1 February 1961, to the metric system of weights and measures forms another important step in the progressive replacement of non-metric units by metric units for various types of work in this country. As a result of the changes now made, postage on postal articles which before 1 February 1961, was being charged in terms of weight units in tolas or pounds or ounces is now being levied in term of weight units in the metric system. Besides, various specifications relating to postal articles, such as maximum and minimum permissible weights and dimensions have been refixed in terms of metric units. The opportunity has also been taken to streamline the various provisions laid down in this behalf.

Supply and Distribution of Weights

From the beginning, the aim of the Posts and Telegraphs Department was to introduce the change in such a way as to cause the least inconvenience both to the public and to the postal staff. It was realized at the outset that the first essential prerequisite was that all post offices in the country should be equipped with an adequate number of weights in metric units before the change-over was brought about. The magnitude of ensuring this can be gauged when it is

realized that there are more than seventy thousand post offices in the country and 80 percent of them are small branch offices in rural and remote areas. The Department took up the question of the manufacture and supply of metric weights three years ago and after ascertaining the requirements of all post offices, indents were placed for such weights through the Director General of Supplies and Disposals as early as October 1958. The indents then placed were for about 16 lakh pieces of weights. It naturally took time for the manufacturers to meet the demands for such a large quantity of weights, particularly as, at the same time the metric system of weights and measures was in the process of being introduced in various other spheres and in a number of localities and areas in the country for all commercial transactions. The suppliers also had to surmount difficulties relating to raw materials for manufacturing the weights and transport bottle-necks and in some cases suspension of booking by goods train, after the weights had been manufactured. As a result, extension of time had to be granted to them for completing supplies. That, inspite of these difficulties, supplies against the initial indents could be completed by August 1960 should in the circumstances be regarded as quite satisfactory.

After the weights had been received in the postal stock depots, there was the problem of their further distribution to post offices. In many instances, the work of distribution had to be decentralized by entrusting the task of making supplies to the post offices in their jurisdiction to the various Superintendents of Post Offices. In order to ensure that the work of distribution was proceeding satisfactorily, it was arranged that a fortnightly report should be sent to the Director General to enable him to decide when it would be possible to prescribe the date for the change-over.

Revising Postage Rates

Along with the arrangements for the manufacture and distribution of metric weights, the question of revising the postage rates and the specifications relating to weights and dimensions of postal articles was also taken up. It was apparent from the outset that the postage rates could not be revised in terms of metric weight units by merely replacing the existing weight units in tolas or pounds etc. by their equivalents in grams. It was also considered essential that the use of conversion tables in connection with the day-to-day work of the Department should be avoided as far as possible. The main problem in connection with the refixation of postage rates in terms of metric weight units was, therefore, to devise a rate structure which differed as little as possible from the existing one but which at the same time did not lead to those practical difficulties which cannot be avoided if fractions running into two or three decimal places were included in the rates. Besides, in the case of foreign postal articles, the question had to be considered with due regard to the provisions of the Universal Postal Convention which lays down certain maxima and minima in regard to postage rates, sizes, etc.

Inland Surface Articles

Before the change-over, the postage on inland surface articles (except postcards and letter cards) was being levied in terms of weight units expressed in tolas. (In the case of post-cards and letter cards, postage is not related to weight). The exact equivalent of a tola in terms of metric units is 11.664 grams. In view of the need for fixing the weight unit in grams in convenient figures, such as multiples of 5 or 10, it was decided to change the entire rate structure. Thus in the revised rate structure a weight unit of 1 tola was replaced by a units of 10 grams, 1½ tolas by 15 grams, 2½ tolas by 25 grams and so on.

On the above basis it was decided to refix the postage rates on inland postal articles as below:—

Sl. No.	Category	Rate from 1-2-61
1. (a) Postcard, Ordinary	Single	5 nP.
	Reply paid	10 nP.
(b) Postcard, Local	Single	3 nP.
	Reply paid	6 nP.
2. Letters	Upto 15 grams	15 nP.
	For every additional 15 grams.	10 nP.
3. Letter card		10 nP.
4. Book, Sample and Pattern Packets other than those containing printed books.	Up to 50 grams	8 nP.
	For every additional 25 grams.	3 nP.
5. Book packets containing printed books.	Up to 50 grams	5 nP.
	For every additional 25 grams	3 nP.
6. Registered Newspapers when posted singly.	Upto 100 grams	2 nP.
	100—200 grams	3 nP.
	For every additional 200 grams.	3 nP.
7. Registered Newspapers when posted in packets containing more than one copy.	Up to 100 grams	3 nP.
	For every additional 50 grams.	2 nP.
8. Periodicals registered as Newspapers with the Press Registrar of India.	Up to 100 grams	8 nP.
	For every additional 50 grams	3 nP.
9. Parcels	For every 400 grams.	50 nP.

Before the above rates could be brought into effect, it was necessary to amend the First Schedule to the Indian Post Office Act, 1898, as according to Section 7 of that Act, postage in excess of the rates specified in that Schedule could not be levied on inland postal articles. A Bill (No. 69 of 1960) for this purpose was introduced in the Lok Sabha in September 1960 and was passed into Law by Parliament during the last winter session as Act No. 52 of 1960. According to that enactment, it was left to the Government to decide the date on which the revised rates would come into force. After considering other aspects of the matter such as the necessity for the Indian Post Office Rules, 1933, being suitably amended and for introducing the revised postage rates relating to both inland and foreign postal articles from the same date, it was decided to fix the date of effect as 1 February 1961 (See S.O. 47, dated 2nd January 1961 as amended by S.O. No. 237, dated 19th January, 1961). The revised postage rates were published in a Gazette of India Extraordinary as G.S.R. No. 106 dated 18th January 1961 as part of the Indian Post Office (Amendment) Rules, 1961

Inland Air Mail Articles

In the case of surcharges on inland postal articles for conveyance by air, the same principle of having units of weights in multiples of 5 or 10 grams has been generally adopted. The air surcharge for book packets and registered newspapers has been revised as 4 nP for each 10 grams or part thereof. The surcharges for limited air conveyance of registered newspapers over certain routes have also been similarly revised.

In the case of parcels for conveyance by air, the opportunity has been taken to revise the basis of levying the air conveyance charges. Before the change-over, a combined postage-cum-air fee was being charged for air parcels

at the rate of 63 nP for each 20 tolas or part thereof. From 1 February 1961 a surcharge is being levied in addition to ordinary surface postage on parcels, the unit of weight for levying the surcharge being 200 grams. The surcharge has been fixed as 35 nP for each weight unit. This amount is approximately equal to the cost incurred in conveying the parcels by air. There are also certain routes over which limited air conveyance for parcels may be availed of by the public. The surcharges for such limited conveyance have been re-fixed on the basis of a uniform weight slab of 400 grams over each route. The result of these modifications in the principles relating to the levy of charges on inland air parcels has been to remove certain anomalies which existed before 1 February 1961, when in a few instances, the total postage (including air surcharge) payable on parcels of certain weight categories was more when carried by air over a limited distance than the postage payable if the parcels were carried by air throughout their journey.

Foreign Surface Correspondence

Before the change-over, the weight unit for charging surface postage on correspondence for foreign countries was 1 oz. in the case of letters and 2 oz. in the case of printed matter (including business papers and samples). These weight units in terms of metric measures have been re-fixed as 20 grams and 50 grams respectively. In this matter the Department really had no other choice because the Universal Postal Convention lays down these units of weight for levying postage on correspondence, though, for countries where the British units are in use, that Convention permits 20 grams being replaced by 1 oz. and 50 grams by 2 oz.

It was also decided that, along with the refixation of the weight units in this manner the postage on foreign correspondence should be fixed at the minimum levels permitted by

the Convention. As a result, it has been possible to reduce by 3 nP the postage on the initial weight unit of letters. The rates of postage in force from 1 February 1961 on the main categories of correspondence are indicated below :

From 1 February 1961			
Letters	First 20 grams	.. ..	30 nP.
	Each additional 20 grams or part.	.. ..	20 nP.
Post Cards	Single	.. ..	20 nP.
	Reply paid	.. ..	40 nP.
Printed Matter	First 50 grams	.. ..	12 nP.
	Each additional 50 grams or part.	.. ..	6 nP.
Minimum Charge	Samples	.. ..	30 nP.
	Commercial papers	.. ..	30 nP.

The above rates are strictly in accordance with the provisions of the Universal Postal Convention and are the minimum leviable under that Convention.

Surcharges on Foreign Air Mail Correspondence

In re-fixing the surcharges on foreign air-mail correspondence, the unit for levying the charge was fixed as 10 grams, in place of $\frac{1}{4}$ oz. The corresponding surcharges were calculated *de novo* by keeping in view the stipulation in the Universal Postal Convention that the surcharges should be more or less equal to the actual costs incurred in providing the air conveyance. Thus the charges arrived at in this manner are generally lower per weight unit than the charges per unit in force before 1 February 1961, as the following statement will show :

Destination	Charge per Weight Unit	From 1-2-1961
	Letters nP.	Packets nP.
(1) Pakistan & Ceylon		10
(2) Afghanistan & Burma		10
(3) Various Countries in Asia		30
(4) Various Countries in Europe and Africa.		60
(5) Various Countries in Oceania		75
(6) Various Countries in N and S. America.		100

The combined postage-cum-air fee levied on postcards and aerograms has not been changed.

The effect of the above revision of air surcharges, together with the reduction on the postage on letters is that an ordinary member of the public, whose letters to correspondents abroad do not normally weigh more than 10 grams, need now pay only 90 nP for an air-mail letter to the U.K. instead of Rs. 1.03 and Rs. 1.30 for airmail letter to the U.S.A. or Canada instead of Rs. 1.63 as in the past.

Foreign Parcels

The charges on foreign surface parcels have not been changed but the weight categorization for levying postage has been revised to accord with metric weight units. As a matter of fact, in the international post, the postage on surface parcels is generally levied in terms of the weight categories shown below :

- Parcels weighing not over 1 kg;
- Parcels weighing over 1 kg but not over 3 kg;
- Parcels weighing over 3 kg but not over 5 kg;
- Parcels weighing over 5 kg but not over 10 kg;

Before the switch-over to metric weights the equivalents adopted in British units for the metric weights indicated above was as follows :

- 1 kg = 2 lb; 3 kg = 7 lb;
- 5 kg = 11 lb; 10 kg = 22 lb;

From 1 February 1961, the weight categorization is as generally adopted in the international post in terms of kilograms. The corresponding postage has, however, not been changed on this account.

In the case of foreign air parcels, the opportunity has been taken to revise completely the basis on which the postage is levied. Before the switch-over, there was a minimum charge for a weight up to 1 lb. with a uniform

increase for each 4 oz. or fraction thereof in excess of this weight. From 1 February 1961, the method adopted is to levy a minimum charge for a weight not exceeding 250 grams with a uniform increase for each 250 grams or fraction thereof in excess of 250 grams. Care has been taken to ensure that the portion of the postage which represents the charge for conveyance by air is more or less equal to the actual cost incurred in air conveyance.

Maximum and Minimum Limits of Weights and Dimensions.

The Universal Postal Convention and certain other Agreements of the Universal Postal Union already lay down the conditions in metric units in regard to the maximum and minimum dimensions of postal articles and the weight limits up to which they can be accepted for transmission by post. Prior to 1 February 1961 in regard to inland postal articles, many but not all these provisions had been made applicable in India with the only difference that the specification had been laid down in British units. It was decided to avail of the present opportunity to apply, as far as possible, all the specifications found in the International Convention and Agreements to all postal articles, both inland and foreign. With this end in view, not only were existing specifications for inland and foreign articles converted into metric units, but certain new ones were laid down, particularly for inland articles. The important changes made in this respect are as follows :

1. A maximum limit of weight of 2 kg has been fixed for a letter in the inland service. Previously there was no such limit though, in view of the high postage on letters, very few letters weighing 2 kg or above were actually being posted.
2. For postal articles when packed in the form of rolls, no limits of dimen-

sions existed in the inland service. Such limits have now been prescribed and they are :

	Maximum	Minimum
Any single dimension	80 cm	10 cm
Sum of length and twice diameter	100 cm	17 cm

3. In the case of articles (other than post-cards) whose dimensions measure less than the prescribed minima, transmission by post has been permitted subject to the condition that such an article bears a rectangular address label of cardboard or strong paper of which the two adjacent sides together measure not less than 16 cm and the smaller side is not less than 4 cm.
4. The maximum limit of weight for inland parcels was 1,000 tolas. This maximum has now been increased to 20 kg in the case of parcels for and from a head or sub-post office. In the case of parcels for and from branch post offices, the revised limit is 10 kg. A provision has been made that parcels weighing above 10 kg will be delivered through the postmaster. Such parcels will have to be collected by the addressees from the post office of delivery. Registration of a parcel has been made compulsory if it weighs more than 4 kg. The previous limit was 440 tolas.
5. Minimum limits of dimension for inland parcels have been laid down. They are the same as the minimum limits for letters. The maximum

limits have also been slightly changed as follows :

Maximum length = 1 metre, instead of 3 ft. 6 inches.
Maximum sum of length = 1.80 metres, instead of and girth combined. 6 ft.

Publicity and Training

In order to avoid practical difficulties in dealing with the public at the post office counters it was considered essential to train the staff and also to give wide publicity to the metric concepts. The post office comes into close contact with the public in normal day-to-day work and, therefore, its influence in moulding public thought in such matters can hardly be exaggerated. The measures taken to give publicity to the change-over include :

1. Advertisements have been inserted in various newspapers, both in English and Indian languages;

2. Posters in English and Indian languages have been printed and distributed to all post offices;
3. Brochures in English and Indian languages have been printed and are being distributed in large numbers.
4. For the use of postal staff, cards containing ready-reckoners showing the postage leviable on postal articles of various weights are being printed and will be distributed shortly.

It is hoped that the switch-over to the metric system by the post offices will considerably facilitate and hasten the complete replacement of the various systems of weights and measures in use in this country by the internationally recognised and easy-to-work metric system of weights and measures.

Metric Purchasing

METRIC weights have now come into compulsory use in many areas in the country. Certain traders as also consumers have got into difficulties in transacting business in terms of the new units of weights. These difficulties arise mainly out of the desire to adapt the new system to the old, as for example, asking for 1/4, 1/8 or 1/16 of a kilo of a commodity or insisting on using converted values like 58 grams for 1 chhataak and then weighing out 58 grams. Both the methods of using the new system can only lead to endless calculations and irritation.

The simplest way of transacting business in the new metric system is to quote, sell or buy commodities only in terms of rational metric weights using the crutch of conversion tables only to assess the quantity to be purchased. What has to be remembered is that the kilogram or kilo is some 6 tolas more than the 80 tola seer. Having done this it is advisable to forget the old system and its halving technique, because it is not possible to halve the metric units beyond a certain limit and what is worse, the corresponding weight would not be available in the metric

METRIC PURCHASING

series of weights which proceed in steps of 1, 2, 5, 10, 20, 50, 100, 200 and 500. For example, the 1/2 kg weight is available i.e. 500 grams but not 1/4 kg i.e. 250 grams nor 1/8 kg or 125 grams. The 250 grams would have to be made up by 2 weights viz. 200 grams and 50 grams, and 125 grams by adding 3 weights, namely, 100 grams, 20 grams and 5 grams. Many will agree that it is not worthwhile proceeding with our weighing in this manner and then complicating calculations of the amount to be paid. The halving system was perhaps suitable for the rupee of 16 annas and the seer of 16 chhataaks only, but is not suited to metric weights and decimal coinage.

Facility of Metric System

The excellence, simplicity and facility of the metric system lie in its decimal steps. If we do not use this facility we are bound to get into difficult calculations. For example, a dry fruit seller purchased his wares in the wholesale market in terms of kilos and converted the price to the seer units and rupees and annas. Then he sold them to his customers by converting the chhataaks and paos they had asked for into grams and weighing out the requisite quantity with gram weights. This trader got into difficulties when a suspicious customer asked him to pack up 100 grams of cashewnuts. The converted prices did not help him and he got himself and the customer into knots calculating how much 100 grams would cost. How simple would it have been if he had quoted the rate per kilo which was current in the market and then calculated for 100 grams !

Metric system and decimal coinage together afford a facility which was rarely present in the old structure of pricing. But many people get enmeshed into irritating calculations because they still want to convert prices into rupees, annas and pies and the weights into seers, chhataaks and paos.

Metric Purchasing

Let us examine the metric way of transactions. The first step is to price commodities in decimal coinage in terms of metric units. The next is to re-orientate our thinking to metric units. Thus we may ask for a kilo of commodity instead of 1 seer, 2 kilo instead of 2 seers and 40 kilo or 50 kilo instead of a maund. Remember that it is possible to weigh out 1 kilo of any commodity with just one weight but to weigh out 933 grams (1 seer) we require weights of 500, 200, 200, 20, 10, 2 and 1 grams in the pan, i.e. 7 weights. This is a waste of time both for the trader and the purchaser and leads to quarrels over calculations. Similarly, because a maund is 37 kilos, it does not mean that we must purchase 37 kilos. Quickness of transaction and settlement of the bill would lie in purchasing 40 kilos or if so desired 50 kilos, because the price quoted would be per quintal (100 kg).

When we come to fractions of a kilogram, it is preferable to proceed in units of 100 grams. This will simplify calculations because, the cost of 100 grams is 1/10th the cost of a kilo of a commodity. Thus if rice is sold at Rs. 1.20 per kilo, 100 grams would cost 12 nP. Therefore, it will facilitate calculations if we purchase our requirements in terms of 100 gram units.

If further sub-divisions are necessary, we may proceed in 10 gram units. This would be desirable for costly commodities like cloves, cardamoms etc. For even smaller quantities it is, of course, advisable to proceed by 1 gram steps as when we purchase small quantities of gold.

No Quarter Kilo Weight

If this procedure is followed, it would make the use of the quarter unit redundant, which is not such a great loss. It would also mean less chances of your being cheated. Some

traders are known to palm off the 200 gram weight as 1/4 kilo. This is wrong. Remember that 1/4 kilo of a commodity cannot be weighed out with a single metric weight piece. Weight pieces of 200 grams and 50 grams have to be used. Anybody who offers to weigh 1/4 kilo with one weight piece is cheating and should be reported to the nearest Inspector of Weights and Measures.

Capacity Measures

What has been said about weights is also applicable to capacity measures. The series of measures run in the ratio of 1, 2, 5 as in the case of weights. There is no measure of 1/4 litre *i.e.* 250 ml. Only a 200 ml measure or 1/5 litre is available in the series. To give 250 ml of milk the milkman

should pour out 200 ml with one measure and then 50 ml with another measure.

Length Measures

In the case of the length measures, the difficulty of half and quarter would not arise although 1/8 would still be difficult to purchase. The metre measure is divided at every 5 cm and, therefore, it would be preferable to purchase cloth in terms of 5 cm units. There would be 20 such 5 cm units in a metre.

In short, only when we start quoting, purchasing and selling in terms of metric weights and decimal coinage and use both these rationally, shall we realize fully the benefits inherent in both these reforms.

Conversion Tables for Tola and its Fractions

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WITH the enforcement of the metric system and the decimal coinage a number of conversion tables for tolas and higher units have been prepared but none is complete and in a form understandable to the uneducated, and even the educated people in India, mainly on account of certain defects in the tables. For example, the expression one tola = 11.6638 grams carries little meaning to anyone except a highly educated person, for neither the seller nor the buyer can make out

anything and does not know what weights to use for weighing out in the metric system. The correct way of presenting it to a common-man would have been 1 tola = 1 decagram, 1 gram, 6 decigrams, 6 centigrams, 3 milligrams, 8 decimilligrams in a clear-cut tabular form. But since the nomenclature decagram, decigram etc., is not normally used in practice and an accuracy of 1 milligram is often sufficient it could be written as 11 grams and 664 milligrams.

CONVERSION TABLES FOR TOLA AND ITS FRACTION

Usual Tables Inadequate

The usual tables are graded in tolas *i.e.* 1 tola, 2 tolas, 3 tolas and so on, but do not give fractions of the tola which are so important in many daily transactions. This leaves gaps in the tables, such as equivalents of 1 tola and 1 masha, 1 tola and 2 mashas and so on to be calculated by the persons concerned, ninety nine percent of whom cannot do them, and those who can, do not wish to waste time and energy on them.

There is no conversion table in the market which could give the equivalent of, say, 4 ratis 3 chawals. Such weights are commonly required in many States for trade in pearls, rubies, diamonds, precious stones, precious metals like gold and silver, jewellery and in ayurvedic and yunani medicines. It is towards fulfilling this need that the present attempt has been directed. It

is hoped that it is useful to the trade and customers.

The normal table for subdivisions of the tola is as follows :

8 chawal	= 1 ratti
8 ratti	= 1 masha
12 masha	= 1 tola

This gives the approximate relation
 $8 \times 8 \times 12$ *i.e.* 768 chawal = 1 tola
 = 11664 milligrams

$\therefore$ 1 chawal = 15 milligrams approximately.

The smallest weight physically available in the metric system is one milligram and weighings of finer accuracy are not likely to be required in the normal commercial transactions involving precision weighing. In order, therefore, to be directly useful the Table that follows has been given correct to the nearest milligram.

TABLE I
CHAWALS, RATIS, MASHAS AND TOLAS TO MILLIGRAMS AND GRAMS
Factor used : 1 tola 0.116638 kilogram.

Tola	Masha	Rati	Chawal	Gram	Milligram
			1		15
			2		30
			3		46
			4		61
			5		76
			6		91
			7		106
		1	—		121
		1	1		137
		1	2		152
		1	3		167
		1	4		182
		1	5		197
		1	6		213
		1	7		228
		2	—		243
		2	1		258
		2	2		273
		2	3		289
		2	4		304
		2	5		319
		2	6		334
		2	7		349
		3	—		364
		3	1		380
		3	2		395
		3	3		410
		3	4		425

TABLE I (contd.)

Tola	Masha	Rati	Chawal	Gram	Milligram
		3	5		440
		3	6		456
		3	7		471
		4	—		486
		4	1		501
		4	2		516
		4	3		532
		4	4		547
		4	5		562
		4	6		577
		4	7		592
		5	—		607
		5	1		623
		5	2		638
		5	3		653
		5	4		668
		5	5		683
		5	6		699
		5	7		714
		6	—		729
		6	1		744
		6	2		759
		6	3		775
		6	4		790
		6	5		805
		6	6		820
		7	7		835
		7	0		850
		7	1		866
		7	2		881
		7	3		896
		7	4		911
		7	5		926
		7	6		942
		7	7		957
	1	—	—	1	972
	2	—	—	2	988
	3	—	—	3	1004
	4	—	—	4	1020
	5	—	—	5	1036
	6	—	—	6	1052
	7	—	—	7	1068
	8	—	—	8	1084
	9	—	—	9	1100
	10	—	—	10	1116
	11	—	—	11	1132
1		—	—		1148
2		—	—		1164
3		—	—		1180
4		—	—		1196
5		—	—		1212
6		—	—		1228
7		—	—		1244
8		—	—		1260
9		—	—		1276
10		—	—		1292
				104	1308
				116	1324
					1340
					1356
					1372
					1388
					1404
					1420
					1436
					1452
					1468
					1484
					1500
					1516
					1532
					1548
					1564
					1580
					1596
					1612
					1628
					1644
					1660
					1676
					1692
					1708
					1724
					1740
					1756
					1772
					1788
					1804
					1820
					1836
					1852
					1868
					1884
					1900
					1916
					1932
					1948
					1964
					1980
					1996
					2012
					2028
					2044
					2060
					2076
					2092
					2108
					2124
					2140
					2156
					2172
					2188
					2204
					2220
					2236
					2252
					2268
					2284
					2300
					2316
					2332
					2348
					2364
					2380
					2396
					2412
					2428
					2444
					2460
					2476
					2492
					2508
					2524
					2540
					2556
					2572
					2588
					2604
					2620
					2636
					2652
					2668
					2684
					2700
					2716
					2732
					2748
					2764
					2780
					2796
					2812
					2828
					2844
					2860
					2876
					2892
					2908
					2924
					2940
					2956
					2972
					2988
					3004
					3020
					3036
					3052
					3068
					3084
					3100
					3116
					3132
					3148
					3164
					3180
					3196
					3212
					3228
					3244
					3260
					3276
					3292
					3308
					3324
					3340
					3356
					3372
					3388
					3404
					3420
					3436
					3452
					3468
					3484
					3500
					3516
					3532
					3548
					3564
					3580
					3596
					3612
					3628
					3644
					3660
					3676
					3692
					3708
					3724
					3740
					3756
					3772
					3788
					3804
					3820
					3836
					3852
					3868
					3884
					3900
					3916
					3932
					3948
					3964
					3980
					3996
					4012
					4028
					4044
					4060
					4076
					4092
					4108
					4124
					4140
					4156
					4172
					4188
					4204
					4220
					4236
					4252
					4268
					4284
					4300
					4316
					4332
					4348
					4364
					4380
					4396
					4412
					4428
					4444
					4460
					4476
					4492
					4508
					4524
					4540
					4556
					4572
					4588
					4604
					4620
					4636
					4652
					4668
					4684
					4700
					4716
					4732
					4748
					4764
					4780
					4796
					4812
					4828
					4844
					4860
					4876
					4892
					4908
					4924
					4940
					4956
					4972
					4988
					5004
					5020
					5036
					5052
					5068
					5084
					5100
					5116
					5132
					5148
					5164
					5180
					5196
					5212
					5228
					5244
					5260
					5276
					5292
					5308
					5324
					5340
					5356
					5372
					5388
					5404
					5420
					5436
					5452
					5468
					5484
					5500
					5516
					5532
					5548
					5564
					5580
					5596
					5612
					5628
					5644
					5660
					5676
					5692
					5708
					5724
					5740
					5756
					5772
					5788
					5804
					5820
					5836
					5852
					5868
					5884
					5900
					5916
					5932
					5948
					5964
					5980
					5996
					6012
					6028

Mathematics Syllabuses for Primary Classes

(The Inter-State Board for Anglo Indian—Education, New Delhi, has recently published its 'Revised Syllabuses in Mathematics' for primary classes which reflect to a considerable extent the actual use of the metric system of weights and measures in preference to other systems.

Reproduced below is the text of the 'Revised Syllabuses in Mathematics' for primary classes.

Editor)

SUPPLEMENT TO A SUGGESTED SCHEME OF STUDIES FOR PRIMARY CLASSES OF ANGLO-INDIAN SCHOOLS

Revised Syllabuses in Mathematics

The following syllabuses are intended to be only a guide to teachers in respect of the norms of achievement. They must not be taken either as prescribing or encouraging the class teaching of arithmetic.

Arithmetic learning is very much a matter of individual interest and pace. Where

large numbers render such individual methods impracticable or when social schemes and projects are to be used the class should be divided into appropriate groups, the individuals in each group being approximately at the same stage of achievement.

In the following list, which is not meant to be exhaustive, are given the titles and publishers of some of the best books on the teaching of the subject. They constitute the minimum requirement for the relevant department of the teacher's library.

Particular attention is called to the works of Schonell and Menzel on the diagnosis of individual difficulties. Much waste of time and much dullness and discouragement entailed by the present prevalent practice of indiscriminate repetition can be avoided by the use of diagnostic tests and the specific remedial teaching indicated by them.

Books on the Teaching of Arithmetic

H. G. Wheat	The Psychology and Teaching of Arithmetic	Heath
Godfrey & Siddons	The Teaching of Elementary Mathematics	Cambridge University Press
Keith & Robertson	The Teaching of Arithmetic	Blackie
A. Monteith	The Teaching of Arithmetic in the Primary School	Harrap
M. Drummond	Learning Arithmetic by the Montessori Method	Harrap

MATHEMATICS SYLLABUSES FOR PRIMARY CLASSES

P. B. Ballard	The Teaching of Arithmetic	University of London
E. V. Staynor	Teacher's Handbook to Modern School Arithmetic Books I-IV	Press Orient Longmans
F. A. G. Lamborn	Reason in Arithmetic	Oxford University Press
C. F. Potter	The Teaching of Arithmetic	Pitman
E. M. Menzel	Suggestions for the Use of New Type Tests in India	Oxford University Press
P. J. Schonell	Diagnosis of Individual Difficulties in Arithmetic	Oliver and Boyd
L. D. Adams	A Background of Primary School Arithmetic	Oxford University Press
D. Williams	A Realistic Approach to Number Teaching	Oxford University Press

CLASS I

1. Number experiences, individual and social activity in

- Reciting, singing and acting nursery rhymes.
- Sorting and counting objects.
- Counting actions.
- Constructive play.
- Use of special toys and individual apparatus.

(f) Imitative and imaginative play.

2. Counting of objects from 1 to 5, then 5 to 10, and finally 5 to 20. Counting by twos to 20. Writing numbers in figures from 1 to 10, and from 10 to 100.

3. Use of apparatus, such as the abacus and 100-squares board. Rote counting to 100. Counting by tens to 100. Recognition of numbers to 100.

4. Meaning of ordinals—first to fifth.

5. Addition and subtraction facts first to 10, then up to 100 with carrying figure. Number combinations first within the limits of 10. Tables of addition and subtraction up to 10 e.g.

$$\begin{array}{ll} 1+2=3, & 1+3=4 \\ 6-3=3, & 6-2=4. \end{array}$$

6. Recognition of naye paise currency.

7. Simple experiences of position and shape, and comparison of size and quantity, and the use of the words : point, straight, round, square, big, bigger, biggest, short, long, shorter, longer. These may include paper cutting, making flowerbeds of different shapes, simple weighing and measuring, filling cups, jugs, pacing out playing-field, etc.

8. Concrete exercises in addition, comparison, subtraction (of two figure numbers within the limits of 100). Multiplication tables of 2 and 5 (2×10 , 5×10), through concrete experience.

CLASS II

1. Extension of counting beyond 100. Counting in 2s, 10s, 5s, 4s.

2. Reading numbers to 10,000.

3. Extension of addition and subtraction. Mental addition and subtraction of one-figure.

Tables of multiplication and division, at least up to 10×10 . (The following order of tables is recommended 2, 5, 10, 3, 6, 4, 8).

Division—Use of the Division Box.

Quotition and partition : Simple problems in both kinds of division.

[No attempt to make the distinction explicit, however, should be made.]

4. Multiplication and division based on tables learnt above : Answers should not extend to more than four figures.

5. Study of the *standard units of the metric system* (without using the decimal point).

6. Simple shopping sums using Rupees and naye paise only.

7. Measuring experiences with : centimetres and metres.
: litres.

8. Meaning and use of terms : minute, hour, day. Telling the *time*.

9. Simple experiences of position and shape, and comparison of size and quantity, extending scope of work done in Class I e.g. cutting out and covering patterns and designs, making designs with paper, estimations and check measurements of parcels, pails, own height and weight, length of stride etc.

10. Study of lines : straight, curved, bent.

CLASS III

1. Revision and extension of numeration and notation, up to 100,000.

2. Revision and extension of addition and subtraction. "Adding in the head" extended, e.g. from $5+8=13$ to $5+18=23$; $5+28=33$ etc.

Ladder sums—climbing up and climbing down.

Addition up to 3 rows of 5-figured numbers.

Subtraction up to 5-figured numbers.
Simple problems.

Simple problems taken from daily life and "centres of interest".

3. Revision of multiplication and division (by not more than two-figure numbers). Short division by divisors 13 to 19,

by *ad hoc* compilation of multiplication tables required (See Keith and Robertson Chap. V).

Simple problems taken from every day life and centres of interest.

Tables up to 12×12 and 16×12 .

4. Revision of the *standard units of the metric system* in simple problems taken from daily life and "centres of interest".

5. Extension of notions about time; months and days.

6. Ideas of space and simple practical work.

Paper cutting and folding.

Simple design work and colouring.

Squares, rectangles, circles, regular triangles.

Measurement and comparison of lengths—using the centimetre as unit.

CLASS IV

1. Extension of multiplication and division to three-figure multipliers, and divisors. Tests of divisibility by 2, 3, 5 and 11.

2. *The decimal system*. Changing of units. The four operations simply.

3. *The metric system*. Changing of units. The four operations.

4. *Decimal fractions*. Addition and subtraction. Concrete fractions : $1/2$; $1/4$; $3/4$, introduced through decimals.

5. Problems : Mental management in shopping and similar operations of Rs. 10.

6. Unitary Method. Simple examples in direct proportion drawn from and extending the child's experience.

7. Space Work Measurement. Revision and extension of the notions of lines and angles.

Use of compasses—Circles. Use of squared paper, comparing areas. Simple design involving the above figures.

The right angle. Drawing squares and rectangles to given measurements with the use of set-square and ruler.

CLASS V

[N.B.—The Indian Metric Units are to be used throughout.]

1. Extension of multiplication and division to more than 3-figure multipliers and divisors. Multiplication and division by factors.

2. Revision and extension of work of Class IV in the Decimal system.

3. Revision and extension of work in units of length and longitudinal measurement (Metric system).

4. Shopping and bills—practical work.

5. Fractions—extension of previous work to

(i) third, fifth, sixth, tenth, sixtieth.

(ii) Equivalences, and comparisons.

Adding and subtracting (with halves, quarters, thirds, fifths, tenths).

Use of ruler for teaching the adding and subtracting of tenths.

Adding and subtracting (proper, improper and mixed) fractions. Use of this process in simple problems based on daily life or "centres of interest."

Meaning and evaluation $3/7$ of, $3/5$ of.

6. Unitary Method, extension of previous work.

7. Prime factors. Divisibility by 3, 4, 6, 8, 9. H.C.F. and L.C.M. by factors.

8. Finding and use of averages.

9. Measure of time (including seconds and year), and simple problems. Com-

pound addition, subtraction; multiplication and division of units of time (days, hours, minutes, seconds).

10. Space work extended to angles and the use of the protractor. The Mariner's Compass—practical work. Construction of perpendiculars.

Simple construction of triangles—3 sides, a side and 2 angles, the regular hexagon, designs.

Circumference of circle, surface of circle, lateral surface of cylinder.

11. Column Graphs—Marks, height, rainfall, etc.

12. Simple equations.

Codes—using letters for numbers—substitution.

CLASS VI

1. Study of British Units of length, weights and measures and money. Extension of compound addition, etc. to these units.

2. Factors; H.C.F. and L.C.M. by factors—

Extension of work of Class V to divisors 7, 11, 13, 17, 19.

3. (a) Decimals—addition, subtraction, division and multiplication—extension of work done in Class V.

(b) Fraction—equivalences and conversions, addition, subtraction, multiplication and division.

Rules of signs.

(c) Percentages : different expressions (6% , $6/100$, 0.06) : use of a percentage in expressing marks, and profit and loss.

(d) Simple conversion—decimals to vulgar fraction and *vice-versa*.

4. Unitary Method—Extension to fractional method (omitting middle stage of unitary method).

5. Scales of plans and maps. Correspondence of volume, capacity and weight.
6. Areas—rectangle, square, rectangular trapezoid and simple patterns involving these. 8. Construction of prependiculars, perpendicular bisectors, bisector of angle, parallels, triangles, circumscribed circle, inscribed circle, angle-sum property of the triangle.
- Use of graph paper for finding area of irregular shapes.
- Simple solids—box-cube and rectangular solid-sphere. 9. Graphical work—Column graphs.
- Descriptive—Simple measurements. Continuous graphs—Records of height, weight rise of water level in a tank, etc.
- Models with paper cutting and folding. 10. Simple algebraic equations.
- Simple figures into triangles, rectangles, and rectangular trapezoids. Problems leading to the above.
- The lateral surfaces of simple geometrical volumes. Framing of formulae—generalization of simple rules.
7. Volumes (including practical ideas): The cube, the rectangular parallelepiped; the straight prism and the cylinder. Substitution.

RECOMMENDED TEXT BOOKS

Arithmetic

- | | | |
|--|------------------------|----------------------------|
| 1. First Steps in Number Books I-IV. | Dorothy Williams | Oxford University Press |
| 2. Now for Number (Junior Series) | Jean Walker | Chambers |
| 3. Real Arithmetic (Junior Series) | Burniston | Collins Clear Type Press |
| 4. Modern School Arithmetic. | E. V. Staynor | Orient Longmans |
| 5. Fundamental Arithmetic | P. B. Ballard | University of London Press |
| 6. Indian Primary Arithmetics. | L. G. Owen | Macmillan & Co. |
| 7. Four Rules of Number | K. A. Hesse | Longmans, Green |
| 8. Number Picture Books | J. Coupland | Longmans, Green, |
| 9. Lomond Number Books | Low, Murrery and Stott | University of London Press |
| 10. Lomond Arithmetics | Christie and Gibson | University of London Press |
| 11. The Child's Number Books. | P. B. Ballard | University of London Press |
| 12. New Indian Arithmetic | J. T. Best | Orient Longmans |
| 13. Infant Sum Books | | Longmans, Green |
| 14. A School Arithmetic | Channon and Smith | Longmans, Green |
| 15. A General Arithematic for Schools. | C. V. Durell | Bell |

MATHEMATICS SYLLABUSES FOR PRIMARY CLASSES

Algebra

- | | | |
|----------------------------------|---------------------|-----------------|
| 1. Elementary Algebra | Durrell | Bell |
| 2. An Introduction to Algebra. | G. W. Walters | Macmillan & Co. |
| 3. Essentials of School Algebra. | A. B. Mayne | Macmillan & Co. |
| 4. Algebra for Schools | Milne and Roberston | Bell |
| 5. A Modern School Algebra | Wilkinson | Cooper |
| 6. A New Algebra for School. | C. V. Durell | Bell |
| 7. A School Algebra | Channon and Smith | Longmans, Green |

Geometry

- | | | |
|--|-------------------|----------------------------|
| 1. Geometry for Juniors—Books I, II, III. | Ridout | Blackie |
| 2. With Ruler and Compasses. | | Nelson |
| 3. Fundamental Geometry | P. B. Ballard | University of London Press |
| 4. Simplified Geometry, Part I. | Durell and Tuckey | Bell |
| 5. Vital Primary Geometry | Williams | Macmillan & Co. |
| 6. Modern School Arithmetic (Relevant Sections). | E. V. Staynor | Orient Longmans |
| 7. A New Geometry for Schools Stage A & B. | C. V. Durell | Bell |
| 8. A School Geometry | Channon and Smith | Longmans, Green |

CORRECTION

In the July 1960 issue of *Metric Measures* the following corrections may be noted in the article 'Indian Geodetic System and Foot-Metre Ratio' by J. C. Bhattacharij.

(1) Page 14, lines 19-20 from top, 'differing in scale by 1.7×10^{-6} in place of 'differing by 1.7×10^{-6} .'

(2) Page 14, line 10 from bottom, by ' 1.7×10^{-6} in scale' in place of' by 1.7×10^{-6} .'

Metric Paper Sizes for Printing

A Conference of the Controllers of Printing in States, representatives of Railway Board, the Indian Standards Institution, Ministry of Commerce and Industry and the Chief Controller of Printing and Stationery was held in Udyog Bhavan on 16 January 1961. Shri K.V. Venkatachalam, Joint Secretary, Ministry of Commerce and Industry, presided.

The Chairman said that the Indian Standards Institution had already recommended standard metric sizes for trimmed paper. A draft standard for untrimmed paper had also been circulated by them for comments. The standard sizes for both trimmed and untrimmed paper conformed to the recommendations of the International Organization for Standardization. Paper manufacturers in the country were ready and willing to supply paper of standard metric sizes. There was, however, little demand for these sizes from users. With the progressive adoption of the metric system in various fields in the country, it was necessary that users of paper should increasingly use standard metric sizes. The Government as the biggest users of paper in the country had a special responsibility, and should make an early beginning. The use of metric sizes of paper for stationery was comparatively easy. The Chief Controller of Printing and Stationery had already adopted metric sizes (A sizes) for a number of important stationery items. The Departments of Printing and Stationery might consider adopting the same sizes with such modifications as might be needed to suit their

requirements. The Government Presses should also begin to use 'A' sizes of paper, but care had to be taken to limit the replacement of machinery, to the absolute minimum.

The Chief Controller of Printing and Stationery said that 'B' sizes of paper might be used on machines which could not accommodate the 'A' sizes. It would not, therefore, be necessary to scrap any existing machines. He expected that machines in use, which could not accommodate 'A' sizes would become due for scrapping in less than 10 years' time. A large proportion of the machines in use could, however, accommodate 'A' sizes of paper, but the chases would have to be changed. Manufacturers in the U.K. would be able to supply metric chases. Indian manufacturers would be able to supply chases made of cast steel, although these might not be as durable as imported chases made of cold rolled steel. He had found them giving satisfactory performance.

It was pointed out there would be no increase in printing work although the number of pages might increase. There would, therefore, be some increase of work in stitching and binding books. Over 2/3 of Government Press work consisted of printing forms, where no stitching or binding was involved. The increase in total work load would, therefore, be proportionately small.

The Conference agreed to make the following recommendations to the Governments.

Stationery

The Chief Controller of Printing and Stationery should send copies of his revised specifications for stationery items to the Controllers of Printing and Stationery of the States. The State Departments of Printing and Stationery would adopt the same sizes to the extent possible with such modifications as may be necessary. Where it is not possible to accept these sizes, they would draw up their own specifications based on 'A' sizes. The revised specifications would be used exclusively, for all stationery items, in 1962-63.

Printing

All printing machines which can accommodate 'A' sizes of paper should print exclusively on these within 5 years. During this period, they will take steps to replace their chases. From 1-4-1966, only 'A' sizes of paper should be used in these machines. All new machines to be installed, and all replacements to existing machines should be capable of using 'A' sizes of paper. There would, however, be no scrapping of any machine which had a useful life left. Any such machine which cannot accommodate 'A' sizes of paper would continue to work with 'B' sizes.

Standard Forms

The Departments of Printing and Stationery of the State Governments and the Railway Board should examine the forms they print in consultation with the users, with a view to reduce the number of forms and rationalize them. A Special Officer may be appointed in each Department for the purpose, if necessary. The examination of the forms and the design of new forms should be completed within 1 year, i.e., by 1-1-1962.

Indents for Paper

The Printing and Stationery Departments of the Central and State Governments and the Railway Board should immediately begin indenting for 'A' series of paper to the extent possible. Orders for other sizes must also specify the sizes in centimetres, rounded off to the nearest 0.5 cm. The paper substance must be specified in grams per square metre.

Progress Report

The Controllers of Printing and Stationery should send quarterly reports on the progress in carrying out the above recommendations to the Chief Controller of Printing and Stationery, with copies to the Secretary, Standing Metric Committee.

APPENDIX 1

METRIC SIZES OF PAPER IN MILLIMETRES AND INCH EQUIVALENTS

Designation (1)	Size in mm (2)	Size in inches (3)	Designation (4)	Size in mm (5)	Size in Inches (6)
4A O	1682×2378	66.22×93.62	B O	1000×1414	39.37×55.67
2A O	1189×1682	46.81×66.22	B 1	707×1000	27.83×39.37
A O	841×1189	33.11×46.81	B 2	500×707	19.68×27.83
A 1	594×841	23.39×33.11	B 3	353×500	13.90×19.68
A 2	420×594	16.54×23.39	B 4	250×353	9.84×13.90
A 3	297×420	11.69×16.54	B 5	176×250	6.93×9.84
A 4	210×297	8.27×11.69	B 6	125×176	4.92×6.93
A 5	148×210	5.83×8.27	B 7	88×125	3.46×4.92
A 6	105×148	4.13×5.83	B 8	62×88	2.44×3.46
A 7	74×105	2.91×4.13	B 9	44×62	1.73×2.44
A 8	52×74	2.05×2.91	B 10	31×44	1.22×1.73
A 9	37×52	1.46×2.05			
A 10	26×37	1.02×1.46			

APPENDIX 2

Government of India have already standardized several items of manufactured stationery and forms commonly used in all Government Departments and for their manufacture, the existing machinery and equipment already available, will not create any difficulties. The items are as below—

Description of Article	Present Size in Inches	Proposed Size (Designation/Size in mm/Exact Size in Inches).
Blotting white Demy (40 lbs)	17½"×22½"	= 150 gms
Blotting white Demy (38 lbs)		A-2 i. e. 420×594 mm or = 130 gsm
Blotting Pink Demy (40 lbs)		16.54"×23.39" = 150 gsm
Typewriting (6 lbs)	13"×16"	= 40 gsm
Books Blank Plain Royal (in different quires)		
File Books, 250 guards cloth bound.	13½"×19½"	A-3 i. e. 297×420 mm or 11.69"×16.54"
Typewriting (3 lbs)	10½"×14½"	= 40 gsm
Books blank and ruled in different qrs.	8"×13"	
Draft Continuation Sheet Buff	8½"×13"	A-4 i. e. 210×297 mm or 8.27"×11.69"
Note Sheet Blocks in different varieties	6-3/8"×8"	A-5 i. e. 148×210 mm or 5.83"×8.27"
Draft Sheet pad F cap folio.		
Books quarto-ruled, cloth bound 6 qrs.		
Exercise Books 64 pgs. of different varieties/Note Book, Shorthand Draft sheet pad F cap folio.		

Standards of Weights And Measures (Conversion of Land Areas) Rules, 1960

(Recently the Government of India have published Standards of Weights and Measures (Conversion of Land Areas) Rules, 1960 in the Official Gazette. As the Rules may be required for reference often by various authorities, they are being published in 'Metric Measures' in full. The following is the text of the Notification—Editor)

3. Manner of Conversion.—All references in any contract, deed, instruments, record or other document to areas of land expressed in terms of acres and cents shall be construed as references to areas expressed in terms of hectares and ares, converted thereto at the rates specified in the Schedule to these rules.

NOTIFICATION

S.O. 2874 New Delhi, dated the 25th Nov., 1960.

In exercise of the powers conferred by Section 16 and 17 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby makes the following rules namely:—

1. Short Title.—These rules may be called the Standards of Weights and Measures (Conversion of Land Areas) Rules, 1960.

2. Definitions.—In these rules:—

- 'acre' means 4840 square yards ;
- 'Act' means the Standards of Weights and Measures Act, 1956 (89 of 1956) ;
- 'are' means 100 square metres ;
- 'cent' means 48.4 square yards ;
- 'hectare' means 10,000 square metres.

SCHEDULE

CONVERSION TABLE FOR LAND AREAS.

TABLE I
(Cents to ares)

Cents	Ares
1	0.40
2	0.81
3	1.21
4	1.62
5	2.02
6	2.43
7	2.83
8	3.24
9	3.64

Table

(Acres and Cents to Hectares)

Cents	0		10		20		30		40	
	Acres	Hect-ares	Acres	Hect-ares	Acres	Hect-ares	Acres	Hect-ares	Acres	Hect-ares
0	0	0	0	0	0	0	0	0	0	0
1	0	40.47	0	44.52	0	48.56	0	52.61	0	56.66
2	0	80.94	0	84.98	0	89.03	0	93.08	0	97.12
3	1	21.41	1	25.45	1	29.50	1	33.55	1	37.59
4	1	61.87	1	65.92	1	69.97	1	74.01	1	78.06
5	2	2.34	2	6.39	2	10.44	2	14.48	2	18.53
6	2	42.81	2	46.86	2	50.90	2	54.95	2	59.00
7	2	83.28	2	87.33	2	91.37	2	95.42	2	99.47
8	3	23.75	3	27.79	3	31.84	3	35.89	3	39.94
9	3	64.22	3	68.26	3	72.31	3	76.36	3	80.40
10	4	4.68	4	8.73	4	12.78	4	16.83	4	20.87
11	4	45.15	4	49.20	4	53.25	4	57.29	4	61.34
12	4	85.62	4	89.67	4	93.72	4	97.76	4	1.81
13	5	26.09	5	30.14	5	34.18	5	38.23	5	42.28
14	5	66.56	5	70.61	5	74.65	5	78.70	5	82.75
15	6	7.03	6	11.07	6	15.12	6	19.17	6	23.21
16	6	47.50	6	51.54	6	55.59	6	59.64	6	63.68
17	6	87.96	6	92.01	6	96.06	6	1.10	6	4.15
18	7	28.43	7	32.48	7	36.53	7	40.57	7	44.62
19	7	68.90	7	72.95	7	76.99	7	81.04	7	85.09
20	8	9.37	8	13.42	8	17.46	8	21.51	8	25.56
21	8	49.84	8	53.88	8	57.93	8	61.98	8	66.03
22	8	90.31	8	94.35	8	98.40	8	2.45	8	6.49
23	9	30.77	9	34.82	9	38.87	9	42.92	9	46.96
24	9	71.24	9	75.29	9	79.34	9	83.38	9	87.43
25	10	11.71	10	15.76	10	19.81	10	23.85	10	27.90
26	10	52.18	10	56.23	10	60.27	10	64.32	10	68.37
27	10	92.65	10	96.70	10	0.74	10	4.79	10	8.84
28	11	33.12	11	37.16	11	41.21	11	45.26	11	49.30
29	11	73.59	11	77.63	11	81.68	11	85.73	11	89.77
30	12	14.05	12	18.10	12	22.15	12	26.19	12	30.24
31	12	54.52	12	58.57	12	62.62	12	66.66	12	70.71
32	12	94.99	12	99.04	12	3.08	12	7.13	12	11.18
33	13	35.46	13	39.51	13	43.55	13	47.60	13	51.65
34	13	75.93	13	79.97	13	84.02	13	88.07	13	92.12
35	14	16.40	14	20.44	14	24.49	14	28.54	14	32.58
36	14	56.86	14	60.91	14	64.96	14	69.01	14	73.05
37	14	97.33	14	1.38	14	5.43	14	9.47	14	13.52
38	15	37.80	15	41.85	15	45.90	15	49.94	15	53.99
39	15	78.27	15	82.32	15	86.36	15	90.41	15	94.46
40	16	18.74	16	22.79	16	26.83	16	30.88	16	34.93
41	16	59.21	16	63.25	16	67.30	16	71.35	16	75.39
42	16	99.68	16	3.72	16	7.77	16	11.82	16	15.86
43	17	40.14	17	44.19	17	48.24	17	52.28	17	56.33
44	17	80.61	17	84.66	17	88.71	17	92.75	17	96.80
45	18	21.08	18	25.13	18	29.17	18	33.22	18	37.27
46	18	61.55	18	65.60	18	69.64	18	73.69	18	77.74
47	19	2.02	19	6.06	19	10.11	19	14.16	19	18.21
48	19	42.49	19	46.53	19	50.58	19	54.63	19	58.67
49	19	82.95	19	87.00	19	91.05	19	95.10	19	99.14
50	20	23.42	20	27.47	20	31.52	20	35.56	20	39.61
51	20	63.89	20	67.94	20	71.99	20	76.03	20	80.08
52	21	4.36	21	8.41	21	12.45	21	16.50	21	20.55
53	21	44.83	21	48.88	21	52.92	21	56.97	21	61.02
54	21	85.30	21	89.34	21	93.39	21	97.44	21	1.48
55	22	25.77	22	29.81	22	33.86	22	37.91	22	41.95
56	22	66.23	22	70.28	22	74.33	22	78.37	22	82.42
57	23	6.70	23	10.75	23	14.80	23	18.84	23	22.89

II

and Ares upto 100 Acres)

Cents	50		60		70		80		90	
	Acres	Hectares	Acres	Hectares	Acres	Hectares	Acres	Hectares	Acres	Hectares
0	0	20.23	0	24.28	0	28.33	0	32.37	0	36.42
0	0	60.70	0	64.75	0	68.80	0	72.84	0	76.89
1	1	1.17	1	5.22	1	9.26	1	13.31	1	17.36
1	1	41.64	1	45.69	1	49.73	1	53.78	1	57.83
1	1	82.11	1	86.15	1	90.20	1	94.25	1	98.30
2	2	22.58	2	26.62	2	30.67	2	34.72	2	38.76
2	2	63.04	2	67.09	2	71.14	2	75.19	2	79.23
3	3	3.51	3	7.56	3	11.61	3	15.65	3	19.70
3	3	43.98	3	48.03	3	52.08	3	56.12	3	60.17
3	3	84.45	3	88.50	3	92.54	3	96.59	3	0.64
4	4	24.92	4	28.97	4	33.01	4	37.06	4	41.11
4	4	65.39	4	69.43	4	73.48	4	77.53	4	81.57
5	5	5.86	5	9.90	5	13.95	5	18.00	5	22.04
5	5	46.32	5	50.37	5	54.42	5	58.46	5	62.51
5	5	86.79	5	90.84	5	94.89	5	98.93	5	2.98
6	6	27.26	6	31.31	6	35.35	6	39.40	6	43.45
6	6	67.73	6	71.78	6	75.82	6	79.87	6	83.92
7	7	8.20	7	12.24	7	16.29	7	20.34	7	24.39
7	7	48.67	7	52.71	7	56.76	7	60.81	7	64.85
7	7	89.13	7	93.18	7	97.23	7	1.28	7	5.32
8	8	29.60	8	33.65	8	37.70	8	41.74	8	45.79
8	8	70.07	8	74.12	8	78.17	8	82.21	8	86.26
9	9	10.54	9	14.59	9	18.63	9	22.68	9	26.73
9	9	51.01	9	55.06	9	59.10	9	63.15	9	67.20
9	9	91.48	9	95.52	9	99.57	9	3.62	9	7.66
10	10	31.95	10	35.99	10	40.04	10	44.09	10	48.13
10	10	72.41	10	76.46	10	80.51	10	84.55	10	88.60
11	11	12.88	11	16.93	11	20.98	11	25.02	11	29.07
11	11	53.35	11	57.40	11	61.44	11	65.49	11	69.54
11	11	93.82	11	97.87	11	1.91	11	5.96	11	10.01
12	12	34.29	12	38.33	12	42.38	12	46.43	12	50.48
12	12	74.76	12	78.80	12	82.85	12	86.90	12	90.94
13	13	15.22	13	19.27	13	23.32	13	27.37	13	31.41
13	13	55.69	13	59.74	13	63.79	13	67.83	13	71.88
13	13	96.16	13	0.21	13	4.26	13	8.30	13	12.35
14	14	36.63	14	40.68	14	44.72	14	48.77	14	52.82
14	14	77.10	14	81.15	14	85.19	14	89.24	14	93.29
15	15	17.57	15	21.61	15	25.66	15	29.71	15	33.75
15	15	58.04	15	62.08	15	66.13	15	70.18	15	74.22
16	16	98.50	16	2.55	16	6.60	16	10.64	16	14.69
16	16	38.97	16	43.02	16	47.07	16	51.11	16	55.16
16	16	79.44	16	83.49	16	87.53	16	91.58	16	95.63
17	17	19.91	17	23.96	17	28.00	17	32.05	17	36.10
17	17	60.38	17	64.42	17	68.47	17	72.52	17	76.57
18	18	0.85	18	4.89	18	8.94	18	12.99	18	17.03
18	18	41.31	18	45.36	18	49.41	18	53.46	18	57.50
18	18	81.78	18	85.83	18	89.88	18	93.92	18	97.97
19	19	22.25	19	26.30	19	30.35	19	34.39	19	38.44
19	19	62.72	19	66.77	19	70.81	19	74.86	19	78.91
20	20	3.19	20	7.24	20	11.28	20	15.33	20	19.38
20	20	43.66	20	47.70	20	51.75	20	55.80	20	59.84
20	20	84.13	20	88.17	20	92.22	20	96.27	20	0.31
21	21	24.59	21	28.64	21	32.69	21	36.73	21	40.78
21	21	65.06	21	69.11	21	73.16	21	77.20	21	81.25
22	22	5.53	22	9.58	22	13.62	22	17.67	22	21.72
22	22	46.00	22	50.05	22	54.09	22	58.14	22	62.19
22	22	86.47	22	90.51	22	94.56	22	98.61	22	2.66
23	23	26.94	23	30.98	23	35.03	23	39.08	23	43.12

METRIC MEASURES, VOL. 4, MARCH 1961

		Table									
Cents		0		10		20		30		40	
Acres		Hect-ares	Ares	Hect-ares	Ares	Hect-ares	Ares	Hect-ares	Ares	Hect-ares	Ares
58		23	47.17	23	51.22	23	55.26	23	59.31	23	63.36
59		23	87.64	23	91.69	23	95.73	23	99.78	24	3.83
60		24	28.11	24	32.15	24	36.20	24	40.25	24	44.29
61		24	68.58	24	72.62	24	76.67	24	80.72	24	84.76
62		25	9.04	25	13.09	25	17.14	25	21.19	25	25.23
63		25	49.51	25	53.56	25	57.61	25	61.65	25	65.70
64		25	89.98	25	94.03	25	98.08	26	2.12	26	6.17
65		26	30.45	26	34.50	26	38.54	26	42.59	26	46.64
66		26	70.92	26	74.97	26	79.01	26	83.06	26	87.11
67		27	11.39	27	15.43	27	19.48	27	23.53	27	27.57
68		27	51.86	27	55.90	27	59.95	27	64.00	27	68.04
69		27	92.32	27	96.37	28	0.42	28	4.46	28	8.51
70		28	32.79	28	36.84	28	40.89	28	44.93	28	48.98
71		28	73.26	28	77.31	28	81.35	28	85.40	28	89.45
72		29	13.73	29	17.78	29	21.82	29	25.87	29	29.92
73		29	54.20	29	58.24	29	62.29	29	66.34	29	70.38
74		29	94.67	29	98.71	30	2.76	30	6.81	30	10.85
75		30	35.13	30	39.18	30	43.23	30	47.28	30	51.32
76		30	75.60	30	79.65	30	83.70	30	87.74	30	91.79
77		31	16.07	31	20.12	31	24.17	31	28.21	31	32.26
78		31	56.54	31	60.59	31	64.63	31	68.68	31	72.73
79		31	97.01	32	1.06	32	5.10	32	9.15	32	13.20
80		32	37.48	32	41.52	32	45.57	32	49.62	32	53.66
81		32	77.95	32	81.99	32	86.04	32	90.09	32	94.13
82		33	18.41	33	22.46	33	26.51	33	30.55	33	34.60
83		33	58.88	33	62.93	33	66.98	33	71.02	33	75.07
84		33	99.35	34	3.40	34	7.34	34	11.49	34	15.54
85		34	39.82	34	43.87	34	47.91	34	51.96	34	56.01
86		34	80.29	34	84.33	34	88.38	34	92.43	34	96.47
87		35	20.76	35	24.80	35	28.85	35	32.90	35	36.94
88		35	61.22	35	65.27	35	69.32	35	73.37	35	77.41
89		36	1.69	36	5.74	36	9.79	36	13.83	36	17.88
90		36	42.16	36	46.21	36	50.26	36	54.30	36	58.35
91		36	82.63	36	86.68	36	90.72	36	94.77	36	98.82
92		37	23.10	37	27.15	37	31.19	37	35.24	37	39.29
93		37	63.57	37	67.61	37	71.66	37	75.71	37	79.75
94		38	4.04	38	8.08	38	12.13	38	16.18	38	20.22
95		38	44.50	38	48.55	38	52.60	38	56.64	38	60.69
96		38	84.97	38	89.02	38	93.07	38	97.11	39	1.16
97		39	25.44	39	29.49	39	33.53	39	37.58	39	41.63
98		39	65.91	39	69.96	39	74.00	39	78.05	39	82.10
99		40	6.38	40	10.42	40	14.47	40	18.52	40	22.56
100		40	46.85								

		Table									
Acres		(Acres to Hectares & Ares)									
Acres		0		100		200		300		400	
		Hect-ares	Ares	Hect-ares	Ares	Hect-ares	Ares	Hect-ares	Ares	Hect-ares	Ares
1000		0	0	40	46.85	80	93.69	121	40.54	161	87.38
2000		404	68.46	445	15.36	485	62.15	526	9.00	566	55.84
3000		809	36.92	849	83.76	890	30.61	930	77.45	971	24.30
		1,214	5.37	1,254	52.22	1,294	99.07	1,335	45.91	1,375	92.76

STANDARDS OF WEIGHT AND MEASURES CONVERSION OF LAND AREAS RULE 1961

II—contd.											
50		60		70		80		90			
Hectares	Ares	Hectares	Ares	Hectares	Ares	Hectares	Ares	Hectares	Ares	Hectares	Ares
23	67.40	23	71.45	23	75.50	23	79.55	23	83.59		
24	7.87	24	11.92	24	15.97	24	20.01	24	24.06		
24	48.34	24	52.39	24	56.44	24	60.48	24	64.53		
24	88.81	24	92.86	24	96.90	25	0.95	25	5.00		
25	29.28	25	33.33	25	37.37	25	41.42	25	45.47		
25	69.75	25	73.79	25	77.84	25	81.89	25	85.93		
26	10.22	26	14.26	26	18.31	26	22.36	26	26.40		
26	50.68	26	54.73	26	58.78	26	62.82	26	66.87		
26	91.15	26	95.20	26	99.25	27	3.29	27	7.34		
27	31.62	27	35.67	27	39.71	27	43.76	27	47.81		
27	72.09	27	76.14	27	80.18	27	84.23	27	88.28		
28	12.56	28	16.60	28	20.65	28	24.70	28	28.75		
28	53.03	28	57.07	28	61.12	28	65.17	28	69.21		
28	93.49	28	97.54	29	1.59	29	5.64	29	9.68		
29	33.96	29	38.01	29	42.06	29	46.10	29	50.15		
29	74.43	29	78.48	29	82.53	29	86.57	29	90.62		
30	14.90	30	18.95	30	22.99	30	27.04	30	31.09		
30	55.37	30	59.42	30	63.46	30	67.51	30	71.56		
30	95.84	30	99.88	31	3.93	31	7.98	31	12.02		
31	36.31	31	40.35	31	44.40	31	48.45	31	52.49		
31	76.77	31	80.82	31	84.87	31	88.91	31	92.96		
32	17.24	32	21.29	32	25.34	32	29.38	32	33.43		
32	57.71	32	61.76	32	65.80	32	69.85	32	73.90		
32	98.18	33	2.23	33	6.27	33	10.32	33	14.37		
33	38.65	33	42.69	33	46.74	33	50.79	33	54.84		
33	79.12	33	83.16	33	87.21	33	91.26	33	95.30		
34	19.58	34	23.63	34	27.68	34	31.73	34	35.77		
34	60.05	34	64.10	34	68.15	34	72.19	34	76.24		
35	0.52	35	4.57	35	8.62	35	12.66	35	16.71		
35	40.99	35	45.04	35	49.08	35	53.13	35	57.18		
35	81.46	35	85.51	35	89.55	35	93.60	35	97.65		
36	21.93	36	25.97	36	30.02	36	34.07	36	38.11		
36	62.40	36	66.44	36	70.49	36	74.54	36	78.58		
37	2.86	37	6.91	37	10.96	37	15.00	37	19.05		
37	43.33	37	47.38	37	51.43	37	55.47	37	59.52		
37	83.80	37	87.85	37	91.89	37	95.94	37	99.99		
38	24.27	38	28.32	38	32.36	38	36.41	38	40.46		
38	64.74	38	68.78	38	72.83	38	76.88	38	80.93		
39	5.21	39	9.25	39	13.30	39	17.35	39	21.39		
39	45.67	39	49.72	39	53.77	39	57.82	39	61.86		
39	86.14	39	90.19	39	94.24	39	98.28	40	2.33		
40	26.61	40	30.66	40	34.71	40	38.75	40	42.80		

III
Ares upto 10,000 ares)

500		600		700		800		900	
Hect-ares	Ares	Hect-ares	Ares	Hect-ares	Ares	Hect-ares	Ares	Hect-ares	Ares
202	34.23	242	81.07	283	27.92	323	74.77	364	21.61
607	2.69	647	49.53	687	96.38	728	43.22	768	90.07
1011	71.15	1052	17.99	1,092	64.84	1,133	11.68	1,173	58.53
1416	39.60	1,456	86.45	1,497	33.29	1,537	80.14	1,578	26.99

Table III (contd.)

Acres	0		100		200		300		400	
	Hectares	Ares	Hectares	Ares	Hectares	Ares	Hectares	Ares	Hectares	Ares
4000	1618	73.83	1659	20.68	1699	67.52	1740	14.37	1780	61.22
5000	2023	42.29	2063	89.14	2104	35.98	2144	82.83	2185	29.67
6000	2428	10.75	2468	57.59	2509	4.44	2549	51.29	2589	98.13
7000	2832	79.21	2873	26.05	2913	72.90	2954	19.74	2994	66.59
8000	3237	47.66	3277	94.51	3318	41.36	3358	88.20	3399	35.05
9000	3642	16.12	3682	62.97	3723	9.81	3763	56.66	3804	3.51
10000	4046	84.58								

Acres	500		600		700		800		900	
	Hectares	Ares	Hectares	Ares	Hectares	Ares	Hectares	Ares	Hectares	Ares
4000	1821	8.06	1861	54.91	1902	1.75	1942	48.60	1982	95.44
5000	2225	76.52	2266	23.36	2306	70.21	2347	17.06	2387	63.90
6000	2630	44.98	2670	91.82	2711	38.67	2751	85.51	2792	32.37
7000	3035	13.44	3075	60.28	3116	7.13	3156	53.97	3197	0.83
8000	3439	81.89	3480	28.74	3520	75.58	3561	22.43	3601	69.28
9000	3844	50.35	3884	97.20	3925	44.04	3965	90.89	4006	37.75

News & Views

Recent Notifications

(1) Motor Transport

No. S.O. 3178, Dated 28th December, 1960.

In exercise of the powers conferred by Sub-section (3) of section 1 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby appoints the first day of January, 1961 as the date on which the provisions of the said Act, shall come into force in respect of :—

1. motor transport undertakings, in so far as they undertake the transport by road of passengers, animals or goods;

2. undertakings engaged in the manufacture of motor vehicles, or spare parts of motor vehicles in so far as they relate to the purchase or sale of motor vehicles or spare parts thereof;

and

3. transactions involving the sale or purchase of motor vehicles or spare parts thereof.

S.O. No. 3179, Dated 28th December, 1960.

In exercise of the powers conferred by Section 14 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby permits, in respect

of the classes of undertakings and of transactions referred to in the Notification of the Government of India in the Ministry of Commerce and Industry, S.O. No. 3178, dated the 28th December, 1960, the continuance of the use, for a period of one year from the first day of January, 1961, of any weight or measure which, immediately before that day was in use in respect of the said classes of undertakings or of transactions.

S.O. No. 3180, Dated 29th December, 1960.

In exercise of the powers conferred by Sub-section (2) of Section 1 of the Motor Vehicles (Second Amendment) Act, 1960, (51 of 1960), the Central Government hereby appoints the first day of January, 1961, as the date on which the said Act, shall come into force.

Ministry of Transport & Communications
Department of Transport
(Transport Wing)

(2) Tobacco Industry

S.O. No. 3115, Dated 22nd December, 1960

In exercise of the powers conferred by Sub-section (3) of section 1 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby appoints the 1st day of January, 1961, as the date on which the provisions of the said Act shall come into force in respect of undertakings engaged in the processing of tobacco leaf or the manufacture of tobacco, in so far as they undertake the purchase or sale of tobacco leaf or manufactured tobacco.

(3) Payment of Wages (Mines) Amendment Rules, 1960.

S.O.No. 1369 PWA/Mines/Rules/Am, Dated 21st December, 1960.

In exercise of the powers conferred by Sub-sections (2), (3) and (4) of section 26,

read with section 24, of the Payment of Wages Act, 1936 (4 of 1936), the Central Government hereby makes the following rules to further amend the Payment of Wages (Mines) Rules, 1956, the same having been previously published as required by Sub-Section (5) of the said section 26, namely:—

1. These rules may be called the Payment of Wages (Mines) Amendment Rules, 1960.
2. In the Payment of Wages (Mines) Rules, 1956, hereinafter referred to as the said rules, in sub-rule (2) of rule 17 for the words, figures and brackets "the Measures of Length Act, 1889 (2 of 1889) and the Standards of Weights Act, 1939 (9 of 1939)" the words, figures and brackets "The Standards of Weights and Measures Act, 1956 (89 of 1956)" shall be substituted.
3. In the said rules, in rule 22, for the word and figures "17 and 18", the word and figures "17, 18 or 19" shall be substituted.

Ministry of Labour and Employment

(4) Ports & Shipping

S.O. No. 261, Dated the 31st January, 1961.

In exercise of the powers conferred by section 14 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby makes the following amendment in the Notification of the Government of India in the Ministry of Commerce and Industry No. S.O. 1899, dated the 1st August, 1960, (relating to the permission of the continuance of the use of any weight or measure which, immediately before the 1st August, 1960, was in use in respect of Ports and Shipping industry), namely:—

In the said Notification, for the words "for a period of six months", the

words "for a period of one year" shall be substituted.

(For Notification No. S.O. 1899, dated 1st August, 1960, see *Metric Measures*, September, 1960, p. 23).

(5) Imports and Exports Control

On the subject of introduction of metric system of weights and measures in Import and Export Trade Control a reference is invited to Public Notice No. 11-ITC(PN)/60, dated the 18th January, 1960, issued by the Ministry of Commerce and Industry, Government of India, stating that the metric system of weights and measures for the purposes of for Import and Export Trade Control will be adopted from August, 1960.

2. The Customs Duties and Cesses (Conversion to Metric Units) Act, 1960, has come into force from the 1st October, 1960. Public Notice No. 119-ITC(PN)/60, dated 4th October 1960 read with Public Notice No. 119-ITC (PN)/60 dated 27th January, 1961, reads as follows and states that the metric system will, be adopted from this date for the purposes of Import and Export Trade Control also to the extent below :—

(i) All shipping documents relating to imports, exports and re-exports will be in Metric Units. Shippers in foreign countries such as United Kingdom or United States of America, will, however, have the option to use British Units in their shipping documents, invoices etc.

(ii) Where licensing is on the basis of quantity e.g. Raw Jute etc., new quota certificate and licence will be issued in Metric Units; even otherwise quantities in licences will be shown in Metric Units, wherever necessary.

(iii) While applying for licences importers and exporters will indicate quantities in Metric Units.

Movement of Weights by Rail

From October 1, 1960 the use of weights other than metric weights has become illegal in a number of areas. Some of the States

and Union Territories do not have enough manufacturers of weights and measures and have to depend on weights brought from other States for the enforcement of the metric system. One of the difficulties in getting weights from other States was that no priority was accorded on the Railways to the transport of metric weights. The Railway Board have now agreed to raise the priority assigned to the movement of weights and measures, and issued necessary instructions to the General Managers of all Indian Government Railways to arrange movement of weights under the higher priority item 'D' of the Preferential Traffic Schedule, when offered for despatch by the consignors on the respective Railways.

Working Standard Length Measures

The general specifications for the working standards length measures (line standards) were generally approved in the third meeting of the Sub-Committee for Reference, Secondary and Working Standard Weights and Measures (EDC 41:1) of the Indian Standards Institution. The following general characteristics were agreed upon :—

- (1) *Material*: Pure nickel (Cobalt free) 99.0 Percent, min, nickel.
- (2) *Section*: Rectangular 30 mm × 15 mm.
- (3) *Overall Length*: 1 030 mm (Nominal).
- (4) *Graduated Length*: 1 010 mm.
- (5) *Finish*: Bright.
- (6) *Graduations*: —10 mm to +10mm graduated in millimetres, and +10 mm to 1 000 mm graduated every 5 millimetres.
- (7) *Thickness of Graduation Marks*: Thickness of graduation marks to be normally 60 to 70 microns. No lines to be less than 50 microns or more than 80 microns.
- (8) *Length of Graduation Marks*:
cm marks = 8 mm.
5mm marks = 5 mm.
mm marks = 3 mm.

rupee and the paisa there are 4 intermediate coins of the value of 50, 25, 10 and 5 paisa.

Only three new coins of the denominations of 1 paisa, 5 paisa and 10 paisa were introduced on 1 January. The new rupee, 50 paisa and 25 paisa coins would be introduced later. Till then, the existing rupee, 1/2 rupee and 1/4 rupee coins would continue to be common to both the present and the new coinage systems as they are the exact equivalents of 100 paisa, 50 paisa and 25 paisa respectively.

The present 2 anna, 1 anna, 1/2 anna, 1 pice and pie coins would not have exact equivalents in the new coins but their place would be taken by 10 paisa, 5 paisa and 1 paisa. The existing coins, along with the new coins, would continue to be legal for 3 years. The principle of rounding off is that 1/2 paisa and less will be ignored and more than 1/2 paisa will be treated as 1 paisa.

All Government accounts would be maintained in terms of the new currency from 1 January, 1961. The banks and commercial houses have been advised to switch over to the new currency from 1 January 1961.

It has already been announced that the metric system of weights and measures will be introduced in Pakistan from 1 January 1962.

- (9) *Tolerance*: Overall length (0 to 1 000 mm) ± 0.1 mm.
Between any two consecutive mm, 5 mm, cm and 10 cm marks = ± 0.05 mm.
- (10) *Figuring*: Height of numerals and letters = 3 mm approximately.
- (11) *Identification Marks*: Ashok Chakra and other identification marks to be put along centre line of the top surface.
- (12) *Hole for Stamping Plug*: Approximately 5 mm in diameter and 3 mm in depth (with slight taper).
- (13) *Stop for Aligning the End of the Metre Bar under Test*: This is to be provided only on 1 000 mm side.
- (14) *Cursor*: To be made from 'Perspex' or any other suitable plastic material of 3 mm thickness and suitable size, with 3 lines, right through, on the under side, 1mm apart.
- (15) *Magnifier*: This shall have ×3 to ×4 magnification.
- (16) *Box*: Suitable teak wood box with lock, carrying handle and a name plate.

The Mint at Bombay has already started production of the measures to the above specifications.

Pakistan Change-over to Decimal Currency

From 1 January 1961, Pakistan has switched over to decimal coinage.

Under the new system the rupee is divided into 100 paisa instead of 16 annas or 64 pice or 192 pies as in the old system. Between the

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Book Review

A HANDBOOK OF METRIC WEIGHTS AND MEASURES : (English)—Joginder Singh Bakshi, Weights and Measures Department, 455—Model Town, Yamuna Nagar, (Ambala), Punjab—Published by the Author, 1960, pp60, Price Rs. 1.50

The Inspector of Weights and Measures is the person who is most intimately and directly connected with the enforcement of metric weights and measures. And since the enforcement of weights and measures is being carried out with great persuasiveness, the onus of finding out the difficulties and solving them in practice falls on the Inspector. He, therefore, has wide knowledge of the problems of various types of trades and consumer interests. As such the 'Handbook of Metric Weights and Measures' written by Shri Bakshi, himself a weights and measures Inspector, reflects the field experience of the Weights and Measures Department and has turned out to be a valuable, handy guide which will help everybody.

The author has divided the book into 4 parts. The first part—why and wherefore—is treated in a question-answer fashion, in which questions like what is the metric system, why has India adopted it inspite of involving the expenditure of a few crores of rupees, what is its superiority and the nature of change-over have been briefly but directly answered. The second part deals with curiosities like the number of weights required for the change-over, weights of new coins, conversion of temperature and so on. The third part concerns

'Metric Weights and You'. In this again the author reverts to the question-answer form and answers precisely and to the point problems like how one can familiarize oneself with the new weights, the effect on prices, international names, the various types of metric weights for use, the relation between weights and measures, the prefixes and abbreviations, simple conversions and conversion factors. In the fourth part various types of tables needed in every day transactions are given with explanatory notes on how to use them. There are some 24 tables, some of which relate to conversion of prices, while others deal with conversion of weights and measures.

The Handbook is undoubtedly an excellent reference book and anybody who refers to it will find answers for most of the questions that arise when one is carrying out a transaction in metric units. It is particularly useful for the common man and being handy can be easily carried about for reference.

At present, however, the Handbook is available in English only. Its utility will be multiplied many times if it comes out in the Indian regional languages. It may be too much to expect the author who is also the publisher, to bring out these editions himself. The Government of Punjab may perhaps consider its translation and publication at least in Hindi and Punjabi. The Handbook is highly recommended to those who wish to keep themselves abreast of the reform.

Licensed Manufacturers, Dealers and Repairers of Weights and Measures(12)

Metric Measures has been publishing a series of lists of manufacturers, dealers and repairers of weights and measures, weighing and measuring instruments licensed by the Governments in the various States and Union Territories under their Weights and Measures (Enforcement) Act in their respective jurisdiction. This is the twelfth list. The first list appeared in the March 1959 issue.

Progressively steps are being taken for licensing manufacturers, dealers and repairers in all States and further lists of licensees would be published in *Metric Measures* as this work progresses.

The number in brackets against the name of the State or Union Territory indicates the particular instalment number of the list of that State or Union Territory. The issues of *Metric Measures* in which previous lists appear are also shown suitably.

An analysis of the licensees, including the present list, shows that the total number of licensees in 14 States and 3 Union Territories is 540 manufacturers, 1653 dealers, and 484 repairers. The details of published information are as follows :

Sl. No.	State/Union Territory	Licensees		
		Manu- fac- turers	Dealers	Re- pairers
(1)	Andhra Pradesh ..	44	67	37
(2)	Assam ..	10	17	7
(3)	Bihar ..	20	69	34
(4)	Delhi ..	22	76	19
(5)	Gujarat ..	45	226	55
(6)	Himachal Pradesh ..	1	7	1
(7)	Kerala ..	9	219	12
(8)	Madhya Pradesh ..	3	160	4
(9)	Madras ..	79	210	37
(10)	Maharashtra ..	60	162	106
(11)	Mysore ..	37	232	27
(12)	Orissa ..	10	15	0
(13)	Punjab ..	27	92	21
(14)	Rajasthan ..	16	69	18
(15)	Tripura ..	0	10	0
(16)	Uttar Pradesh ..	92	222	51
(17)	West Bengal ..	65	200	55
		540	1,653	484

LICENSED MANUFACTURERS, DEALERS & REPAIRERS OF WEIGHTS & MEASURES (12)

ASSAM (I)

The following is a list of manufacturers, dealers Measures (Enforcement) (Amendment) Act, 1960 and and repairers licensed under the Assam Weights and Rules framed thereunder.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Agarwal & Agarwal, Private Ltd., Dibrugarh ..	Weights
(2)	Alluminium Industries (Assam) Private Ltd., Tinsukia ..	Weighing and Measuring Instruments
(3)	Annapurna Rice & Oil Mills, Gauhati ..	Weights, Measures, Weighing and Measuring Instruments.
(4)	Assam Steel & Wire Products, Tinsukia ..	Weights, Measures, Weighing and Measuring Instruments.
(5)	Hanuman Industries, Fancy Bazar, Gauhati ..	Weights, Weighing & Measuring Instruments
(6)	R. B. Industries, Fancy Bazar, Gauhati ..	Weights
(7)	Jayshree Assam Engineering Company, Dhubri ..	Weights
(8)	More Industrial Corporation, Nowgong ..	Weights and Measures
(9)	Siotia Steel Trunk and Bucket Factory, Fancy Bazar, Gauhati ..	Measures
(10)	K. C. Trunk and Bucket Factory, Gauhati ..	Measures

Dealers

Serial No.	Name and Address of Dealer	Details of Articles Sold
(1)	Annapurna Rice & Oil Mills, Gauhati.	(Weights, Measures, Weighing and Measuring Instruments)
(2)	Dhing Pioneer, Multipurpose Co-operative, Dhing, Nowgong.	
(3)	Durga-Trunk, Bucket & Ridging Works, Haibargaon, Nowgong.	
(4)	Ganeshlal Bagri, Poona Bazar, Imphal.	
(5)	Hariprasad, Goswami, B. Com., Bongaigaon Town.	
(6)	R. B. Industries, Fancy Bazar, Gauhati.	
(7)	Jayshree (Assam), Engineering Co., Dubri.	
(8)	Kayaliram Tarachand, Haibargaon, Nowgong.	
(9)	Khetulal Todi, Haibargaon, Nowgong.	
(10)	Nandalal Bhawarlal, Haibargaon, Nowgong.	
(11)	Rangalal Bagarie & Others, Haibargaon, Nowgong.	
(12)	Shantilal Jain & Co., Fancy Bazar, Gauhati.	
(13)	Steelnagar Hardware Stores, Tinsukia.	
(14)	Sundaram Gaurishankar, G. S. Road, Shillong.	
(15)	Sundaram Gaurishankar, Fancy Bazar, Gauhati.	
(16)	Todi Motor & Cycle Co., Tinsukia.	
(17)	K. C. Trunk & Bucket Factory, Fancy Bazar, Gauhati.	

Repairers

Sl. No.	Name and Address of Repairer	Details of Article Repaired
(1)	Alilur Rahman, C/o B. O. C. (I.T.) Ltd., Digboi ..	Weighing and Measuring Instruments
(2)	Annapurna Rice & Oil Mills, Gauhati ..	Weights, Measures, Weighing and Measuring Instruments
(3)	J. C. Bhattacharjee, C/o, B. O. C. (I.T.) Ltd., Digboi, Assam ..	Weighing and Measuring Instruments
(4)	D. C. Choudhury, Marketing Engineer, C/o, B. O. C. (I.T.) Ltd., Digboi.	Weighing and Measuring Instruments
(5)	C. E. De Mello, Asst. Marketing Engineer, C/o, B. O. C. (I.T.) Ltd., Digboi.	Weights and Measuring Instruments
(6)	B. S. Gill & Co., Namrup, Lakhimpur Dist. ..	Weighing and Measuring Instruments
(7)	Standard Vacuum Oil Company, Station Road, Gauhati ..	Weights and Measures

GUJERAT (I)

List of licensed Manufacturers, dealers and repairers licensed under the Bombay Weights and Measures (Enforcement) Act, 1958.

Manufacturers

Serial No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Adler Sewing Machine Works Near Matar Bhavani Vav, Asarwa, Ahmedabad.	Weights
(2)	Amin Engineering and Moulding Company Saraspur, Kadiawad, Ahmedabad-2.	Weights
(3)	Anantrai Hirachand Doshi, Amratwel Zampa, Savarkundla	Beam Scales Class C & D
(4)	Arjan Valji & Sons, Nadi Kantha, Savarkundla	Beam Scales
(5)	Associated Scales Industries Hathibhai Street, Savarkundla	Beam Scales
(6)	V. K. Engineering Works, Shahpur Panjra Poles, Dariapur Garden Road, Shop No. 3396/1, Ahmedabad.	Weights
(7)	M. M. Esmailji, Prop. Modern Measuring Equipment, House No. 4/4623, Tayebi Mohalla, Surat.	Beam Scales
(8)	Gandhi Scale Manufacturing Co., Sheth Street, Savarkundla	Beam Scales
(9)	Gujarat Engineering Works, Lal Gin, Station Road, Broach	Weights
(10)	Hari Metal Works, Mandavi Bazar, Lunawada	Weights
(11)	K. C. Industries, Near Bethak, Behind Anand Ice Factory, Anand ..	Weights
(12)	Ishwar Engineering Works and Casting Co., Bhakti Nagar Station Road, Rajkot.	Weights
(13)	Jeram Trikam Ravji & Brothers, Nadi Kantha, Savarkundla	Beam Scale Class C
(14)	Jewellery Scales Works, Lehipura, New Road Golwad Gali, Krishna Kunj, Baroda.	Beam Scales Class C & D
(15)	Jivan Nanji & Sons, Nadi Kantha, Savarkundla	Beam Scales
(16)	Kansara Brothers, Gujarat Hosiery Mill Compound, Rakhial Road, Ahmedabad.	Weights
(17)	Khoda Natha, Nadi Kantha, Savarkundla	Beam & Scales Class C & D
(18)	Lotus Brass Works, Opp: Udyog Bazar, Bhaktinagar, Station Road, Rajkot.	Weights
(19)	Luhar Bhavan Mulji, Dhobi Sheri, Savarkundla	Beam Scales Class C & D
(20)	Luhar Govind Mulji, Nadi Kantha, Odwado, Savarkundla	Beam Scales Class C & D
(21)	Luhar Govind Vira, Manibhai Road, Savarkundla	Beam Scales Class C & D
(22)	Luhar Hakabhai Kanji, Manibhai Road, Savarkundla	Beam Scales Class C & D
(23)	Luhar Jiva Gopal & Co., Amratwel Gate, Savarkundla	Beam Scales Class C & D
(24)	Luhar Karsan Ramji & Sons, Popat Bogha Street, Savarkundla ..	Beam Scales Class C & D
(25)	Luhar Mavji Dadwa, Mota Bhamodra, Via, Savarkundla	Counter Scales
(26)	Luhar Mulji Naran, Manibhai Road, Savarkundla	Beam Scale Class C & D
(27)	Luhar Ramji Velji Keshav, Nadi Kantha, Savarkundla	Beam Scale Class C & D
(28)	Luhar Mavji Velji, Devia Gate, Savarkundla	Beam Scale Class C & D
(29)	Madha Mavji & Company, Nadi Kantha, Savarkundla	Beam Scales Class C & D
(30)	Manubhai Duadbhai Outside Raipur Gate, Kankaria Road, Trimbak Dehla Shop No. 431/4, Ahmedabad	Beam Scales Class C & B
(31)	Morarji Dhanji & Brother, Zinzuda Gate, Savarkundla	Beam Scales Class C & D
(32)	Luhar Mulji Trikam Ravji Co., Nadi Kantha, Savarkundla	Beam Scales Class C & D
(33)	Narsi Giga & Co., Nadi Kantha, Savarkundla	Weights
(34)	Noble Scale Repairing Works, Gheekanta Road, Bhutni Ambli, Ahmedabad.	Weights
(35)	Pioneer Engineering Works Naroda Road, Ahmedabad	Weights
(36)	Raja Gordhan & Co., Nadi Kantha, Savarkundla	Beam Scale Class C & D
(37)	Ranchhodbhai Fakirbhai Panchal, Lal Akhoda, Near Sarasia Tank, Fatepura, Baroda.	Weights
(38)	Sarvodaya Khadi Saranjam Sangh, Harijan Ashram, Sabarmati, Ahmedabad.	Weights
(39)	Shah Moulding Works, Sir Chinubhai Baronet Compound, Shahpur, Ahmedabad.	Weights
(40)	Shreyas Engineering Corporation, Station Road, Anand	Weights
(41)	Sidhapura Scale Industries, Jamadar Pada, Savarkundla	Beam Scales Class C & D.
(42)	Sinroja Brass Works, Lakhajiraj Para, Street No. 2, Rajkot	Brass Bullion Weights
(43)	Vasant Engineering Limited, Pratap Nagar, Baroda	Weights
(44)	Vithaldas Dahyabhai Panchal, 1341/2, Khadia, Madan Gopal's Haveli, Near Pipra Pole, Ahmedabad.	Weights
(45)	Yadev Brass Works, Bhaktinagar Station Plot, Near Vithal Chhagan Factory, Rajkot.	Weights

LICENSED MANUFACTURERS, DEALERS & REPAIRERS OF WEIGHTS & MEASURES (12)

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	A. Dinkarrai and Bros., Lokhand Bazar, Bhavnagar	Weights and Beam Scales.
(2)	A. Salehbhai & Co., Outside Golwadi Gate, Viramgaum, Dist. Ahmedabad.	Weights, Weighing and Measuring Instruments.
(3)	Abbasbhai Esmailji, Lokhand Bazar, Station Road, Viramgaum ..	Weights, Weighing and Measuring Instruments
(4)	Abdulbhai Sakurbhai, Dabhad Taluka Kheralu, Dist. Mehsana ..	Weights, Weighing and Measuring Instruments
(5)	Abdulkadar Abdulhusein, Rangwala, 1166, Bangadi Bazar, Pankore Naka, Ahmedabad.	Weights, Weighing and Measuring Instruments
(6)	Abdulasul Amibhai Zajwala Vohorwad, Bazar, Prantiji, District Sabarkantha.	Weights, Weighing and Measuring Instruments.
(7)	Abdullahi Bodalbhai & Sons, Mahatma Gandhi Road, Rajkot ..	Weights and Beam Scales
(8)	Abdulrahim Pirmohamad Memon, Sadar Bazar, New Deesa ..	Weights, Weighing and Measuring Instruments
(9)	Abdulhusein Valibhai Lokhandwala, Near Sharda School, Station Road, Anand.	Weights, Weighing and Measuring Instruments
(10)	Adamji Pirbhai & Sons, Garedia Kuva Road, Rajkot	Weights & Beam Scales
(11)	Ahmed Shujadain & Sons, Nava Bazar, Miyagam	Weights, Weighing and Measuring Instruments
(12)	Ahamadalli Adamji Gujar Bazar, Rajkot	Weights and Beam Scales.
(13)	Akbarali Abdulali Lokhandwala, Chhoti Bazar, Palanpur	Weights, Weighing and Measuring Instruments
(14)	Akbarali Abdulali Vadgamwala Near Vohra Musafirkhana Library, Deesa. Dist. Banaskantha.	Weights, Weighing and Measuring Instruments
(15)	Akbaralli Mohamadalli Gujar Bazar, Rajkot	Weights and Beam Scales
(16)	Alexandra Scale Co., H.O. 115/1, Pankore Nakak, Ahmedabad-1 ..	Weights, Weighing and Measuring Instruments
(17)	Ambalal Damodardas Shah, Bazar, Thasra, Dist. Kaira	Weights, Weighing and Measuring Instruments
(18)	Ambalal Shamaldas Shah, Pattayya Bazar, Kanadwani, Dist. Kaira	Weights, Weighing and Measuring Instruments
(19)	Amin Engineering and Moulding Co., Saraspur, Kadiwad, Ahmedabad	Weights, Weighing and Measuring Instruments
(20)	Amirbhai Miyabhai Patel, Kapad Bazar, Viramgam	Weights, Weighing and Measuring Instruments
(21)	Aminbhai Hajirahimbhai, Bazar, Harli, Dist. Mehsana	Weights, Weighing and Measuring Instruments
(22)	Amratlal Arjunbhai & Bros., Sardar Patel Road, Junagadh	Weights and Beam Scales
(23)	Amthalal M. Prajapati, Kheda-Falia, Vejalpur, Dist. Panchmahals	Weights, Weighing and Measuring Instruments
(24)	Amulakhdas Hargovandas Shah, Luhar Chakla, Unjha, Dist. Mehsana	Weights, Weighing and Measuring Instruments
(25)	Anantrai Hirachand Doshi, Amratwal Zampa, Savarkundla	Weights and Beam Scales
(26)	Arjan Valji and Sons, Nadi Kantha, Savarkundla	Weights and Beam Scales
(27)	S. Asgarali, Umreth	Weights, Weighing and Measuring Instruments
(28)	Asgaralli Kamruddin, Kadia-Lane, Gondal	Weights, Weighing and Measuring Instruments
(29)	Ashabhai Nathabhai Desai, Station Road, Petlad	Weights, Weighing and Measuring Instruments
(30)	Associated Scale Industries, Station Road, Savarkundla	Beam Scales
(31)	Avery Co. of India Private Ltd., 2069 Raikhand, Ahmedabad ..	Weights, Weighing and Measuring Instruments
(32)	Azarali Zafarali, Nava Bazar, Baroda	Weights, Weighing and Measuring Instruments
(33)	Babubhai N. Mistry, Mahidharpura Opp: Manirasheri Narshi Mandir Chawl, Surat.	Weights, Weighing and Measuring Instruments
(34)	Baaji Laxmidas, P. O. Vanda, Via Savarkundla	Beam Scales
(35)	Becharadas and Bros. Bhayavadar	Weights and Beam Sales
(36)	Bhaichand Maganlal Panchal, Talod, Dist. Sabarkantha	Weights, Weighing and Measuring Instruments
(37)	Bharat Cane and Hardware Mart, Kapadia Bazar, Ahmedabad-2 ..	Weights, Weighing and Measuring Instruments.
(38)	R.A. Bhayane & Co., Iron Bazar, Bhavnagar	Weights & Beam Scales.
(39)	Bhogilal Mathuradas & Co., Outside Three Gate, Patan	Weights, Weighing and Measuring Instruments.
(40)	C. AND G. Chokshi, Haveli Street, Rajkot	Weights and Beam Scales.
(41)	Chandbhai Rajebhai Sheth, Kansara Bazar, Dabhoi	Weights, Weighing and Measuring Instruments.
(42)	Chandrakant Taralal Soni, Padipole Ambaji Mata's Corner, Baroda	Weights, Weighing and Measuring Instruments.
(43)	Chandulal Garbaldas Solwala, New Station Road, Rajpipla	Weights, Weighing and Measuring Instruments.
(44)	Chandulal Mohanlal Shah, Jhagadia	Weights, Weighing and Measuring Instruments.
(45)	Chaturbhai N. Patel, Kandvav, Kapadwanj	Weights, Weighing and Measuring Instruments.
(46)	Chemdyes Corporation, Kotharia Naka, Rajkot	Weights and Beam Scales.
(47)	Chhotalal Ramchand Panchal, Amla Chauta, Mehsana	Weights, Weighing and Measuring Instruments.
(48)	Chimanlal Parshottamdas, Lal Bazar, Sanand, District Ahmedabad	Weights, Weighing and Measuring Instruments.
(49)	Choksee Bros. Mandi Bazar, Sidhpur, District Mehsana	Weights, Weighing and Measuring Instruments.
(50)	Dahyabhai Punjabhai Oza, Near Post Office, Kalol (N.G.)	Weights, Weighing and Measuring Instruments.
(51)	Damjibhai Narayanbhai Luhar, Manilal Chunilal's Madh, Kothariwada, Idar Dist. S.K.	Weights, Weighing and Measuring Instruments.
(52)	Dhirajlal Chunilal Soni, Near Champaner Darwaja, Baroda	Weights, Weighing and Measuring Instruments.
(53)	Dhulalal Amolakh Patwa, Simla Gate, Palanpur	Weights, Weighing and Measuring Instruments.
(54)	Dodia Scale Co., Bhanbhivas Corner, Idar	Weights, Weighing and Measuring Instruments.
(55)	Durlabhji Devshi & Bros., Gujar Bazar, Rajkot	Weights and Beam Scale.

Dealers (Contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(56)	V.K. Engineering Works, 35, Masketi Market, Ahmedabad	Weights, Weighing and Measuring Instruments.
(57)	Fakirchand Vahajibhai, Nava Bazar, Baroda (Contractor)	Weights, Weighing and Measuring Instruments.
(58)	F. Jamaludeen & Bros., Wadgamwala, Bazar, New Deesa	Weights, Weighing and Measuring Instruments.
(59)	Gandhi & Sons, Rajkot	Weights, and Beam Scales.
(60)	Gordhandas Dharamshi, Jamjodhpur	Weights, and Beam Scales.
(61)	Govindlal Haribhai, Makwana Falia, Station Road, Dabhoi	Weights, Weighing and Measuring Instruments.
(62)	Gujarat Hardware Stores, Dhansura, District Sabarkantha	Weights, Weighing and Measuring Instruments.
(63)	Gujarat Scale Mart, 1119, Pankore Naka, Ahmedabad	Weights, Weighing and Measuring Instruments.
(64)	Gujarat Scale Repairing Works, Hansia Chachar, Patan	Weights, Weighing and Measuring Instruments.
(65)	Gulabdas V. Mehta, Kansara Bazar, Rajkot	Weights, and Beam Scales.
(66)	Gulamohamad Ganibhai Malekji, Modasa, Distt. Sabarkantha	Weights, Weighing and Measuring Instruments.
(67)	Gulamabbas Valibhai Vohra, Vorvad, Station Road, Umreth	Weights, Weighing and Measuring Instruments.
(68)	H.R. Sajapoorwala, Saiphy Mohalla, Surat	Weights, Weighing and Measuring Instruments.
(69)	Haji Nabibhai Aminhai Malekji, Modasa, District Sabarkantha	Weights, Weighing and Measuring Instruments.
(70)	Haji Umarbhai Jivabhai Bhurawala, Bazar, Prantij, District Sabarkantha	Weights, Weighing and Measuring Instruments.
(71)	Haribhai Bavabhai, Jamnagar	Weights and Beam Scales.
(72)	Harilal Maganlal Shah, Kansara Bazar, Dholka	Weights, Weighing and Measuring Instruments.
(73)	Hasanali Amiji & Bros., Gujar Bazar, Rajkot	Weights and Beam Scales.
(74)	Hasanali Sulemanji Lokhandwala, 286, Limda Chowk, Surat	Weights, Weighing and Measuring Instruments.
(75)	J. Himatlal & Co., Lokhand Bazar, Bhavnagar	Weights and Beam Scales.
(76)	Himatlal Ujamshi, Zaveri, Mandvi Chowk, Rajkot	Weights and Beam Scales.
(77)	Hiptullabhai Mulla Abdulhusein, Lokhandwala & Co., Char Rasta, Broach	Weights, Weighing and Measuring Instruments.
(78)	Hiralal Bhurabhai, Mandvi Chowk, Rajkot	Weights and Beam Scales.
(79)	Hiralal Lakhamshi, Shroff Bazar, Bhuj (Kutch)	Weights and Beam Scales.
(80)	I.G. Patel, 1147/1, Pankore Naka, Ahmedabad-1	Weights, Weighing and Measuring Instruments.
(81)	Ibrahim Abdul Kayum, Lokhand, Bazar, Bhavnagar	Weights and Beam Scales.
(82)	Ibrahim Alibhai Memon, Bazar, Bhabhar	Weights, Weighing and Measuring Instruments.
(83)	Ibrahim Hamidbhai Malekji, Bazar, Modasa	Weights, Weighing and Measuring Instruments.
(84)	Ibrahim Noorbhai Makati & Bros., Sanghadia Bazar, Jamnagar	Weights, Beam Scales.
(85)	Ideal Agency, Gandhidham	Weights, Weighing and Measuring Instruments.
(86)	K.C. Industries, Near Mahaprabhuji's Bethak, Anand	Weights, Weighing and Measuring Instruments.
(87)	G.M. Imailji, Kanpith, Chhakapir gali, Surat	Weights, Weighing and Measuring Instruments.
(88)	Isvarlal Gopalji, Bhujwalla, Rajkot	Weights, Weighing and Measuring Instruments.
(89)	Jagdish Industries, Pathak & Co., Bodeli	Weights and Beam Scales.
(90)	Jaihind Iron Works, Bazar, Dehgam	Weights, Weighing & Measuring Instruments.
(91)	Jainulbhai Abdulkhadar & Co., Mota Bazar, Navsari	Weights, Weighing & Measuring Instruments.
(92)	Janta Stores, Ranjit Road, Jamnagar	Weights and Beam Scales.
(93)	Jashabhai Chaturbhai Patel, Manroth Sani Khadki, Nadiad	Weights and Measuring Instruments.
(94)	Jayantilal Nandlal Patel, Khar Gate, Bhavnagar	Weights and Beam Scales.
(95)	Jeram Trikam Ravji & Bros., Savarkundla	Beam Scales.
(96)	Jethalal Somalal Mistry, Kansara Bazar, Dholka	Weights, Weighing and Measuring Instruments.
(97)	Jethalal Shivram, Bazar, Chansma, District Mehsana	Weights, Weighing and Measuring Instruments.
(98)	Jivan Nagji & Sons, River Bank, Savarkundla	Beam Scales.
(99)	Jwellery Scale Works, Laheripura, New Road, Golvad Naka, Krishna Kunj, Baroda	Weights, Weighing and Measuring Instruments.
(100)	Kamlesh Iron and Steel Works, Bharatkhand Cotton Mills Compound, Naroda Road, Block No. 3512, Ahmedabad-11.	Weights, Weighing & Measuring Instruments.
(101)	Kamruddin Haji Maulabh & Sons, 1178/1, Pankore Naka, Ahmedabad	Weights, Weighing & Measuring Instruments.
(102)	Kansara Brothers, Gujarat Hosiery Mills Compound, Rakhial Road, Ahmedabad.	Weights, Weighing & Measuring Instruments.
(103)	Kantilal Bhogilal & Co., Near Kundvav, Kapadwanj	Weights, Weighing and Measuring Instruments.
(104)	Kantilal Manilal Shah, Sathamba, District Sabarkantha	Weights, Weighing and Measuring Instruments.
(105)	Kantilal Sonabhai Patel, 26, Lokhand Bazar, Ahmedabad-1	Weights, Weighing and Measuring Instruments.
(106)	Kapurchand Panchand Mehta, Para Bazar, Rajkot	Weights, & Beam Scale.
(107)	Karanchi Hardware Stores, Gujar Bazar, Rajkot	Weights & Beam Scales.
(108)	Karsan Ramji & Sons, Savarkundla	Beam Scales.
(109)	Keshavlal Gordhandas Bhatt, Near Kot Darwaja, Dakor	Weights, Measures, Weighing and Measuring Instruments.
(110)	Krishnalal Chaturbhai Patel, Hardware Merchant, Harij	Weights, Measures, Weighing and Measuring Instruments.

Dealers (Contd.)

Serial No.	Name and Address of Dealer	Details of Articles Sold
(111)	Krishna Hardware Stores, Dhansura, District Sabarkantha	Weights, Measures, Weighing and Measuring Instruments.
(112)	Kumar Stores, Hinglanchanhar, Patan	Weights, Measures, Weighing and Measuring Instruments.
(113)	Kurbhusen Ibrahimibhai, Bazar, Borsad	Weights, Measures, Weighing and Measuring Instruments.
(114)	Lalibhai Samjibhai Luhar, City Danapith, Opp. Municipal Shop No. G.2/2924, Ahmedabad.	Weights, Weighing and Measuring Instruments.
(115)	Laxmanbhai Purshottamdas & Co., Lal Darwaja, Visnagar	Weights, Measuring and Weighing Instruments.
(116)	Luhar Bhimji Devraj, Nava Naka, Main Road, Palitana	Beam Scales.
(117)	Luhar Chhaganlal Haribhai, P.O. Vanda	Beam Scales.
(118)	D.S. Lahar & Bros. Co., Opp. Padsha Pole Relief Road, Ahmedabad	Weights, Weighing and Measuring Instruments.
(119)	Luhar Iswarlal Maganlal & Bros., Vallabhabhai Patel Road, Junagadh	Weights and Beam Scales.
(120)	Luhar Kanji Jethabhai, Burdhan Chowk, Jamnagar	Weights and Beam Scales.
(121)	Luhar Khoda Natha, Near River Bank, Savarkundla	Beam Scales.
(122)	Luhar Manji Dadva, Mota Bhamodra, Via Savarkundla	Beam Scales.
(123)	Luhar Meghaji Chhagan, Devla Gate, Savarkundla	Beam Scales.
(124)	Luhar Mulji Trikam Ravji & Co., Nadi Kantha, Savarkundla	Beam Scales.
(125)	Luhar Nanji Mulji, Chital	Beam Scales.
(126)	Luhar Narayan Devraj, Nava Naka, Main Road, Palitana	Beam Scales.
(127)	Luhar Narshi Giga & Co., Nadi Kantha, Savarkundla	Beam Scales.
(128)	Luhar Nanji Purshottam, Chital	Beam Scales.
(129)	Luhar Nanji Velji, Devla Gate, Savarkundla.	Beam Scales.
(130)	Luhar Narshidas Purshottam & Sons, Opp. Kabutarkhana, Chital	Beam Scales.
(131)	Luhar Ranchhod Punja, Savarkundla	Beam Scales.
(132)	Luhar Ravji Madhavji, Luhar Sar, Jamkhambhalla	Beam Scales.
(133)	Luhar Valji Ramji Makwana, Savarkundla	Beam Scales.
(134)	Madha Manji & Co., Nadi Kantha, Savarkundla.	Beam Scales.
(135)	Madhu Home Industries, Sardar Patel, Road, Mandvi (Kutch)	Beam Scales.
(136)	Maganlal Amtharam Patel, 1177, Pankor Naka, Ahmedabad-1	Weights, Weighing and Measuring Instruments.
(137)	Maganlal Madhubhai Mistry, Nagarsheri, Mahichpura, Surat.	Weights, Weighing and Measuring Instruments.
(138)	Mahakali Sewing Machines & Iron Works, Station Road, Nandol Dehgam, District Ahmedabad.	Weights, Measuring and Weighing Instruments.
(139)	J.J. Makwara & Bros., Opp. Mirajini Medi, Jetpur	Weights and Beam Scales.
(140)	Manilal Jamnadas Shah, Behind Vegetable Market, New Deesa	Weights, Weighing and Measuring Instruments.
(141)	Mansukhbhai Jethabhai Sukhadia & Co., Bazar, Borsad	Weights, Weighing and Measuring Instruments.
(142)	Mechanical Supplying Syndicate, Panchal Blocks, Gheekanta Road, Ahmedabad.	Weights, Weighing and Measuring Instruments.
(143)	Mehsana Iron and Brass Works, Choksi Bazar, Mehsana	Weights, Weighing and Measuring Instruments.
(144)	Mistry Jivraj Karamshi & Bros., Savarkundla	Beam Scales.
(145)	Modern Measuring Equipments, House No. 4/4623, Tayabi Mohalla, Surat.	Weights, Weighing and Measuring Instruments.
(146)	Mohanlal Amratlal Shah, Devgad-Baria, District Panchmahals	Weights, Weighing and Measuring Instruments.
(147)	Mohanlal Babulal Thakkar, Surendranagar	Weights and Beam Scales.
(148)	Mohmadali Alibhai & Sons, Para Bazar, Rajkot	Weights and Beam Scales.
(149)	Mohmadhusen Dosabhai, Vohrawad, Umreth	Weights, Weighing and Measuring Instruments.
(150)	Mohmadali F. Kalawala, Nichwas Bazar, Godhra	Weights, Weighing and Measuring Instruments.
(151)	Mohanlal Hargovandas Mistry, Jaihind Kanta Bhandar, Station Road, Anand.	Weights, Weighing and Measuring Instruments.
(152)	Mohmadally Sultanally Lokhandwala, Katopora Bazar, Broach	Weights, Weighing and Measuring Instruments.
(153)	S.K. Moiz & Co., Tower Road, Surat	Weights, Weighing and Measuring Instruments.
(154)	Motabhai Alibhai & Co., Lohkand Bazar, Virangam	Weights, Weighing and Measuring Instruments.
(155)	Musaji Alibhai Bharmal & Sons, Garedia Kuva Road, Rajkot	Weights and Beam Scales.
(156)	Naginlal Dahyabhai Shah, Nava Bazar, Baroda	Weights, Weighing & Measuring Instruments.
(157)	Nandlal Damodardas Mistry, Near River Bank, Botad.	Weights and Beam Scale.
(158)	Narayanji Purshottam Jodhani, Gokaldas Tejibhai Road, Mandvi	Weights and Beam Scale.
(159)	Narendrabhai Mangaldas Shah, Station Road, Unjha	Weights, Weighing and Measuring Instruments.
(160)	Nanalal Kuberdas & Sons, Station Road, Godhra.	Weight, Weighing and Measuring Instruments.
(161)	Naradas Ranthhoddas Patel, Pankore Naka, Ahmedabad-1.	Weight, Weighing and Measuring Instruments.
(162)	National Hardware & Electric Stores, Chitari Bazar, Bombay.	Weight, Weighing and Measuring Instruments.
(163)	National Metal and Measures Stores, 2760, Pankore Naka, Ahmedabad	Weight, Weighing and Measuring Instruments.

Dealers (Contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(164)	Natvarlal Jivanlal Shah, Station Road, Halol, Dist. Panchmahals.	Weights, Weighing and Measuring Instruments.
(165)	Natvarlal L. Kantawala, Pirmshah Roja, Near Regal Cinema, Ahmedabad.	Weights, Weighing and Measuring Instruments.
(166)	Noble Scale Repairing Works, Gheekanta Road, Bhutni Ambali, Ahmedabad.	Weights, Weighing and measuring Instruments.
(167)	Oriental Industries, Gol Sheri, Patna.	Weights, Weighing and measuring Instruments.
(168)	P. Keshavalal & Co., Dhrangadhra Utara, Surendranagar.	Weights, and Beam Scales.
(169)	Patel Bros & Co., Patna.	Weights, Weighing and Measuring Instruments.
(170)	M.K. Patel & Co., 1169/1, Pankorenaka, Ahmedabad-1.	Weights, Weighing and Measuring Instruments.
(171)	Patel Kacharabhai Mohanlal 1169/1, Pankore Naka, Ahmedabad.	Weights, Weighing and Measuring Instruments.
(172)	R. F. Panchal, Opp. Bhadra Kacheri, Baroda.	Weights & Weighing and Measuring Instruments.
(173)	Parshotamdas Pitambardas, Bhabhar, Distt. Banaskantha.	Weights & Weighing and Measuring Instruments.
(174)	Pioneer Engineering Works, Naroda Road, Ahmedabad.	Weights & Weighing and Measuring Instruments.
(175)	M.G. Poonawala Limda Chowk, Surat.	Weights & Weighing and Measuring Instruments.
(176)	Popatlal Laxmichand Doshi, Vadali, Dist. Sabarkantha.	Weights & Weighing and Measuring Instruments.
(177)	Prabhat Scale Works, Paththar Sadak, Palanpur.	Weights & Weighing and Measuring Instruments.
(178)	Prakash Industries, Rajkot.	Weights and Beam Scale.
(179)	Purshottam Ghelabhai Gandhi, Porbandar.	Weights and Beam Scales.
(180)	Purshottam Shivram Panchal Bazar, Chansma.	Weights, Weighing and Measuring Instruments.
(181)	Pushpakant Jayantilal & Co., New Station Road, Rajpipla.	Weights, Weighing and Measuring Instruments.
(182)	Raj Metal Depot, Kalupur Chaklali, Near Tower, Opp. Haji Ahmed's Pole, Ahmedabad.	Weights, Weighing and Measuring Instruments.
(183)	Raja Gordhan & Co., Savarkundla.	Beam Scales.
(184)	Rajabali Bhijibhai Station Road, Botad.	Weights and Beam Scales.
(185)	Rajnikant Mafatlal Parikh, Near Kadi Masjid, Kapadvanj.	Weights, Weighing and Measuring Instruments.
(186)	Ramanlal Keshavalal Shah, Juna Bazar, Idar.	Weights, Weighing and Measuring Instruments.
(187)	Ratanlal Nanalal Kansara, Kansara Bazar, Umreth.	Weights, Weighing and Measuring Instruments.
(188)	Ratilal Mohanlal Choksi, Kapad Bazar, Sidhpur.	Weights, Weighing and Measuring Instruments.
(189)	Rudabhai Kanjibhai, Sardar Patel Road, Junagadh.	Weights and Beam Scale.
(190)	Sabbir Bros, Botad.	Weights and Beam Scale.
(191)	Sakarchand Bhikhabhai & Co., Bazar, Vijapur (N.G.).	Weights and Beam Scale.
(192)	Salebhai Abdulhusen Lokhandwala, 3749, Pankore Naka, Ahmedabad.	Weights and Beam Scale.
(193)	Sankalchand K. Gandhi, Dholka.	Weights and Beam Scale.
(194)	Sauddin Rajabali, Bazar, Dehgam.	Weights and Beam Scale.
(195)	Saurashtra Paints & Hardware Mart, Garedia Kuva Road, Rajkot.	Weights and Beam Scale.
(196)	Shah Amarshi Pranjiwan, Vallabhnbhai Patel Road, Junagadh.	Weights and Beam Scale.
(197)	Shah Danmal Swami, Sadar Bazar, Deesa.	Weights, Weighing and Measuring Instruments.
(198)	Shah Engineering Stores, Main Bazar, Nakhatrana (Kutch).	Weights and Beam Scales.
(199)	Shah Kantilal & Bros., Mangrol.	Weights and Beam Scale.
(200)	Shah Bhogilal Devchand, New Vasan Market, Manek Chowk, Ahmedabad-1.	Weights, Weighing and Measuring Instruments.
(201)	Shah Moulding Works, Sir Chinubhai Baronet Compound, Shahpur, Ahmedabad.	Weights, Weighing and Measuring Instruments.
(202)	Shah Takurlal Bapulal, Gawara Road, Cambay.	Weights, Weighing and Measuring Instruments.
(203)	Shanta Vijay Chain Factory, Savarkundla.	Beam Scales.
(204)	Sinroja Brass Works, Gundavadi, Rajkot.	Weights and Beam Scales.
(205)	Somalal D. Shah, Bazar, Jambusar.	Weights, Weighing and Measuring Instruments.
(206)	Shankerlal Shivalal Thakkar, Talod.	Weights, Weighing and Measuring Instruments.
(207)	Shantilal Jethalal Shah, Dholka.	Weights, Weighing and Measuring Instruments.
(208)	Sheth Haji Usmanbhai Ahmedbhai Juna Bazar, Himatnagar.	Weights, Weighing and Measuring Instruments.
(209)	Sheth Jayantilal Manilal, Jogidas Vithaldas Pole, Raopura, Baroda.	Weights, Weighing and Measuring Instruments.
(210)	Standard Mechanical & Iron Works, Nava Bazar, Baroda.	Weights, Weighing and Measuring Instruments.
(211)	T.C. Bors., Veraval.	Weights and Beam Scale.
(212)	Tarmohmad Ibrahim Memon, Kansara Bazar, Petlad.	Weights, Weighing and Measuring Instruments.
(213)	Tayabhai & Fidahusein & Co., Limda Chowk, Surat.	Weights, Weighing and Measuring Instruments.
(214)	Trikamlal Manchharam Mistry, Three Gate, Patan.	Weights, Weighing and Measuring Instruments.
(215)	Umedram Ranchhodas Patel, 1167, Pankore Naka, Ahmedabad.	Weights, Weighing and Measuring Instruments.
(216)	Unjha Consumer Co-operative Store Ltd., Unjha.	Weights, Weighing and Measuring Instruments.
(217)	Usmanbhai & Jamalbhai Vadrnagri Azad Chowk, Juna Bazar, Himatnagar.	Weights, Weighing and Measuring Instruments.
(218)	V.K. Makwana & Co., Nava Bazar, Baroda.	Weights, Weighing and Measuring Instruments.

Dealers (Contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(219)	Vasant Engineering Ltd., Pratapnagar, Baroda.	Weights, Weighing and Measuring Instruments.
(220)	Vipinchandra Ramanlal Shah, Juna Bazar, Himatnagar.	Weights, Weighing and Measuring Instruments.
(221)	Vithaldas Dahyabhai Panchal, Madan Gopal's Haveli, Near Pipla, Pole, Khadia, Ahmedabad.	Weights, Weighing and Measuring Instruments.
(222)	Vithaldas Venichand Panchal, Station Road, Dehgam.	Weights, Weighing and Measuring Instruments.
(223)	Yakubhbhai Taiyabali Bardawala, Katopore Darwaza, Broach.	Weights, Weighing and Measuring Instruments.
(224)	Yusufali Kadibhai, Green Lodge, Rajkot.	Weights and Beam Scale.
(225)	Z. & H. Co., Limda Chawk, Surat.	Weights.
(226)	Zaver Motiram Mistry, Sidhraj Road, Tripolie, Patan.	Weights, Weighing and Measuring Instruments.

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	Akbarli Nuruddin Bambawala, Nava Bazar, Baroda.	Weights, Measures, Weighing and Measuring Instruments.
(2)	Alexandra Scale Co., 1115/4, Pankore Naka, Ahmedabad-1.	Weights, Measures, Weighing and Measuring Instruments.
(3)	Ambica Engineering Works, Kalupur, 3/2532, Near Regal Talkies, Pirmshah Road, Ahmedabad.	Weights, Measures, Weighing and Measuring Instruments.
(4)	Avery Company of India Private Ltd., 2059, Raikhad, Ahmedabad.	Weights, Measures, Weighing and Measuring Instruments.
(5)	Avery Co. of India Pvt. Ltd., 16, Dougall Road, Ballard Estate, Bombay.	Weights, Measures, Weighing and Measuring Instruments.
(6)	Babubhai N. Mistry, Mahidharpura, Opp. Maniara Sheri, Narshi Mandir Chawl, Surat.	Weights, Measures, Weighing and Measuring Instruments.
(7)	Bhagvanji Damodar Kansara, Kaji Chaklo, Jamnagar.	Weighing Instruments.
(8)	Bhaichand Maganlal Panchal, Talod.	Weights, Measures, Weighing and Measuring Instruments.
(9)	Chaturbhai N. Patel, Kandvav, Kapadwanj.	Weights, Measures, Weighing and Measuring Instruments.
(10)	Chandrakant Teralal Soni, Padipole, Near Ambamata, Mandvi Road, Baroda.	Weights, Measures, Weighing and Measuring Instruments.
(11)	Chhotalal Ramchand Panchal, Amli Chauta, Mehsana.	Weights, Measures, Weighing and Measuring Instruments.
(12)	F.V. Contractor, F/1/23015, Nava Bazar, Baroda.	Weights, Measures, Weighing and Measuring Instruments.
(13)	Dhirajlal Chuntalal Soni, Near Champaner Darwaja, Baroda.	Weights, Measures, Weighing and Measuring Instruments.
(14)	Dhuralal Amulakh Patwa, Simla Gate, Palanpur.	Weights, Measures, Weighing and Measuring Instruments.
(15)	Dodia Scale Works, Bhambhivas Corner, Idar.	Weights, Measures, Weighing and Measuring Instruments.
(16)	G.M. Esmailji, Kanpith Chhakapar Gali, Surat.	Weights, Measures, Weighing and Measuring Instruments.
(17)	Gandhi Mechanical Works, Taiyabi Mohalla, Zampa Bazar, Surat.	Weights, Measures, Weighing and Measuring Instruments.
(18)	Hasanalli Amiji & Bros., Gujar Bazar, Rajkot.	Weights and Weighing Instruments.
(19)	B.R. Herman & Mohatta (India) Private Ltd., People's Building, Sir P.M. Road, Bombay-1.	Weighing Instruments.
(20)	Hiptullabhai Mulla Abdulhusen Lokhandwalal & Co., Mohmadpura, Broach.	Weights, Measures, Weighing and Measuring Instruments.
(21)	Ibrahim Najumuddin Vohra, Nava Bazar, Baroda.	Weights, Measures, Weighing and Measuring Instruments.
(22)	Isvarlal Gopalji Bhujwalla, Panchnath Road, Rajkot.	Weights, Measures, Weighing and Measuring Instruments.
(23)	Ishwarlal Narottamdas Mistry, Opp. Parsis's Chawl, Vyara.	Weights, Measures, Weighing and Measuring Instruments.
(24)	Jaihind Kanta Bhandar, Station Road, Anand.	Weights, Measures, Weighing and Measuring Instruments.
(25)	Jainulbhai Abdulkadar & Co., Mota Bazar, Navsari.	Weights, Measures, Weighing and Measuring Instruments.
(26)	Jashbhai Chaturbhai Patel, Kisha Bapa's Daheli, Dhaban Bhagol, Nadiad.	Weights, Measures, Weighing and Measuring Instruments.

Repairers (contd.)

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(27)	Jivarj Karamshi & Bros., Hothibhai Street, Savarkundla	Scales
(28)	Jewellery Scale Works, Krishna Kunj, Golwad Naka, Laheripura, New Road, Baroda.	Weights and Measures, Weighing and Measuring Instruments.
(29)	Laljiibhai Samjibhai Luhar, City Danapith, Opp: Municipality shop No. G. 2/924, Ahmedabad.	Weights and Measures, Weighing and Measuring Instruments.
(30)	Luhar Bhimji Devraj, Palitana,	Weighing Instruments.
(31)	D.S. Luhar & Bros. Co., Opp. Padsha Pole Relief Road, Ahmedabad	Weights, Measures, Weighing and Measuring Instruments.
(32)	Luhar Khoda Natha, Savarkundla	Weighing Instruments.
(33)	Luhar Mulji Trikam Rayji & Co., Nadi Kantha, Savarkundla ..	Weights, Measures, Weighing and Measuring Instruments.
(34)	Luhar Mulji Velji, Devla Gate, Savarkundla	Weights, Measures, Weighing and Measuring Instruments.
(35)	Luhar Nanji Mulji, Beside River Bank, Chital	Weights, Measures, Weighing and Measuring Instruments.
(36)	Luhar Madha Manji & Co., Nadi Kantha, Savarkundla	Weights, Measures, Weighing and Measuring Instruments.
(37)	Luhar Meghaji Chhagan, Devla Gate, Savarkundla	Weighing Instruments.
(38)	Maganlal Madhubhai Mistry, Nagarsheri Mahidharpura, Surat ..	Weights and Measures, Weighing and Measuring Instruments.
(39)	V.K. Makwana & Co., Nava Bazar, Baroda	Weights and Measures, Weighing and Measuring Instruments.
(40)	Modern Measuring Equipments, House No. 4/4632, Tayabi Mohalla, Surat.	Weights and Measures Weighing and Measuring Instruments.
(41)	Natvarlal L. Kantawala, K-3, 10931, Piramshah Roja, Near Regal Cinema, Ahmedabad.	Weights and Measures, Weighing and Measuring Instruments.
(42)	Noble Scale Repairing Works, Gheekanta Road, Bhutni Ambli, Ahmedabad.	Weights and Measures, Weighing and Measuring Instruments.
(43)	Patani Scale Repairing Works, Sidharji Road, Tripolia, Patan. ..	Weights and Measures, Weighing and Measuring Instrument.
(44)	M.G. Poonawala, Chhakapir Gali, Surat	Weights and Measures, Weighing and Measuring Instruments.
(45)	R.F. Panchal, Opp. Bhadra Kachari, Surat	Weights and Measures, Weighing and Measuring Instruments.
(46)	Prabhat Scale Works, Pathathar Sadak, Palanpur	Weights and Measures, Weighing and Measuring Instruments.
(47)	Raja Gordhan & Co., Rivar Bank, Savarkundla	Weighing Instruments.
(48)	Ratanlal Nanalal Kansara, Kansara Bazar, Umreth	Weights and Measures, Weighing and Measuring Instruments.
(49)	Ratilal Mohanlal Choksi, Mandi Bazar, Mahaja Nivala, Sidhpur ..	Weights and Measures, Weighing and Measuring Instruments.
(50)	Saif Scale Works, Dhalvas, Palanpur	Weights and Measures, Weighing and Measuring Instruments.
(51)	H.R. Sajapoorwala, Saify Mohalla, Surat	Weights and Measures, Weighing and Measuring Instruments.
(52)	Shankerlal Shivlal Thakkar, Talod	Weights, Measures, Weighing and Measuring Instruments.
(53)	Trikamlal Manchharam, Three Gate, Patan	Weights, Measures, Weighing and Measuring Instruments.
(54)	Vithaldas Dahyabhai Panchal, Madan Gopalni Haveli, Near Pipla Pole, Ahmedabad.	Weights, Measures, Weighing and Measuring Instruments.
(55)	Vakubali Abdultaiyab Bardanwala, Katopora Darwaja, Broach ..	Weights, Measures, Weighing and Measuring Instruments.

HIMACHAL PRADESH (2)

In November 1960 issue of Metric Measures a list of licensed manufacturers and dealers in Himachal Pradesh Administration was published. The following is a list of dealers and repairers subsequently licensed under the Rajasthan Weights and Measures (Enforcement) Act, 1958 as extended to the Union Territory of Himachal Pradesh and Rules framed thereunder.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Avery Company of India, Private Ltd., 255 Court Road, Amritsar	Weights, Measures, Weighing and Measuring Instruments.
(2)	Megh Singh Thakur Dass, Gandhi Chowk, Mandi	Cast iron Weights (50 kg to 100g) Brass Weights (50g to 1g).
(3)	Nand Kumar & Sons, Gandhi Chowk, Mandi	Cast iron Weights.
(4)	Param Dev Tej Singh, Gandhi Chowk, Mandi	(i) Cast iron weights (50 kg to 100g). (ii) Brass Weights (1 kg. to 1g). (iii) Bullion weights (500 mg, 200 mg, 100 mg, 50 mg and 20 mg.) (iv) Beam Scales Class 'C' (upto 100 kg capacity). Beam Scale Class 'D' (upto 5 kg capacity). Beam Scales Class 'B' (upto 200 g capacity).

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	Avery Company of India, Private Ltd., 255 Court Road, Amritsar ..	Weights, Measures, Weighing and Measuring Instruments.

ORISSA (4)

In the March, July and November issue of Metric Measures lists of licensed manufacturers, dealers and repairers of weights and measures in Orissa State were published. The following is a list of manufacturers and dealers subsequently licensed by the Government of Orissa under the Orissa Weights and Measures (Enforcement) Act, 1958.

Manufacturer

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Avery Co., of India Private Ltd., Avery House, 28/2 Waterloo Street, P.B. No. 377, Calcutta-1.	Weights, Measures, Weighing and Measuring Instruments.
(2)	Satish Chandra Das & Co., Rutton Babu's Road, Cossipur, Calcutta	Brass Bullion and Brass Weights.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	B.K. Ghose, Station Road, Puri	Cast Iron Weights.
(2)	Khuburam Ashram, At/P.O. Bolangir, Distt. Bolangir	Cast Iron Weights.

PUNJAB (8)

In the July and September, 1959, March, May, July, September and November 1960 issues of 'Metric Measures' lists of Manufacturers, dealers and repairers of Weights and Measures in Punjab State were published. The following is a list of manufacturers, dealers and repairers subsequently licensed by the Government of Punjab under the Punjab Weights and Measures (Enforcement) Act, 1958.

Manufacturers

Serial No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Ambala Metal Industries, Ambala Cantt.	Brass Weights 50g, 20g, 10g.
(2)	Naryana Foundry, Private Ltd., Rohtak	Cast Iron Weights 100g to 50kg.
(3)	National Metal Works, Ambala	Cast Iron Weights 100g to 50kg. Brass Weights 10g to 50g.
(4)	Singla Engineering Works, Gurgaon	Cast Iron Weights 100g to 50 kg.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Amir Chand Bansi Lal, Saddar Bazar, Dalhousie	Weights, Measures and beamscales.
(3)	Chhabil Dass Ram Kumar, Iron & Hardware Merchants, Moti Bazar, Hissar.	Weights, Measures, Weighing and Measuring Instruments.
(2)	Balm Ram Pawan Kumar, Jaita	Weights, Measures, Weighing and Measuring Instruments.
(4)	Ghasi Ram Panna Lal, Gurgaon	Weights, Measures, Weighing and Measuring Instruments.
(5)	Gopal Krishan Gupta & Sons, Gopal Bhawan, Nicholson Road, Ambala Cantt.	Weights, Measures, Weighing and Measuring Instruments.
(6)	Harnam Dass Sheekan Dass, Iron Merchants, Barwala Mandi Dist. Hissar.	Weights, Measures, Weighing and Measuring Instruments.
(7)	Inder Singh Daram Singh, Iron & Hardware Merchants, Samrala	Weights, Measures and beamscales.
(8)	Mahabir General Store, Ellenabad, Distt. Hissar	Weights, Measures, and beamscales.
(9)	Ramesh Chand Mahash Chand, Ghar Bazar	Weights, Measures and beamscales.
(10)	Ravi Engineering Company, Kacha Bazar, Ambala Cantt	Heavy weighing machines for which they are licensed as manufacturer, repairing verification ex-state.
(11)	Salig Ram & Sons, Kasauli	Weights, Measures and Beamscales.

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	Avery Compnay of India, Private Limited, Amritsar	Weights, Weighing and Measuring Instruments.
(2)	Bedi Oil Compnay, G.T. Road, Batala	Weights, Measures of length and capacity.

TRIPURA (3)

In the March and November 1960 issues of Metric Measures lists of licensed dealers of weights and measures in the Union Territory of Tripura were published. The following is a list of dealers subsequently licensed by the Tripura Administration under the Rajasthan Weights and Measures (Enforcement) Act, 1958, as extended to the Union Territory of Tripura.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	P.N. Dev & Co (P) Ltd., 7, Jagannathbari Road, Agartala	Weights
(2)	Kamal Stores Supply, Sakuntala Road, Agartala	Weights and Measures.

LICENSED MANUFACTURERS, DEALERS & REPAIRERS OF WEIGHTS & MEASURES (12)

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
The following list of dealers which has appeared in the March 1960 issue of Metric Measures may be deleted from the list of Tripura.		
(1)	Banerjee & Co., Motor Stand Road and Central Road Junction, Agartala.	Weights
(2)	Bhandar, Central Road Agartala	Weights
(3)	Durga Bhandar, 99, Bat-tala, Agartala	Weights
(4)	Tripura Paint & Hardware Store, 58/2, Central Road, Agartala	Weights

UTTAR PRADESH (5)

In the July, September, November 1960 and January 1961 issues of Metric Measures lists of licensed manufacturers, dealers and repairers of weights and measures in Uttar Pradesh were published. The following is a list of manufacturers, dealers and repairers subsequently licensed by Government of Uttar Pradesh under the Uttar Pradesh Weights and Measures (Enforcement) Act, 1959.

Manufacturers

Serial No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Dina Nath Faquir Chand, Khairula Street, Bareilly	Weights, Measures, Weighing and Measuring Instruments.
(2)	J.P. Engineering Works, 76/574, Collie Bazar, Kanpur	Cast Iron and Brass Weights, Measures and Beam Scales.
(3)	Hari Singh & Sons, Gwalior Road, Jhansi	Metal Weights of Cast Iron and Brass.
(4)	Hind Udyog, 906 Civil lines, Jhansi	Cast Iron Weights, and Small Brass Weights.
(5)	Indian Iron Industries, Langre-Ki-Chowki, Agra	Cast ron Weights 50 Kg, 20 Kg, 10Kg, 5 Kg, 2Kg, 1Kg, 500g, 200g and 100g.
(6)	Jhansi Iron & Steel Rolling Mills, Civil Lines, Jhansi	Weights.
(7)	Jitendra Oil Mills, Farrukabad	Weights.
(8)	Kanpur Iron & Steel Industries, 59/39, Birhana Road, Kanpur	Weights Measures and Measuring Instruments.
(9)	E.S. Koomar & Company, Chukukupul, Katranaj, Moradabad	Bullion Weights.
(10)	Kumar Foundry, 128/10 C, Kidwai Nagar, Kanpur	Weights and Measures.
(11)	Mazdoor Balance Works, CK-42/68, Chah-Mahema, Varanasi	Weights and Weighing Instruments.
(12)	Moradabad Iron & Steel Industries, Gulshaheed, Moradabad	Weights.
(13)	Nathu Lal Bulkidas Iron & Hardware Merchants, Nainital Road, Bareilly.	Weights and Measures.
(14)	A.K. Neogy Industries, 89/209, Sir Iqbal Library Road, Kanpur	Weights and Weighing Instrments.
(15)	Roop Kamal Industries, 91/139, Delalpurwa, Gurdwara Road, Kanpur.	Brass and Sheets Metal Weights of all denominations, Measures, Weighing and Measuring Instruments.
(16)	Nathu Lal Bulkidas Iron & Hardware Merchants, Nainital Road, Bareilly.	Weights and Measures.

Dealers licensed for Weights, Measures, Weighing and Measuring Instruments

No.	
(1)	Ambika Mills Stores, C.K. 52/15, Raja Darwaza, Varanasi.
(2)	Balm Ram Prakash Chand, Iron Merchants, Kabari Bazar, Meerut.
(3)	Balm Ram Sukhbir Singh, Meerut Iron Merchants, Naya Bazar, Baraut, District Meerut.
(4)	Bansal Hardware, Stores, (Budhist Temple), Gautam Budh Marg, Lucknow.
(5)	Bhanamal & Co. (P) Ltd., Baraganesh, Varanasi.
(6)	Bhanamal Gulzarimal (P) Ltd., Bara Bazar, Bareilly.
(7)	Bholanath Sita Ram, 9 Aminabad Park, Lucknow.
(8)	Bulmukund Hanumant Ram, 57 Sri Ram Road, Lucknow.
(9)	Chandrika Prasad, K. 58/11, Baraganesh, Lohatia Varanasi.
(10)	Chhotey Lal Rameshwar Dayal, Yahliaganj, Lucknow.
(11)	K.T. Company, Daliganj, Lucknow.
(12)	Dharam Chand Davarka Das Agrawal, 76/574, Cooli Bazar, Kanpur.

Dealers licensed for Weights, Measures, Weighing and Measuring Instruments.

No.	
(13)	Dug Ram Gupta, Hardware & Brass Merchants, Fateganj, Lucknow.
(14)	Gurdas Mal Tikamdas, 104/A/212 P. Road, Kanpur.
(15)	Gauri Mal Raghunandan Prasad, Iron and Steel Merchants, Bareilly.
(16)	Girja Shanker Ved Prakash, 20 Hatia Market, Kanpur.
(17)	Gopal Prasad and Sons, 887, Bara Bhai Street, Belanganj, Agra.
(18)	Gulzari Lal Kanthi Ram, Iron Merchants, Bara Bazar, Bareilly.
(19)	Gaya Prasad Kishore Lal, Iron Merchants, Pratapgarh.
(20)	Hafizuddin Jallaluddin Hardware Merchant, K-62/122, Saftsagar, Varanasi.
(21)	Hind Udyog, 906 Civil Lines Jhansi.
(22)	Jagdish Prasad Prakash Chand, Iron Merchants, Naya Bazar, Baraut, District Meerut.
(23)	Jaiswal Brothers, P.O. Siwa Bazar, Gorakhpur.

Dealers Licensed for Weights, Measures, Weighing and Measuring Instruments	
Sl. No.	
(24)	Kalika Prasad, Kerana and Iron Merchants, P.O. Chughli, Gorakhpur.
(25)	Kanpur Iron and Steel Industries 59/39 Birhara Road, Kanpur.
(26)	Kashi Nath Singh, Mohalla Bazar Sadanand, P.O. Rampura, Varanasi.
(27)	Kishore Machinery Stores, Pathwari, Belanganj, Agra.
(28)	Kumar Foundry, 128/10C, Kidwai Nagar, Kanpur.
(29)	Lajja Ram Jagdish Prasad, 73/7 Collectorganj, 52 Dukan, Kanpur.
(30)	Mahabir Prasad Sham Lal Jain, Naya Bazar, Baraut, District Meerut.
(31)	Mehrotra Bros., Bara Bazar, Bareilly.
(32)	Modern Machinery Stores, Golghar, Gorakhpur.
(33)	Mukund Lal Gupta, Iron Merchants, Basantpur, Gorakhpur.
(34)	Munna Lal Badri Prasad, Baraganesh, Varanasi-1.
(35)	Nathu Lal Bulakidas Iron and Hardware Merchants, Bara Bazar, Bareilly.
(36)	Panna Lal Gupta, Pipraich, Gorakhpur.
(37)	Panchayati Dharam Kanta, Chowk, Moradabad.
(38)	Phool Chand Har Narain, Bhadwarganj, Ujhani, Budaun.
(39)	Prem Chand Agarwal, Sadar Bazar, Jhansi.
(40)	Ram Chandra Prasad, Agrawal, Vill. and P.O. Banegaon, Gorakhpur.
(41)	Ram Chandra Prasad, Vill. P.O. Kauri Ram, Tehsil Banegaon Gorakhpur.
(42)	Ram Lal Gupta, K/77/71, Narhenpura, Lohatia, Varanasi.
(43)	Ram Lal Roshan Lal Shyamganj, Bareilly.
(44)	Ram Lal Roshan Lal Chaumukha Pul, Moradabad.
(45)	Ramji Jaiswal, D 50/111, Quazi Pura Kalan, Varanasi.
(46)	Rishi Prasad Gupta, Tyne Road Lucknow.
(47)	R.K. Sharma Iron Foundry, Pathwari, Belanganj, Agra.
(48)	Sheo Nath Ram Nand Kishore Lal, Shahabganj, Gorakhpur.
(49)	Tirbeni Sahai Ram Bharose Lal Bhadwarganj, Ujhani.
(49)	Shyam Lal Bala Prasad Arti, Rishikesh, Distt. Dehadun.
(50)	Uma Shanker Prasad and Co., Bindi Bazar, Gorakhpur.
(51)	Uma Shanker Verma, 494/72 Sarai Hasanganj, Faizabad Road, Lucknow.
(52)	Vibhuti Ram, Village and P.O. Barhalganj, District Gorakhpur.

II

Dealers Licensed for Weights	
Sl. No.	
(1)	Babu Lal and Sons, Coolie Bazar, Kanpur.
(2)	Bareilly Sarraf Mandar (Regd.), Bareilly.
(3)	Calcutta Hardware Stores, Baraganesh, Varanasi.
(4)	Jain Traders, 46/45 Rajaddi, Batia, Kanpur.
(5)	Gupta Metal Stores, 24, Gautam Budh Marg, Lucknow.
(6)	Indian Engineering Company, Maldahia, Varanasi-2.
(7)	Jitendra Oil Mills, Farrukhabad.
(8)	Kashi and Sons, Village & P.O. Pipraich, Distt. Gorakhpur.
(9)	Kumar and Company, 71/180, Canal Road, Kanpur.
(10)	Kumayu Madhu Bhandar P.O. Karan Ghanta, Varanasi.
(11)	Mills-Ko Iron and Steel Foundry, 359, Civil Lines, Jhansi.
(12)	New Bat Stores, Sahabganj, Gorakhpur.

III

Dealers Licensed for Weights and Measures	
Sl. No.	
(1)	Bakshi Ram Ram Hori Lal, Iron-Merchants, Choutmukha-phul, Moradabad.
(2)	Bareilly Iron Syndicate, Bareilly.
(3)	Bhanamal Guljarimal (P) Ltd., Sahabganj, Gorakhpur.
(4)	Brahm Autar Abhimanu Kumar, Hussaini Bazar, Chandauli, District Moradabad.
(5)	Devi Sahai Narain Lal, Spri Bazar, Jhansi.
(6)	Durga Prasad Agrawal, Pulia No. 9, Jhansi.
(7)	Janeswar Das Jain Kishore Kumar Jain, Baraut District Meerut.
(8)	Gama Distributors Private Ltd., Latenche Road, Kanpur.
(9)	Jugal Kishore Nani Chand Jain, Jharna Gate, Jhansi.
(10)	Kashi Prasad and Sons, Loha Bazar, Rakabganj, Lucknow.
(11)	Katachi Hardware Stores, Mithai Bazar, Jhansi.
(12)	Luxmi Narain Ram Sewak Gupta, Iron Merchants, Subhasganj, Jhansi.
(13)	Matholal Ram Nath, Bara Bazar, Jhansi.
(14)	Nihal Chand Prakash Chand Jain, Iron Merchant, Gandhi Road, Jhansi.
(15)	Om Prakash Agrawal Industries 209, West End Road, Meerut Cantt.
(16)	Ram Charan Ram Narain, Iron Merchants, Bara Bazar, Jhansi.
(17)	Ramdin Ram Kumar, Spri Bazar, Jhansi.

IV. Dealers Licensed for Weights, Measures and Weighing Instruments

Sl. No.	
(1)	Ahmed Yar Khan, Hardware Merchants, Bazar Englishganj, Qila, Bareilly.
(2)	Aruma Iron Stores, Iron and Hardware Merchants, Rakabganj, Loha Bazar, Lucknow.
(3)	Narain Das, H.No. 60, Ganesh Bazar, Jhansi.
(4)	Om Prakash and Company, Ohatia, Varanasi.

V. Dealers Licensed for Weights, Weighing and Measuring Instruments

Sl. No.	
(1)	Nandram Rameshwar Das, Iron Merchants, Bara Bazar, Jhansi.

VI. Dealers Licensed for Weights and Weighing Instruments.

Sl. No.	
(1)	Banaras Iron Hardware and General Trading Co., Baraganesh, Varanasi.
(2)	Behari Lal Jai Ram Das, 76/157, Halsey Road, Kanpur.
(3)	Moti Ram Manohar Lal, Aminabad Road, Lucknow.
(4)	National Iron Foundry, Motilal Nehru Road, Agra.
(5)	Ram Sunder Raja Ram, Baraganesh, Varanasi.
(6)	Sushil Kumar Satish Kumar, Kothi Shukul Ji, Yohiaganj, Lucknow.

VII. Dealers Licensed for Weights and Measuring Instruments.

Sl. No.	
(1)	Brij Basi Lal Bhusan Saran Iron Merchants, Loha Bazar, Pilibhit.
(2)	Muni Lal Moti Lal Golghar, Gorakhpur.

VIII. Dealers licensed for Weights, Weighing and Measuring Instruments

Sl. No.	
(1)	Nandram Rameshwar Das, Iron Merchants, Bara Bazar, Jhansi.

IX. Dealers Licensed for Weights, Measures and Measuring Instruments.

Sl. No.	
(1)	Surya Prasad and Company, Baraganesh, Varanasi.

Repairers

(1)	J.P. Engineering Works, 76/574, Coolie Bazar, Kanpur.
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(2)	Jitendra Oil Mills, Farrukhabad.
(3)	Kumar Foundry, 128/10 C, Kidwai Nagar, Kanpur.
(4)	Moradabad Iron and Steel Industries, Gulshaheed, Moradabad.
(5)	National Iron Foundry Moti Lal Nehru Road, Agra.
(6)	Punchayati Dharam Kanta, Chawk, Moradabad.
(7)	Ram Saran S/o Sri Phali Ram, 24 New Punjabi Market, Bareilly.
(8)	K.R. Sharma Iron Foundry, Pathwari, Belanganj, Agra.
(9)	Subol Chand Dass, Shree Bhawan, Narhi, Lucknow.

WEST BENGAL (4)

In the March, July and November, 1960 issues of 'Metric Measures' lists of licensed manufacturers, dealers and repairers, of Weights and Measures in West Bengal were published. The following is a list of manufacturers, dealers and repairers subsequently licensed by the Government of West Bengal under the West Bengal Weights and Measures (Enforcement) Act, 1958.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Dalmia Iron & Steel Ltd., P.O. Sukehar, 24-Prags., West Bengal	Cast Iron Weights.
(2)	H.P. Das & Co., 22, Sri Gopal Mullick Road, Ariadha, 24, Parganas	Beam scales and Cast Iron Weights.
(3)	Das Iron & Steel Co., 38/1F Manik Tolla Main Road, Calcutta-11	Iron Beam Scales.
(4)	Dhirendra Nath Ghose, 3, Hem Dey Lane, Calcutta-4	Beam Scales.
(5)	Dey's Weighing Scales & Eng. Works, 233, Belilious Road, Howrah	Weighing instruments excluding Beam Scales.
(6)	Gopal Chandra Das, 98/H/B Charakdanga Road	Beam Scales.
(7)	Nagendra Nath Karmakar, S/o Wooma Charan Karmakar, 213, Harrison Road, Calcutta-7.	Beam Scales and Counter Scales.
(8)	Indian Weighing Scales & Eng. Co. P. Ltd., 53, Ashu Bose Lane, Howrah	All types of weighing instruments and C.I. Weights.
(9)	Sankar Iron Eng. Works Private Ltd., 1, Kali Mazumdar Road, Howrah	Cast Iron Weights.
(10)	Rampada Sen Taraprasad Sen, 157, Netaji Subhas Road, Calcutta-1.	Capacity Measures.
(11)	Pioneer Engineering & Scales Co., Anandakaman, Haltikari, Howrah	Cast Iron Weights.
(12)	Shalimar Iron & Steel Industries, P-34, Benaras Road, Belgachia, P.O. Dassnagar, Howrah.	Cast Iron Weights.
(13)	Spun Casting & Eng. Co. P. Ltd., 21/1, Ezra Mansion, 10 Govt. Place, East, 1st floor, Calcutta-1.	Cast Iron Weights.
(14)	Tulsi Charan Karmakar, Barisha, Kamarpara, Calcutta-8	Iron Beam Scales.
(15)	Venus Eng. Co., 16A, Halderpara Lane, P.O. Santragachi, Howrah	Weights.

Sl. No.	Dealers Licensed for Weights.
(1)	Asiatic Machinery Corporation (P) Ltd., 10/1, Kailash Ch. Chandra Lane, Howrah.
(2)	Dey & Co., 225, Harrison Road, Calcutta-8.
(3)	Kanai Lal Sahu, 88, Market Street, Calcutta-13.
(4)	Krishandhan Sury & Bros., 58, Clive St., 1st Floor, Calcutta-19.
(5)	Sinha & Singha, 85, Netaji Subhas Road, Calcutta-1.

Sl. No.	Dealers Licensed for Beam Scales and Weights.
(1)	Amrita Lal Singha, 78, Netaji Subhas Road, Calcutta-7.
(2)	Bankim Ch. Chinya, 57, Clive Street, Calcutta-7.

Sl. No.	Dealers licensed for Beam Scales and Weights
(3)	Basanta Kumar Paul & Co., 23, R.G. Kar Road, Calcutta-4.
(4)	Bebhuti Bhusan Nundy, 57, Clive Street, Calcutta-7.
(5)	Bishnu Pada Atta, 55A, Clive Street, Calcutta-7.
(6)	Continential Commercial Co. P. Ltd., 8/1, Dalhousie Sqr., East., Calcutta-1.
(7)	Dilip Kumar Mittra, 23/1, Maharshi Debendra Road, Calcutta.
(8)	Dulal Chandra Paul & Bros., 57, Clive Street, Calcutta-7.
(9)	Durga Pada Singh, 56, Clive Street, Calcutta-7.
(10)	Durga Paint Shop, 93, Feeder Road, Belghoria, 24, Parganas.
(11)	Eastern Hardware Co., 58, Clive Street, Calcutta-7.
(12)	Gagadananda Singha, 161, Netaji Subhas Road, Calcutta-1.

Sl. No. Dealers licensed for Beam Scales and Weights

- (13) Gour Chandra Mitra & Bros., 49, Mirbahar Ghat-Street, Calcutta-7.
- (14) D.K. Hardware, 231, Ram Krishnapary Lane, Horwah.
- (15) Jagadish Prasad, 119, Upper Chitpur Road, Stall No. 14, Calcutta.
- (16) K.C. Jana, 113, Manohar Das Chowk, Calcutta-7.
- (17) Kishori Mohon Singha, 56, Clive Street, Calcutta-7.
- (18) Lalit Mohon Singha, 58, Clive Street, Calcutta-7.
- (19) Madan Mohon Das Nurkar, 5, Chadi Ghosh Road, Calcutta-40.
- (20) Madan Mohon Singha, 225, Mahatma Gandhi Road, Calcutta.
- (21) Madan Gopal Singha (P) Ltd., 58, Clive Street, Calcutta.
- (22) Mukherjee Laha & Co., 213, Mahatma Gandhi Road, Calcutta-7.
- (23) D.C. Nath & Sons, 58, Clive Street, Calcutta-7.
- (24) New Hardware Stores, 58, Clive Street, Calcutta-7.
- (25) Nilmony Dey & Co., 213, Mahatma Gandhi Road, Calcutta-7.
- (26) Nirod Baran Mrinal Kanti Dey & Co., 58, Clive Street, Calcutta-7.
- (27) Paris Hardware Stores, 78, Netaji Subhash Road, Calcutta-7.
- (28) Rati Ranjan Dey & Co., 23, R.G. Kar Road, Calcutta-4.
- (29) Santosh Kumar Mullick, D/5, Jaganath Ghat, Calcutta-7.
- (30) D.N. Singh & Co., 58, Clive Street, Calcutta-7.
- (31) Sett. & Co., 57, Clive Street, Raja Katra, Calcutta.
- (32) Singha Hardware Stores, 58, Clive Street, Calcutta-7.
- (33) Sudhir Chandra Das & Sons India (P) Ltd., 57, Civil Street, Calcutta-7.
- (34) Surondva Chandra Banik, 5, Tollyganj Circular Road, Calcutta-31.
- (35) Subal Chandra Dey & Co., 23, R.G. Kar Road, Calcutta-4.

Sl. No. Dealers licensed for Beam Scales and Weights

- (36) Tara Choran Dey & Co., 56, Clive Street, Calcutta-7.
- (37) Tarak Nath Mitra & Bros., 23, R.G. Kar Road, Calcutta-4.
- (38) Thakurda Sureka, 213, Harrison Road, Calcutta-7.
- (39) Tincori Chakrabartty, 5, Jadunandan Goswami Lane, Calcutta-6.
- (40) Tulsi Charan Karmakar, 94, Harrison Road, Calcutta-8.
- (41) Vora Trading Co., 56, Netaji Subhas Road, Calcutta-7.
- (42) Wooma Charan Kamarkar, Prop Tarak Ch. Karmakar & others, 225, Mahatma Gandhi Road, Calcutta-7.

Sl. No. Dealers Licensed for Weights, Measures, Weighing and Measuring Instruments

- (1) Kailash Chandra Paul & Sons, Purulia Chak-Bazar, Kallitolla Lane, Purulia.

Sl. No. Dealers Licensed for Weights and Weighing Instruments

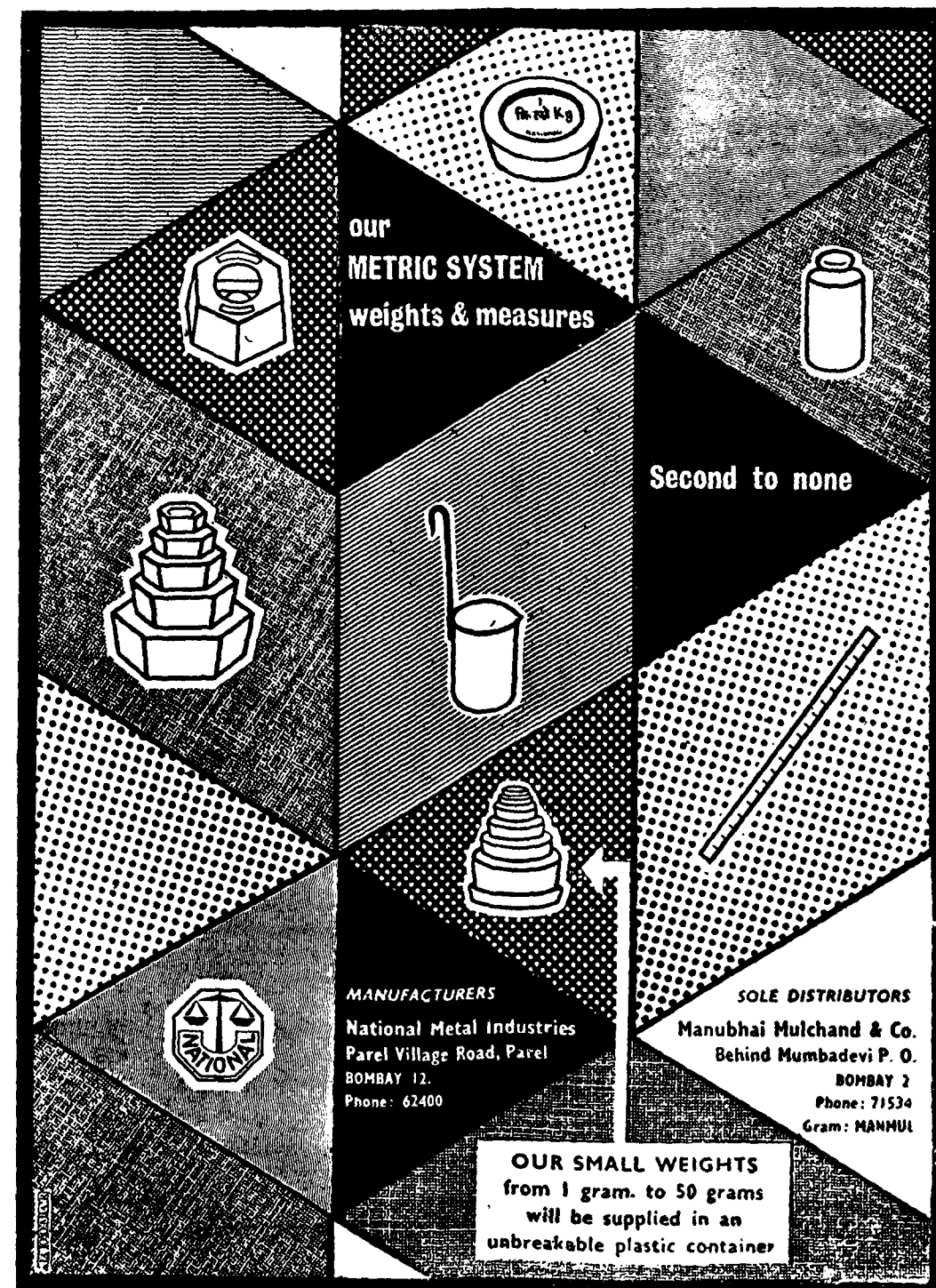
- (1) General Stores Supply Co., 2A, Ramjidas Jatia Lane, Calcutta-7.
- (2) R.K. Kundu & Sons, Main Road, Purulia.
- (3) Misarti Co., 12, Lower Chitpur Road, Room No. 195, Calcutta-1.
- (4) Satish Chandra Das, 113, Khenjrapatti Street, Calcutta-7.
- (5) Universal Trading Co., 167, Old China Bazar St., Calcutta-7.

Sl. No. Dealers Licensed for Weights, Measures and Weighing Instruments

- (1) Gobinda Chandra Kundu, Purulia, Chawak Bazar, Purulia.

Repairer

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	H.P. Das, 22, Srigopal Mullick Road, Ariadaha, 24, Parganas	.. Brass Beam Scales.
(2)	Dinesh Ch. Karmakar, 225, Mahatma Gandhi Road, Calcutta-7	.. Beam Scales.
(3)	Hindusthan Scales Corp., 58, Netaji Subhas Road, Howrah ..	.. Weighing instruments including Beam Scales & Counters Scales.
(4)	Tulsi Charan Karmakar, 92, Diamond Harbour Road, Barisha, Calcutta-8.	.. Iron Beam Scales.



our METRIC SYSTEM weights & measures

Second to none

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National Metal Industries
Parel Village Road, Parel
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Phone: 62400

SOLE DISTRIBUTORS
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Behind Mumbadevi P. O.
BOMBAY 2
Phone: 71534
Gram: MANMUL

OUR SMALL WEIGHTS
from 1 gram. to 50 grams
will be supplied in an
unbreakable plastic container

PRICE CONVERSION TABLE (Maunds to Quintals)

TABLE A

Conversion of Prices from Maund to Quintal (100 kg)

(Factor used : 1 quintal = 2.6792269 maunds)

Naye Paise per maund to Rupees and Naye Paise per quintal

nP/Md	0	1	2	3	4	5	6	7	8	9
	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q
0	0	0.03	0.05	0.08	0.11	0.13	0.16	0.19	0.21	0.24
10	0.27	0.29	0.32	0.35	0.38	0.40	0.43	0.46	0.48	0.51
20	0.54	0.56	0.59	0.62	0.64	0.67	0.70	0.72	0.75	0.78
30	0.80	0.83	0.86	0.88	0.91	0.94	0.96	0.99	1.02	1.04
40	1.07	1.10	1.13	1.15	1.18	1.21	1.23	1.26	1.29	1.31
50	1.34	1.37	1.39	1.42	1.45	1.47	1.50	1.53	1.55	1.58
60	1.61	1.63	1.66	1.69	1.71	1.74	1.77	1.80	1.82	1.85
70	1.88	1.90	1.93	1.96	1.98	2.01	2.04	2.06	2.09	2.12
80	2.14	2.17	2.20	2.22	2.25	2.28	2.30	2.33	2.36	2.38
90	2.41	2.44	2.46	2.49	2.52	2.55	2.57	2.60	2.63	2.65
100	2.68	..	..	..	..	..	..	..	..	..

TABLE B

(Factor used : 1 quintal = 2.6792269 maunds)

Rupees per maund to Rupees and Naye Paise per quintal (q)

Rs/Md	0	1	2	3	4	5	6	7	8	9
	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q	Rs/q
0	0	2.68	5.36	8.04	10.72	13.40	16.08	18.75	21.43	24.11
10	26.79	29.47	32.15	34.83	37.51	40.19	42.87	45.55	48.23	50.91
20	53.58	56.26	58.94	61.62	64.30	66.98	69.66	72.34	75.02	77.70
30	80.38	83.06	85.74	88.41	91.09	93.77	96.45	99.13	101.81	104.49
40	107.17	109.85	112.53	115.21	117.89	120.57	123.24	125.92	128.60	131.28
50	133.96	136.64	139.32	142.00	144.68	147.36	150.04	152.72	155.40	158.07
60	160.75	163.43	166.11	168.79	171.47	174.15	176.83	179.51	182.19	184.87
70	187.55	190.23	192.90	195.58	198.26	200.94	203.62	206.30	208.98	211.66
80	214.34	217.02	219.70	222.38	225.06	227.73	230.41	233.09	235.77	238.45
90	241.13	243.81	246.49	249.17	251.85	254.53	257.21	259.89	262.56	265.24
100	267.92	..	..	..	..	..	..	..	..	..

How to use the Tables :

Suppose a commodity is priced at Rs. 30.50 per maund. To find the price per quintal look up Table B against Rs. 30/maund. The value is Rs. 80.38/(q). Look up Table A against 50 nP/maund. The value is 1.34/(q). Add up the two (Rs. 80.38 + 1.34 = Rs. 81.72). The price per quintal (q) is, therefore, Rs. 81.72.

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metric measures

THE PUBLICATIONS DIVISION

CONVERSION TABLE FOR PRICES (Foot To Metre)

(Conversion Factor used: 1 m = 3.28084 foot)

nP/Ft	nP/m	nP/Ft	nP/m	nP/Ft	nP/m	nP/Ft	nP/m	nP/Ft	nP/m	nP/Ft	nP/m
1	3	21	69	41	1.35	61	2.00	81	2.66		
2	7	22	72	42	1.38	62	2.03	82	2.69		
3	10	23	75	43	1.41	63	2.07	83	2.72		
4	13	24	79	44	1.44	64	2.10	84	2.76		
5	16	25	82	45	1.48	65	2.13	85	2.79		
6	20	26	85	46	1.51	66	2.17	86	2.82		
7	23	27	89	47	1.54	67	2.20	87	2.85		
8	26	28	92	48	1.57	68	2.23	88	2.89		
9	30	29	95	49	1.61	69	2.26	89	2.92		
10	33	30	98	50	1.64	70	2.30	90	2.95		
11	36	31	1.05	51	1.67	71	2.33	91	2.99		
12	39	32	1.08	52	1.71	72	2.36	92	3.02		
13	43	33	1.12	53	1.74	73	2.40	93	3.05		
14	46	34	1.15	54	1.77	74	2.43	94	3.08		
15	49	35	1.18	55	1.80	75	2.46	95	3.12		
16	52	36	1.21	56	1.84	76	2.49	96	3.15		
17	56	37	1.25	57	1.87	77	2.53	97	3.18		
18	59	38	1.28	58	1.90	78	2.56	98	3.22		
19	62	39	1.31	59	1.94	79	2.59	99	3.25		
20	66	40		60	1.97	80	2.62	100	3.28		

NAYE PAISE
PER FOOT
TO
NAYE PAISE
PER
METRE

RUPEES
PER FOOT
TO
RUPEES
PER
METRE

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metric measures

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metric measures

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Working Standard Balances: Part 1- Guiding Factors in Design

B. R. DHURANDHAR

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Bombay

WITH the enforcement of the Standards of Weights and Measures Act, 1956, the housewife is assured of the quantity of everyday articles she buys. A kilogram is a kilogram from Kashmir to Rameshwar and Bhuj to Gauhati. This uniformity is ensured because, unlike the seer, the new weights are the same all over India. But unless the weights are checked to the same accuracy they would not be comparable. This is done by checking all the traders, weights against Inspectors' standard weights to ensure that the weights do remain within the prescribed tolerances so that a fair deal is given both to the seller and the purchaser. The Inspector cannot use his accurate standard weights for comparing or verifying traders' weights unless he has a set of balances of sufficient fineness to achieve his objective. The Inspectors' standard weights against which the traders' weights are calibrated or 'verified' have themselves to undergo a process of calibration before they could be classed as standard weights. For every calibration from standard to standard a good set of balances is necessary. No two weights could be said to be equal unless some instrument is used to compare the earth's pull on these two masses. The finer the

instrument the more precise is the comparison. Thus the balance is the medium for comparing the equality of two weights.

This process of standardizing or comparing weights or 'masses' starts with the absolute international standard kept in France and ends with the weights in use by the common trader.

Importance of Balances

How good is this comparison? It depends, first upon the standard of comparison adopted by each nation under the necessary enactment and the rules under which the limits of tolerances of standard weights used in comparison are fixed and secondly, upon the balances used. Various stages of comparison are necessary for the simple reason that the international standard has to be sparingly used. The less it is used, the better will it maintain its mass. A number of stages have, therefore, been evolved so that the common trader ultimately gets his weights compared in terms of the international standard.

It is expected that 1,000 sets of working standard weights would be used all over India by 1962-63. It is, therefore, not

possible to compare the working standard weights directly with the national prototype, leave alone the international, as the accurate national prototype would be exposed too frequently for comparing working standard weights. Working standard weights are, therefore, checked against what are known as secondary standard weights. These are again calibrated against reference standard weights which are few in number, and in fact there is only one set for each State in India, as compared against the national prototype, which is maintained in India, at National Physical Laboratory in New Delhi.

This national prototype is in turn compared with the international prototype. It would be seen that at each of these following five stages of comparison, sensitive weighing instruments are necessary.

(1) International Prototype Standard	1st stage
(2) National Prototype Standard ..	2nd stage
(3) Reference Standard	3rd stage
(4) Secondary Standard	4th stage
(5) Working Standard	5th stage
(6) Trader's Standard	..

The various types of standard weights have already been described in earlier issues of *Metric Measures*.

In this series of articles an attempt is being made to explain the constructional features, use, care and handling of the Inspectors' or working standard balances which form the link between the trader's weights and the working standard weights (5th stage indicated above).

Guiding Factors in Design of Balances

The State Enforcement Rules lay down that there should be four ranges of working standard balances differentiated by their capacities. For each capacity the degree of fineness *i.e.* sensitivity of these instruments is specified.

Sensitivity and capacity, therefore, primarily determine the other specifications and

the design of these balances. Design is also governed by other factors such as the use to which the balances are put, durability and efficiency in maintaining consistency *i.e.* accuracy. The important factors which have to be taken into consideration while designing the working standard balance apart from its capacity, sensitivity and accuracy, are the materials from which its components are made, the dimensions of the components and their relative placements.

Care has also to be taken to see that the standard balance is easy to assemble and clean. It should also be so rigid that it is not affected in movement and transit.

The essential parts of the equal armed beam balance—which is the most accurate and the simplest weighing instrument—are the beam, knife edges and bearings. Capacity, sensitivity, accuracy, durability and portability determine how these few but essential components should be designed. These factors governing design have to be taken into consideration in the order given.

No suitable design can be evolved if the order of precedence of these factors is not kept in view.

Capacity

Capacity is the first guiding factor in the design of a beam balance. The capacity of a balance is equal to the maximum load (weights) which can be compared on the balance. The maximum shear stress to which the beam balance is subjected depends upon the capacity. The cross-section of the beam is, therefore, immediately determined. The minimum length of the beam depends primarily upon the size of the largest weight which has to be tested on the balance. Cross-section and length thus decide the overall dimensions of a beam.

Sensitivity

Sensitivity is governed by the weight and length of the beam. The longer and

lighter the beam, the more sensitive it is. The weight of the beam is dependent on the cross-section which is already fixed. The minimum cross-section is, therefore, established.

Accuracy

'Accuracy' means the consistent performance of the balance *i.e.* the pointer should establish the same rest point when there is no change in the external forces acting on the balance. The rest point of the pointer changes (1) if the fulcrum or the central knife edge gets displaced on the central bearing which is supposed to be rigidly fixed to the pointer scale, or, (2) if the moments of the load acting through the side knife edges change without any change in forces causing the moments. The former is a defect in the mechanical device to bring the balance to the same position and the latter is a fault in the method of fixing the knife edges.

Durability

Durability of the scale depends upon the material of which the beam, the knife edges and the bearings are made and how they stand the rough wear and tear in transit and exposures to variations in climatic conditions, dust etc.

Portability

Portability in the case of portable or outdoor balances would depend mainly upon the length and the weight of the beam. A mean has to be struck between the optimum length for increasing sensitivity and its portability. Weight is a factor affecting both sensitivity and portability.

Other Points in Design of Balance

After considering the above features in the design, the following points also have to be considered:

- (1) Shape of beam, knife edges and bearings.
- (2) Material for beam, knife edges and bearings.

- (3) Design of beam supporting stand.
- (4) Design of pans.
- (5) Design of protective casing for stationary or indoor balances and of carrying cases for portable or outdoor balance.

Beam, Knife Edges and Bearings

The most suitable shape for the beam is the one which has high modulus of rigidity and which does not develop flexure under stress of loads. Triangular shape of the girder type, known as the open pattern or solid beam type, is usually preferred. Balances which are not installed in a glass case do not permit the use of the open pattern type as this shape is subject to accumulation of dust in its frame work.

The shape of the knife edges is usually triangular. This can withstand the intense crushing load. It has also the advantage of getting a firm fixture in its support without the use of any fixing device.

The theoretical concept of the edge is that it is the thinnest plane strip which has no width or thickness. It is, however, not possible to develop this theoretical edge. The best possible practical concept of the edge is the one formed by the intersection of two perfect planes. This is practicable and primarily responsible for the evolution of the triangular shape.

The ideal shape of the bearing would be a plane which develops the minimum friction in contact with the knife edges. But this requires the use of additional mechanical devices which would bring the beam to rest in the same position over the central bearing. The next suitable design is the V-grooved bearing.

Supporting Stand

The supporting stand *i.e.* the portion which holds the central bearing, requires careful designing. It is very essential that the central bearing and the pointer scale should

be so joined that there is no relative displacement between the two. Otherwise every time the balance is operated, its resting point may change without any change in the external forces.

Pans

The pans are usually round, though any shape is possible. The round shape is preferred as it permits the easy location of the centre of the pan where the load can be placed to avoid eccentric loading of the knife edges. Central placement of loads in the pan also brings it directly over the pan rests, if any, when the balance is not operated.

Protective Casing

Protective casing guards the balance from wind, disturbances, dust and sudden changes in room temperature. The protective casing for stationary or indoor balances is

made of glass to facilitate observation of the working of the balance from outside. Size and shape of the casing depend upon the size of the balance and other considerations of the user.

For portable balances the protective casing, apart from protecting the balance, is also used as its carrying or packing case. Suitable designs are, therefore, developed depending upon the size and shape of the balance and its loose components which need to be packed.

Conclusion

In this part we have considered the general requirements for designing a working standard beam balance. In part 2 of the series we shall consider how designs of working standard balances are based on these general requirements.

Metric System & Building Engineer

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THE metric system of weights and measures is in vogue in most countries of the world except the U.S.A., the U.K. and some countries of the Commonwealth. India used to follow the British system of weights and measures. With the adoption of the metric system in India our building engineer has to change his outlook. He should know the new units and the new instruments. He may often be faced with questions such

as what are the new units of stress, what is the length of a metric chain, what will be the weight of a bag of cement in metric units, how long will be the new levelling staff and what will be its graduations and so on. The object of this article is to acquaint the building engineer with the new units and instruments so that he is prepared for the change-over to the metric system.

With the adoption of the metric system

a large number of tables have appeared giving conversion factors from the British system to the metric system. While these are useful, what is needed in the first phase of transition are the conversion factors from metric system to the British system. The present generation of engineers has been trained in British units. When he says that the bearing capacity of a particular soil is 4 tons/sq ft, he immediately forms a picture in his mind; but when he is told that the bearing capacity of a soil is 44 metric tonnes/sq m, it will be difficult for him to grasp its exact magnitude unless he converts it into British units and correlates it with his present knowledge. Hence he will need conversion factors from metric system to British system more often in the first phase of transition.

Handbook for Building Engineers

This article brings together the information often required by the building engineer. A comprehensive Handbook for Building Engineers is being compiled by the National Buildings Organisation. This Handbook is the outcome of the recommendation made to that effect by the Conference* on the adoption of metric system in architecture, town planning and building industry convened by the Ministry of Works, Housing

and Supply, Government of India, in September 1959.

This Handbook is being compiled by the author. It is proposed to divide the Handbook into the following 24 chapters covering all aspects of building engineering:

- (1) Quantities, Units and Conversion Factors.
- (2) Mathematical Formulae and Tables.
- (3) Structural Sections and Allied Data.
- (4) Materials of Construction.
- (5) Loads on Buildings.
- (6) Structural Analysis—Formulae and Tables.
- (7) Masonry Structures.
- (8) Timber Structures.
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- (17) Water Supply Engineering.
- (18) Sanitary Engineering.
- (19) Surveying.
- (20) Ventilation and Air-Conditioning.
- (21) Electrical Installations in Buildings.
- (22) Measurement of Building Works.
- (23) Building Construction Equipment.
- (24) Miscellaneous Information for the Building Engineer.

This Handbook is so devised that the building engineer can get the information required by him for day-to-day purposes in a single volume.

TABLE 1
Quantities, Units and Conversion Factors

S. No.	Quantity	British Unit	Equivalent Metric Unit	Conversion Factor	
				British to Metric	Metric to British
(1)	(2)	(3)	(4)	(5)	(6)
(1) Length		Inch (in)	Millimetre (mm)	25.400	0.039
		Inch (in)	Centimetre (cm)	2.540	0.394
		Foot (ft)	Metre (m)	0.305	3.281
		Yard (yd)	Metre (m)	0.914	1.094
		Furlong	Kilometre (km)	0.201	4.971
		Mile	Kilometre (km)	1.609	0.621

*see *Metric Measures*, January 1960, pp. 29-32.

TABLE 1—contd.

S. No.	Quantity	British Unit	Equivalent Metric Unit	Conversion Factor	
				British to Metric	Metric to British
(1)	(2)	(3)	(4)	(5)	(6)
(2)	Area	sq in	cm ² (sq cm)	6.452	0.155
		sq ft	m ² (sq m)	0.093	10.764
		sq yd	m ² (sq m)	0.836	1.196
		Acre	Hectare (ha)	0.405	2.471
(3)	Volume	cu in	cm ³ (cu cm)	16.387	0.061
		cu ft	m ³ (cu m)	0.028	35.315
		cu yd	m ³ (cu m)	0.765	1.308
		Acre foot	Hectare metre	0.123	8.107
(4)	Capacity	Imperial Gallon	Litre (l)	4.546	0.220
(5)	Mass	Pound (lb)	Kilogram (kg)	0.454	2.205
		Hundred-weight (cwt)	Quintal (q)	0.508	1.968
(5)	Mass (contd.)	Ton	Metric Tonne	1.016	0.984
(6)	Density	lb/cu ft.	kg/m ³	16.019	0.062
		lb/cu in	g/m ³	27.680	0.036
(7)	Bending Moment	ft lb	kg cm	13.826	0.072
		in lb	kg cm	1.152	0.868
(8)	Moment of Inertia	in ⁴	cm ⁴	41.623	0.024
(9)	Section Modulus	in ³	cm ³	16.387	0.061
(10)	Stress	lb/sq in	kg/cm ²	0.070	14.223
		lb/sq ft	kg/m ²	4.882	0.205
		ton/sq ft	Metric tonne/m ²	10.937	0.091
		ton/sq in	kg/mm ²	1.575	0.635
(11)	Quantity of Heat	British Thermal Unit (B Th U)	Calorie (Cal)	252.000	0.004
(12)	Work and Energy	ft lb	kg m	0.138	7.233
(13)	Power	Horse Power	Metric Horse power	1.014	0.986
		Horse Power	Kilowatt	0.746	1.341

TABLE 2
Properties of Reinforcing Round Bars

Diameter	Sectional Area	Perimeter	Weight per Metre Length
mm	cm ² (sq cm)	cm	kg
5.0	0.20	1.57	0.15
5.5	0.24	1.73	0.19
6.0	0.28	1.88	0.22
7.0	0.38	2.20	0.30
8.0	0.50	2.51	0.39
9.0	0.64	2.83	0.50
10	0.79	3.14	0.62
11	0.95	3.46	0.75
12	1.13	3.77	0.89
14	1.54	4.40	1.21
16	2.01	5.03	1.58
18	2.54	5.65	2.00
20	3.14	6.28	2.47
22	3.80	6.91	2.98
25	4.91	7.85	3.85
28	6.16	8.80	4.83
32	8.04	10.05	6.31
36	10.18	11.31	7.99
40	12.57	12.57	9.86
45	15.90	14.14	12.49
50	19.64	15.71	15.41

TABLE 3
Metric Scales for Survey Plans, Building & Architectural Drawings
(Derived from IS : 965—1958)

- (1) *Topographical Maps*
1 cm = 0.5 km or $\frac{1}{50\ 000}$
1 cm = 1 km or $\frac{1}{100\ 000}$
1 cm = 2.5 km or $\frac{1}{250\ 000}$
- (2) *Town Surveys*
2 cm = 1 km or $\frac{1}{50\ 000}$
4 cm = 1 km or $\frac{1}{25\ 000}$

10 cm = 1 km or $\frac{1}{10\ 000}$
1 cm = 50 m or $\frac{1}{5\ 000}$

(3) *Small Scale Surveys and Layouts*

1 cm = 10 m or $\frac{1}{1\ 000}$
1 cm = 8 m or $\frac{1}{800}$
1 cm = 4 m or $\frac{1}{400}$

(4) *Preliminary or Sketch Drawings Dependent on the Subject*

1 cm = 4 m or $\frac{1}{400}$
1 cm = 2 m or $\frac{1}{200}$
1 cm = 1 m or $\frac{1}{100}$

(5) *Working Drawings : Plans, Elevations and Sections*

1 cm = 2 m or $\frac{1}{200}$
1 cm = 1 m or $\frac{1}{100}$
1 cm = 0.5 m or $\frac{1}{50}$

(6) *Large Scale Drawings : General Details*

1 cm = 20 cm or $\frac{1}{20}$
1 cm = 10 cm or $\frac{1}{10}$

(7) *Enlarged Details*

1 cm = 10 cm or $\frac{1}{10}$
1 cm = 5 cm or $\frac{1}{5}$
1 cm = 1 cm or Full size.

Other Useful Information

- (1) Net weight of cement in a bag will be 50 kg.
- (2) Cross sectional dimensions of structural steel sections will be in millimetres and length in metres.
- (3) Metric surveying chains will be of two lengths, 20 metres and 30 metres. There will be 5 links to a metre.

- (4) Metric woven metallic tapes will be available in the following lengths : 2, 5, 10, 20, 30, and 50 metres. Division 1 cm.
- (5) Metric steel tapes will be available in the following lengths :— 1, 2, 10, 20, 30 and 50 metres. Division 5 mm. The first 10 cm will have millimetres also marked on the tape.
- (6) Height of metric levelling staff will be 4 metres. Division 0.002 m.
- (7) Dimensions of modular bricks :
 - (a) $19 \times 9 \times 9$ cm
 - (b) $19 \times 9 \times 4$ cm
- (8) Unless a definite degree of accuracy has been specified,
 - (a) Length will be measured to the nearest 0.01 m,
 - (b) Areas will be worked out to the nearest 0.01 m^2 (sq m) and
 - (c) Volume will be worked out to the nearest 0.01 m^3 (cu m).

Metric Weights and Measures for Medicines*

METRIC weights and measures have long been used exclusively in the terminology of chemistry and physics. With the increasing influence of these sciences on modern medical practice, the metric system has been coming slowly but steadily into usage in medical and pharmaceutical literature where hitherto apothecaries' weights and measures were used. The British Pharmacopoeia accorded its official recognition to the metric system for the first time in the year 1898 by giving the formulae in metric as well as Imperial units. In subsequent editions, too, the same practice was continued but with an increasing use of the metric system. Thus, in the 1958 edition, only metric system is used for all drugs and preparations introduced into the B.P. during the previous ten years; in addition to the metric quantities, the

apothecaries' equivalents are given parenthetically in the statement of dose of only the older drugs and of some of their preparations such as tablets, capsules and injections.

In 1955 the General Medical Council accepted the B.P. Commission's recommendation to abandon the apothecaries system in the 1963 edition. In a statement issued recently (*Pharm. J.*, 10 Sept. 1960, p. 252) the B.P. Commission has announced the steps proposed to be taken for implementing the decision. It was noted that :

"1. While the replacement of the apothecaries system by the metric system in certain liquid medicines would raise complicated problems, the abandonment of the apothecaries system in relation to many official dosage-form preparations offered an attractive first step."

"2. If the metric system is adopted in expressing the strength of dosage-form preparations (tablets,

capsules, and injections) of the Pharmacopoeia, it should at the same time be adopted for similar preparations described in the British Pharmaceutical Codex and the British National Formulary."

"3. In order to abolish the use of the apothecaries system for tablets, capsules, and injections of the B.P., B.P.C., and B.N.F., it will be necessary to stipulate : (a) the strength in metric units which *must* be dispensed or supplied in the absence of directions on the prescription or order; (b) the strength in metric units which *must* be dispensed or supplied when a strength in apothecaries units is stated on the prescription or order."

"4. Legislation would be necessary in order to adopt 3(b)."

Accordingly, the Councils of the British Medical Association and the Pharmaceutical Society proposed a schedule of apothecaries and metric quantities and decided "to assist in sponsoring and supporting legislation to secure that when tablets, capsules and other named dosage-forms described in the British Pharmacopoeia, British National Formulary, and British Pharmaceutical Codex are prescribed or demanded with the strength stated in the apothecaries system, the equivalent metric strength stated in the Schedule to the Bill must be dispensed or supplied". The Commission called attention to the following points in connection with the proposals :

"1. This is a partial abandonment of the apothecaries system and applies only to certain named dosage-forms of drugs included in the British Pharmacopoeia, British Pharmaceutical Codex, and British National Formulary."

"2. It would be necessary to provide an interim period adequate for the disposal of stocks of preparations made according to the apothecaries system."

"3. When the change became fully effective it would not be necessary for pharmacists to hold stocks of the preparations concerned which had been made according to the apothecaries system."

"4. Whilst it is expected that the prescribing of these preparations in the metric system will increase, the prescriber would remain free to use the apothecaries system."

"5. The pharmacist would be provided, by means of the Schedule, with a clear statement of the strength by weight in metric units which must be supplied when the B.P., B.P.C., and B.N.F. preparations concerned are prescribed or demanded in the apothecaries system".

At the British Pharmaceutical Conference held recently at Newcastle. Dr. Capper (*Pharm. J.*, 10 Sept. 1960, p. 229) presented a comprehensive review of the problems involved in changing to the metric system in pharmaceutical practice and offered some helpful suggestions. He pointed out that apart from the difficulty of the pharmacists to carry double stocks and the doctors' difficulty of prescribing metric doses, the main hardship during the transitional period would be on the pharmacists who have to dispense in the metric system after converting the medical practitioners' prescriptions with apothecary symbols. Dr. Capper has suggested that the change to metric system could proceed in three stages: (i) tablets, capsules, and injections to be in metric doses as decided for B.P. 1963; (ii) ointments, lotions, eye-drops and other external preparations are to be dispensed only in metric quantities, possibly by 1968 with the agreement of the medical profession and the Ministry of Health; (iii) mixtures, linctuses and other liquid internal medicines usually dispensed extemporaneously, are to be in metric system from 1973 or whenever the entire medical profession is willing to change over to the metric system.

In our country, the Standards of Weights and Measures Act was passed in 1956 for the purpose of establishing standards of weights and measures based on the metric system and it laid down that its provisions should come into force at a date not later than 1966. A beginning in its enforcement has already been made with regard to some commodities and in a majority of the States.

*Reproduced from *The Indian Journal of Pharmacy*, February 1961, pp. 29-30.

Schedule of Apothecaries and Metric Quantities

Grains	Milligrams (mg)	Grains	Milligrams (mg)	Grains	Milligrams (mg)
10	600	$\frac{1}{4}$	15	$\frac{1}{75}$	0.8
$7\frac{1}{2}$	450	$\frac{1}{5}$	12.5	$\frac{1}{100}$	0.6
5	300	$\frac{1}{6}$	10	$\frac{1}{120}$	0.5
4	250	$\frac{1}{8}$	7.5	$\frac{1}{130}$	
3	200	$\frac{1}{10}$	6	$\frac{1}{150}$	0.4
$2\frac{1}{2}$	150	$\frac{1}{12}$	5	$\frac{1}{160}$	
2	125	$\frac{1}{15}$	4	$\frac{1}{200}$	0.3
$1\frac{1}{2}$	100	$\frac{1}{20}$	3	$\frac{1}{240}$	0.25
1	60	$\frac{1}{25}$	2.5	$\frac{1}{300}$	0.2
	50	$\frac{1}{30}$	2	$\frac{1}{320}$	
$\frac{3}{4}$	30	$\frac{1}{40}$	1.5	$\frac{1}{480}$	0.125
$\frac{2}{5}$	25	$\frac{1}{50}$	1.25	$\frac{1}{600}$	0.1
$\frac{1}{3}$	20	$\frac{1}{60}$	1		

"This table has been compiled with regard to the strengths of tablets, capsules, and injections described in the British Pharmacopoeia. The intention is that when a tablet, capsule, or injection is prescribed or demanded with the strength stated by weight as one of the apothecaries quantities given in the left-hand columns, tablets, capsules, or an injection containing the corresponding metric quantity given in the right-hand columns must be dispensed or supplied."

We do not know when medicines and pharmaceuticals are proposed to be brought under the purview of this Act. In anticipation, the pharmaceutical manufacturers are getting ready for the change-over either voluntarily or on the advice of the Drugs Control Administration. But the adoption of the metric system for medicines will not be smooth or complete unless the medical

practitioners fall in line, either of their own accord—a pious hope—or by the compulsion of law. It is high time that in our country too the pharmacists, the pharmaceutical manufacturers and the medical practitioners come to grips with the problems involved and take all necessary steps for an orderly change from the apothecaries to the metric system.

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Metric System in Engineering Industry

THE Engineering Sub-committee of the Standing Metric Committee met at Calcutta on 30 January 1961 to consider problems connected with the adoption of the metric system in engineering industry. Among the subjects discussed were the planning for the design and manufacture in metric units and training for craftsmen. The Sub-committee's recommendations on these two issues are given below:

(1) Implementation of the Metric Reform in the Engineering Industry

The implementation of the metric system in the engineering industry should be brought about by creating conditions that would necessitate its adoption, e.g. in the case of steel products as the steel mills would be rolling only in metric sizes after another year, the indentors would be forced to make use of them and consequently revise their specifications also. It was also agreed that the manufacturers of machine tools in the country could be consulted and a target date fixed, say of two years, after which date all machines manufactured within the country would be in metric units.

A note prepared on the change-over in the engineering industry which was considered by the Sub-committee is reproduced as Appendix 1.

(2) Training Pamphlet for Skilled and Semi-skilled Workers in Engineering Industries

The Sub-committee recommended that training for semi-skilled workers should

commence from now on only in metric units. For skilled labour, the training course which was being adopted by the Training Institute, Jamshedpur, would serve as a suitable guide. For persons engaged in drawing offices, designers and higher technical people, the pamphlet prepared by the Indian Telephone Industries was considered quite adequate. It was agreed that these two pamphlets should be revised and circulated widely.

APPENDIX I

Planning for the change-over in Design and Manufacture in Engineering Industries

The adoption of metric system in engineering industry depends not only on the availability of standards and materials in metric system but also on the initial preparations which each manufacturer must go through in order to be able to utilise metric materials and equipment. It is, therefore, necessary that after a certain stage in the development of standards has been reached, planning for utilisation of metric equipment and materials should go hand in hand with the planning of production.

The progress of formulation of Indian Standards required for the change-over has been reviewed and for convenience a brief statement is attached to this note to bring out the position in regard to basic standards. It will be seen that the majority of basic standards required by engineering industry and also a large number of standards for

materials have either been laid down in metric system or drafts at advanced stages of development are available. The progress is adequate to enable the engineering industry to begin further planning for manufacture in metric units and dimensions.

The next step now should be to adopt metric specifications in existing designs or prepare new designs wherever necessary. Until designs are converted, it will not be possible to visualise all the problems which the designers will have to face. It may be necessary to initiate further actions by appropriate organisations to solve such problems but they will be known only when details are worked out by the industry. ISI will be prepared to assist the industry in this work, but the initiative must come from manufacturers.

Some other initial preparations will also be necessary before production can be changed over to metric system. For example, measuring and inspecting instruments such as scales, micrometers, slip or plug gauges etc., will have to be replaced or recalibrated. Some of the machines will need adjustment particularly where thread cutting is involved and some of the existing fixtures and adopters may have to be changed.

A careful assessment of these requirements should be made along with the preparation of new designs. It should enlist all items to be purchased, work on alteration or adjustment to be carried out and indicate the quantities and time by which the new equipment and materials would be required.

If the above steps are taken by both producer and consumer industries simultaneously, co-ordination between them will be easier to achieve. Even then some of the raw materials, tools, etc., may be available earlier than others requiring adjustment of designs and production from time to time.

These initial difficulties can hardly be entirely avoided but mutual understanding of one another's programme among producer and consumer industries should help in minimising them. To establish and promote such understanding, producer and consumer industries may be encouraged to meet to exchange information from time to time.

To sum up, it is suggested that :

- (1) All engineering units should immediately take up the task of adapting their designs or preparing designs on the basis of metric system;
- (2) any problem which may come up in the course of redesigning or converting existing designs in respect of availability of standards, raw materials, tools, etc., may be referred to ISI and the Standing Metric Committee for necessary action;
- (3) a significant beginning can be made by Indenting Departments to transfer their requirements to metric units. The suppliers would then of necessity adopt the new Indian Standards and a major step in the implementation of the metric system would have been taken;
- (4) an assessment should be made of the need of new stock of materials, measuring instruments and other inspection gauges and tools, so that suppliers may be given an idea of the possible demand and the time when the demand may arise; and
- (5) representative associations are requested to take note of the above recommendations and circularise them to their individual constituent units and review the progress made in the adoption of the metric system periodically.

BASIC AND AUXILLARY STANDARDS FOR ENGINEERING INDUSTRY

(1) Screw Threads		Stage	(3) Sizes of Materials		Stage
Basic Standards	IS : 1330—1958 General Plan for Metric Screw Threads with ISO Profile (Diameter Range 0.25 to 300 mm).	Published	Basic Standards	IS : 1136—1958 Preferred Sizes for Wrought Metal Products	Published
	IS : 1362—1959 Dimensions for Screw Threads for General Purposes (Diameter Range 0.25 to 39 mm).	Published		IS : 1137—1959 Thicknesses of Sheet and Diameters of Wire	Published
	IS : 554—1955 Pipe Threads for Gas List Tubes and Screwed Fittings.	Published		IS : 1594—1960 Metric Sizes of Copper Wires and Conductors for Electrical Purposes.	Published
				IS : 1077—1957 Common Burnt Clay Building Bricks.	Published
Auxiliary Standards	Black Hexagonal Bolts and Nuts (6—39 mm) and Black Hexagonal Screws (6-24 mm)	Under Print	Auxiliary Standards	ISI Handbook for Structural Engineers, Vol. I Structural Steel Sections.	Published
	Precision Hexagonal Bolts Nuts (6-39 mm) and Precision Hexagonal Screws (6-39mm).	Under Print		IS:808—1957 Rolled Steel Beam, Channel and Angle Sections.	Published
	Dimensions of Ends of Bolts and Screws.	Finalised		IS : 1173—1957 Rolled Steel Sections, Tee Bars.	Published
	Dimensions of Screw Thread Runouts and Undercuts.	Finalised		IS : 1252-1958 Rolled Steel Sections, Bulb Angles.	Published
	Slotted Countersunk Head Machine Screws (1.6-20 mm)	Completed wide circulation.		IS : 1161-1958 Steel Tubes for Structural Purposes.	Published
	Slotted Round Head Machine Screws (1.6-20 mm).	Completed wide circulation.		IS : 1239—1958 Mild Steel Tubes and Tubulars.	Published
	Rivets for General Purposes (12—48 mm diameter).	Finalised			
	Split Cotter Pins	Completed wide circulation			
(2) Limits & Fits			(4) General		
Basic Standard	IS : 919—1959 Recommendations for Limits and Fits for Engineering.	Published	Basic Standards	IS : 696—1955 Code of Practice for General Engineering Drawings (under revision).	Revised code soon to be sent for printing.
				IS : 1076—1957 Preferred Numbers.	Published
Auxiliary Standards	Guide for the Selection of Fits. Limits & Fits for above 500 mm.	Under preparation		IS : 1233—1958 Recommendations for Modular Co-ordination of Dimensions in the Building Industry.	Published

		Stage		Stage
	IS : 965—1958 Equivalent Metric Units for Scales, Dimensions and Quantities in General Construction Work.	Published	Metric Steel Scales for Engineers.	Under Print
			(5) <i>Inter-Conversion</i>	
	Equivalent Metric Units for Quantities in Mechanical Engg.	Being finalised.	IS : 786—1956 Conversion Factors & Conversion Tables.	Published
			IS : 787—1956 Guide for Inter-Conversion of Values from one System of Units to Another.	Published
Auxiliary Standards	IS : 1491—1959 Metric Scales for Architectural Purposes.	Published	IS : 1020—1957 Conversion Tables for Ordinary Use.	Published
	IS : 1482 Metric Scales for use with Drafting Machines.	Published	IS : 1105—1957 Method for Precise Conversion of Inch and Metric Dimensions to ensure Interchangeability.	Published
	Metric Scales for General Purposes.	Under Print		

News and Views

Recent Notifications

(1) Introduction of Capacity Measures

No. S.O. 664, dated 21st March 1961.

In exercise of the powers conferred by sub-section (3) of section 1 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby appoints the 1st day of April, 1961, as the date on which the provisions of the said Act in so far as they relate to units of capacity shall come into force in the areas specified in column 2 of the Table below in the State or Union Territory specified in the corresponding entry in column 1 thereof:—

TABLE	
State	Areas in which Metric Units of Capacity are introduced
Andhra Pradesh	Districts of Visakhapatnam, Krishna, Guntur, Kurnool, Hyderabad, Warangal, Nizamabad. Market areas notified under the Madras Commercial Crops Markets Act, 1933 (XX of 1933) and the Hyderabad Agricultural Market Act, 1939 Fasli (II of 1339 F).
Assam	Municipal areas of Gauhati and District of Nowgong.
Bihar	Municipal areas, notified areas, areas under the jurisdiction of Union

State	Areas in which Metric Units of Capacity are introduced
Gujarat	Boards and cantonments. Ahmedabad, Baroda and Rajkot.
Madras	Districts of Madras, Chingleput, South Arcot and North Arcot.
Maharashtra	Municipal areas of Bombay, Poona, Sholapur, Kolhapur, Aurangabad, Nagpur, Akola, Wardha, Amravati and Yeotmal. Market yards and/or sub-yards notified under the Agricultural Produce Markets Act, 1939 (XXII of 1939), the Hyderabad Agricultural Markets Act, 1339 Fasli (II of 1339 F.) and the Central Provinces and Berar Agricultural Produce Markets Act, 1935 (XXIX of 1935) in—Nasik, Malegaon, Lasalgaon, Sangli, Karad, Shrirampur, Ahmednagar, Dhulia, Don-daicha, Jalgaon, Pachora, Latur, Nanded and Jalna.
Mysore	Districts of Bangalore, Raichur and Dharwar. Market areas notified under the Mysore Agricultural Produce Market Act, 1939 (XVI of 1939), Bombay Agricultural Produce Markets Act, 1939 (XXII of 1939) and Hyderabad Agricultural Market Act, 1339 Fasli (II of 1339 F).
Orissa	Municipal areas of Berhampur, Cuttack and Sambalpur.
Punjab	Districts of Amritsar, Jullundur, Ludhiana, Ambala, Patiala and Gurgaon.
Rajasthan	Districts of Ajmer, Bikaner, Jodhpur, Jaipur, Kota and Udaipur.
West Bengal	Municipal areas of Calcutta and Howrah.
UNION TERRITORIES	
Himachal Pradesh	Districts of Mandi and Sirmur.
Manipur	Municipal area of Imphal.
Tripura	Municipal area of Agartala.
Andaman & Nicobar	Port Blair.
Pondicherry	Whole State.

No. S.O. 665, dated 21st March, 1961.

In exercise of the powers conferred by section 14 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby permits, in respect of the areas referred to in the Notification of the Government of India in the Ministry of Commerce and Industry S.O. No. 664, dated the 21st March 1961, the continuance of the use for a period of one year from the 1st day of April, 1961 of any unit of capacity which immediately before that date was in use in respect of the said areas.

(2) *Extension of Metric System to Jammu & Kashmir*
No. S.O. 732, dated 29th March 1961.

In exercise of the powers conferred by sub-section (3) of section 1 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby appoints the 1st day of April, 1961, as the date on which the provisions of the said Act shall come into force in the State of Jammu and Kashmir in respect of the classes of undertakings and the classes of goods specified in the Tables below to the extent specified therein.

TABLE 'A'

1. Government Departments and Commercial and industrial undertakings owned or controlled by Government in so far as they undertake the purchase or supply of stores, including drugs.
2. Government Departments in so far as they undertake survey of land or mines.
3. Government Departments in so far as they undertake the study or publication of any technical, scientific or marketing data relating to weather, irrigation and power projects, or undertake drawings and specifications of scientific apparatus for use in laboratories and educational institutions, except in matters relating to air distances and speed of aircraft.

TABLE 'B'

- | | |
|--|--|
| 1. Cotton textile mills in so far as they undertake the purchase of cotton or sale of yarn and cotton textile products, or the stamping of cloth, yarn and other cotton textile products. | 12. Sale of raw rubber. |
| 2. Iron and Steel factories in so far as they undertake the purchase of raw materials or sale of iron and steel products. | 13. Jute mills in so far as they undertake the purchase of raw jute and sale of jute products. |
| 3. Factories engaged in engineering industry in so far as they undertake the sale of their products. | 14. Factories engaged in the processing of coir yarn or the manufacture of coir products in so far as they undertake the purchase of coir or coir yarn or the sale of coir, coir yarn and other coir products. |
| 4. Factories engaged in the manufacture of heavy chemicals in so far as they undertake the purchase of raw materials or sale of their products. | 15. The Central Coir Cooperative Marketing Societies in so far as they undertake the purchase of coir or coir yarn or the sale of coir, coir yarn and other coir products. |
| 5. Factories engaged in the manufacture of cement in so far as they undertake the sale of cement. | 16. Factories engaged in the manufacture of sugar in so far as they undertake the purchase of sugar-cane or sale of sugar. |
| 6. Factories engaged in the manufacture of salt in so far as they undertake the sale of salt. | 17. Factories engaged in the manufacture of Vanaspati in so far as they undertake the sale of Vanaspati. |
| 7. Factories engaged in the manufacture of paper, pulp, or paper board in so far as they undertake the sale of paper, pulp, or paper board. | 18. Factories engaged in the manufacture of paints in so far as they undertake the sale of paints. |
| 8. Factories engaged in the manufacture of refractories, in so far as they undertake the sale of refractories. | 19. Factories engaged in the manufacture of biscuits in so far as they undertake the sale of biscuits. |
| 9. Coffee Board, in so far it undertakes the sale of coffee from the surplus pool either by itself or through its agents. | 20. Factories engaged in the manufacture of soap to the extent they undertake the purchase of raw materials for such manufacture and the sale of soap. |
| 10. Factories engaged in the manufacture of copper, aluminium, lead, antimony and tin in so far as they undertake the sale of copper, aluminium, lead, antimony and tin including alloys and products of these metals. | 21. Factories engaged in the manufacture of drugs in so far as they undertake the sale of drugs or purchase of materials. |
| 11. Associations recognised by the Central Government under section 6 of the Forward Contracts (Regulation) Act, 1952 (74 of 1952) in so far as they | 22. Sale and purchase of fertilizers. |
| | 23. Crude petroleum and petroleum products, produced, manufactured, distributed, bought or sold, whether by a producer, manufacturer or distributor |

of crude petroleum or petroleum products or by an agent, dealer or retailer engaged in buying and selling crude petroleum or petroleum products.

24. Tea factories in so far as they undertake the sale of manufactured tea or make payments to labourers for plucking tea leaves.
25. Woollen mills in so far as they undertake the purchase of raw wool and sale of woollen products.

No. S.O. 733, dated 29th March 1961.

In exercise of the powers conferred by section 14 of the Standards of Weights and Measures Act, 1956, (89 of 1956), the Central Government hereby permits, in respect of the classes of undertakings or of goods referred to in the notification of the Government of India in the Ministry of Commerce and Industry, S.O. 732, dated the 29th March, 1961 the continuance of the use, for a period of one year from the 1st day of April, 1961, of any weight or measure which, immediately before that day was in use in respect of the said classes of undertakings or of goods.

No. S.O. 734 dated 29th March 1961.

In exercise of the powers conferred by sub-section (3) of section 1 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby appoints the 1st day of April, 1961, as the date on which the provisions of the said Act in so far as they relate to units of mass shall come into force in all the areas in the State of Jammu and Kashmir except in respect of the classes of undertakings and the classes of goods situated in the said areas and specified in the notification of the Government of India in the Ministry of Commerce and Industry S.O. No. 732, dated the 29th March, 1961.

No. S.O. 735 dated 29th March 1961.

In exercise of the powers conferred by section 14 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby permits, in all the areas in the State of Jammu and Kashmir referred to in the notification of the Government of India in the Ministry of Commerce and Industry S.O. No. 734, dated the 29th March, 1961 except in respect of the classes of undertakings and goods referred to in that notification, the continuance of the use, for a period of two years from the 1st day of April, 1961 of any weight or measure which, immediately before that day, was in use in the State of Jammu and Kashmir.

(3) *Amendment to Notification Regarding Shipping Industry*

No. S.O. 688 Dated 15th March, 1961.

In exercise of the powers conferred by sub-section (3) of section 1 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby makes the following amendment in the notification of the Government of India in the Ministry of Commerce and Industry No. S.O. 1898, dated the 1st August, 1960, namely :—

In the said notification, in item (1), for the words "Inland and wharves", the words "Inland Vessels wharves" shall be substituted.

(The original notification appeared in 'Metric Measures' on page 23, September, 1960).

(4) *Foodgrains Movements (Conversion to Metric Weight) Order, 1961.*

No. G.S.R. 26, dated 30th December, 1960.

In exercise of the powers conferred by section 3 of the Essential Commodities Act, 1955 (10 of 1955), the Central Government hereby makes the following Order, namely :—

1. This Order may be called the Foodgrains Movements (Conversion to Metric Weights) Order, 1961.

TABLE I (contd.)

TABLE	
Order	Nature of amendments
(1)	(2)
1. Calcutta Wheat (Movement Control) Order, 1956; S.R.O. 2033; 5-9-1956.	
2. Bombay Wheat (Movement Control) Order, 1956; S.R.O. 2098; 17-9-1956.	In the proviso to clause 3, for "five seers", substitute "five kilograms".
3. Bombay Rice (Export Control) Order, 1957; S.R.O. 1852; 3-6-1957.	
4. Inter-Zonal Wheat Movement Control Order, 1957; S.R.O. 1986; 13-6-1957.	In the first proviso to clause 3, for "five seers", substitute "five kilograms".
5. Rice (Southern Zone) Movement Control Order, 1957; S.R.O. 2258-A; 9-7-1957.	(i) In clause 3,— (a) in the first proviso, for "five seers", substitute "five kilograms"; (b) in the second proviso, for "ten maunds", substitute "four quintals"; (ii) In the proviso to clause 3 A, for "20 seers" and "5 seers", substitute "twenty kilograms" & "five kilograms" respectively.
6. Bihar Foodgrains (Movement Control) Order, 1957; S.R.O. 4076; 20-12-1957.	In the proviso to clause 3 as well as in the proviso to clause 3 A, for "five seers", substitute "five kilograms".
7. Madhya Pradesh Rice (Movement Control) Order, 1957; S.R.O. 4077; 20-12-1957.	
8. Wheat (South Zone Export Control) Order, 1958; G.S.R. 703; 16-8-1958.	In the proviso to clause 3 for "five seers", substitute "five kilograms".
9. Uttar Pradesh Foodgrains (Movement Control) Order, 1958; G.S.R. 758; 29-8-1958.	
10. Rice (Northern Zone) Movement Control Order, 1958; G.S.R.; 818-A; 13-9-1958.	(i) In the proviso to clause 3, for "five seers", substitute "five kilograms"; (ii) In the proviso to clause 3A, for "20 seers" and "5 seers", substitute "twenty kilograms" and "five kilograms" respectively.
11. West Bengal Wheat (Export Control) Order, 1958; G.S.R. 1950; 1-11-1958.	In the proviso to clause 3, for "five seers", substitute "five kilograms".
12. Uttar Pradesh Paddy and Rice (Restriction on Movement) Order, 1958; G.S.R. 1233; 24-12-1958.	In clause 38, for "five seers", substitute "five kilograms".
13. Punjab Paddy (Export Control) Order, 1959; G.S.R. 23; 3-1-1959.	In the proviso to clause 3, for "five seers", substitute "five kilograms".
14. Uttar Pradesh Foodgrains (Restrictions on Border Movement) Order, 1959; G.S.R. 292; 10-3-1959.	In the proviso to clause 3, for "five maunds" and "five seers", substitute "two quintals" and "five kilograms" respectively.

Order	Nature of amendments
(1)	(2)
15. Rajasthan Foodgrains (Restrictions on Border Movement) Order, 1959; G.S.R.; 432; 9-4-1959.	In clause 5, for "20 seers" and "5 seers", substitute "twenty kilograms" and "five kilograms" respectively.
16. Madhya Pradesh Foodgrains (Restrictions on Border Movement), Order, 1959; G.S.R. 450; 14-4-1959.	In the proviso to clause 3, for "10 maunds" and "5 seers", substitute "four quintals" and "five kilograms" respectively.
17. Delhi (Restriction on Import of Wheat Atta) Order, 1959; G.S.R. 693; 15-6-1969.	In the proviso to clause 3, for "five seers", substitute "five kilograms".
18. Tripura Foodgrains Movement Control (No. 2) Order, 1959; G.S.R. 805; 11-7-1959.	
19. Rice (Eastern Zone) Movement Control Order, 1959; G.S.R. 1401; 21-12-1959.	(i) in clause 3,— (a) in the first proviso, for "five seers", substitute "five kilograms"; (b) in the second proviso, for "ten maunds", substitute "four quintals"; (ii) In the proviso to clause 4, for "forty seers" and "five seers", substitute "forty kilograms" and "five kilograms" respectively.
20. Calcutta Rice (Movement Control) Order, 1959; G.S.R. 1402; 21-12-1959.	In the proviso to clause 3, for "five seers", substitute "five kilograms".
21. Rajasthan (Rice Import Restriction) Order, 1960; G.S.R. 696; 17-6-1960.	In clause 3,— (i) in the first proviso, for "five seers", substitute "five kilograms"; (ii) in the second proviso, for "ten maunds", substitute "four quintals".

Extension for Defence Department and Undertakings thereunder.

No. S.O. 668, dated 27th March, 1961.

In exercise of the powers conferred by section 14 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby makes the following amendment in the Notification of the Government of India in the Ministry of Commerce and Industry No. S.O. 2394, dated the 28th September, 1960 (relating to the permission of the continuance of the use of any weight of measure which, immediately before the

1st October, 1958 was in use in respect of the departments and undertakings controlled by the Army, the Navy and the Air Force) namely :—

In the third paragraph of the said notification, for the words and figures "a further period of six months from the 1st day of October, 1960", the words and figures "a further period of one year from the 1st day of October, 1960" shall be substituted. (The original notification S.O. 2394 appeared in 'Metric Measures' on page 17, November, 1960).

Book Review

REPORT OF THE DECIMAL CURRENCY COMMITTEE (English)—Commonwealth of Australia, August, 1960, pp. 144.

The report of the Decimal Currency Committee established in Australia in February 1959 has now been published.

The Committee, after examining all aspects of the effects of decimal coinage in Australia, has recommended that the decimal currency should be adopted in Australia.

The Committee was set up to study the advantages and disadvantages of decimal currency, the units of accounting, denominations of the subsidiary currency, the method of introduction, the estimated costs and other aspects of conversion.

The report is divided into six sections :

- I—The Advantages and Disadvantages of a Decimal Currency.
- II—The Most Appropriate Decimal Currency System for Australia.
- III—Method of Introduction—General.
- IV—Method of Introduction—Machine Aspect.
- V—Cost of Introducing the Recommended System.
- VI—Other Aspects of Decimalization.

The Committee examined the advantages and disadvantages of decimal coinage and noted the particular facility offered by decimal currency in education in addition to the usual aspects.

It strongly recommended that decimal system of currency be introduced by the Commonwealth Government as soon as practicable and that the Commonwealth

Government's decisions on the proposal to decimalise the currency should be announced at the earliest practicable date.

Of the decimal systems such as £-mil system, the 10s-cent system, the 8s. 4 d-cent system, the 5s.-cent system etc. the Committee found that the advantage lay with the 10s-cent system as it was related to the old coinage in a simple manner and was divisible into subsidiary coinage easily as shown below :

Decimal Coins	Present	Values
20 cents		2s.
10 cents		1 s.
5 cents		6d.
1 cent		1·2d.

The Committee also suggested a table for the conversion of old coinage to new.

The Committee further recommended that a preparatory period of about 2 years from the introduction into Parliament of a Bill to decimalise currency was desirable and suggested that if administrative and statutory requirements permitted, the official date of introduction should be the second Monday in February, 1963. The existing currency system should remain as the only official system during the preparatory period.

The Committee gave considerable thought to the machine aspect of the introduction of decimal coinage and recommended that the machine conversion programme should be an officially sponsored and directed one.

BOOK REVIEW

It further recommended that machine conversion should be carried out on the basis of definite age limits to be determined by the Supervisory Body recommended to co-ordinate this programme and old machines would not be included in the official conversion programme. It is also felt that the £-shilling machines should not be imported any further. The total cost of converting all the machines would work out to about £A 30 million.

The Committee pointed out that the costs of conversion would increase if a decision about decimalisation of coinage was postponed. It has indicated that if the conversion is carried out in 1970, instead of 1963, the increase in the cost would be in the order of 64 percent.

The Committee also received many submissions in the course of its enquiry, suggesting that an investigation into the desirability of adopting the metric system of weights and measures should be carried out, but since this subject was not included in its terms of reference, it drew the Commonwealth Government's attention to the fact that the subject was raised by many people who supported a decimal currency.

The movement for the introduction of decimal currency in Australia is as old as the Federation, but the early efforts failed because the Federal Government was reluctant to embark upon this measure without similar action by the U.K.

In 1901, a Committee was set up to enquire into the adoption of decimal coinage; it recommended the step. However, while preparing for the change-over, Australia brought forward a resolution at the Imperial Conference in 1907 that the whole of Empire should establish decimal coinage, and in spite of repeated attempts by Australia the U.K. did not consider this necessary, and even the

Australian preparations received a setback. Subsequent attempts in 1937 and later did not succeed.

However, the present attempt backed as it is by the acceptance in principle of decimal coinage by the Australian Government is likely to be successful, particularly in view of the fact that among the Commonwealth countries, India, Pakistan and South Africa have recently changed over to the decimal coinage and even in the U.K., the Government is likely to change over to the decimal coinage in the near future.

APLI NAVIN WAJNE MAAPE : (Marathi)—by Chanakya, Published by Ananda Karyalaya, 1015 Sadashiv, Poona 2, pp. 60, January 1961, Price Re. 1-00.

The book, written by Chanakya, is divided into eight chapters which deal with the background of the metric system, the important characteristics of the metric system, its implementation in areas and industries, the new standard of length, the new weights and the new measures for measuring liquids and lastly, various tables. The author in his introduction says that after his books on the new coinage and the new Indian Calendar, he is now taking up the new weights and measures in his new book.

In tracing the background against which the metric system is being adopted the author has indicated the wide variety of weights and measures current in India and the history of the metric reform. He has then introduced the metric system and its various units indicating how the decimalization of the seer-maund units would lead to considerable confusion. He has then shown how the new length measures, weights and capacity measures have been standardized and their use in general trade. The tables given at the end are comprehensive and may be useful for a number of transactions.

Handwritten notes: JL, X: 5e m2, N58, N61-4

On the whole the author has taken considerable pains in getting together all the information and putting it across in simple language and with proper illustrations. One, however, feels that the book should have also illustrated the length measures and the conical type of litre measures as also the cylindrical type of bullion weights intended for use by the goldsmiths.

A chapter, perhaps, on how the accuracy of weights and measures in trade is ensured by the Government to give a fair deal both to the purchaser and seller would also add to the value of the book. It is hoped that such extensions of the book would be made in its second edition.

On the whole the book would be useful to the common man at this stage when familiarity with the new weights and measures and the conversion of prices is more important than any other aspects and the book will certainly serve that purpose.

METRIC PADDHATIR OZAN ARU JOOKH : (Assamese)—by Shri Girdhar Sharma, published by Shri A. C. Guha, Assam Book Depot, 21 Patuatala Lane, Calcutta 9, pp. 128, 1960, Price Rs. 2.

The book *Metric Paddhatir Ozan Aru Jookh* written in Assamese by Shri Girdhar Sarma, Special Officer, Metric System, Government of Assam, deals succinctly with the metric system of weights and measures. The book

is handy, the language used is very simple and easily understandable to all.

There are twelve chapters in the book. The first chapter is on the existing system of weights and measures. The second gives a short history of the metric system. The rest are on the various matters connected with the metric system of weights and measures including one on the Standards of Weights and Measures Act, 1956, passed by Parliament. The book contains an interesting account of the pressing need for the introduction of the metric system of weights and measures in the country. The author, it appears, has taken great pains in producing a book of this nature having educative and informative value. The book is not only very useful to the school students but also to others. Examples with drawings given in the book will be of great help to learn calculation in the metric system. The get-up, with the pictures of the new weights, is very attractive.

In short, all necessary information required for knowing the new system have been put up in this useful book with great imagination, care and precision keeping in view the need of all.

K. C. CHAUDHARI

Special Officer (Publicity),
Metric System of Weights and Measures,
Assam.

Readers' Forum

Metric weights

Sir,

I desire to seek the hospitality of the columns of the *Metric Measures* to draw the attention of the Ministries of Commerce and Industry of the Governments of India and the States to the following :

The series of metric weights as available in the market, are easily grouped in different sets according to their numerical values. A set consists of weights, the numerical value of each of which contains the same number of digits. Thus, there are only three weights in each set. For example, the first set (starting from 1 gram) consists of weights of 1, 2 and 5 grams. Other sets have weights which are 1, 2, and 5 multiples of 10 and 100 grams and 1, 10 and 100 kilograms, etc. Each set is incomplete.

It is not possible to weigh a substance weighing 4 or 9 grams with the first set (*i.e.* weights of 1, 2 and 5 grams), by placing the substance on one pan and the weights on the other of a balance. The same difficulty will be felt in case of substances having weights 4 or 9 multiples of 10 and 100 grams and 1, 10 and 100 kilograms, etc.

The most economical way of eliminating this difficulty is to provide with two pieces of the smallest weight (*i.e.* 1 multiple) and one each of 2 and 5 multiples in each set, *e.g.* in the first set there should be two weights of 1 gram each, one of 2 grams and one of 5 grams. This will complete each set.

A. V. Mahajani

Asstt. Prof. of Chemistry,
University of Saugar,
Saugar, M.P.

Standards News

Indian Standard Rules for Rounding Off (IS : 2—1960).

The Indian Standards Institution has just published IS : 2—1960 Rules for Rounding Off Numerical Values (Revised) which prescribes rules for rounding off numerical values for the purpose of reporting results of a

test, an analysis, a measurement or a calculation, and thus assisting in drafting of specifications. It also makes recommendations as to the number of figures that should be retained in course of computation.

This standard was originally issued in 1949, with a view to promoting adoption of

uniform procedure in rounding off numerical values. Rules given in the earlier standard referred only to unit fineness of rounding and in course of years the need was felt to prescribe rules for rounding off numerical values to fineness of rounding other than unity. Moreover, it was also felt that the discussion on the number of figures to be retained as given in the earlier version required further elucidation. The present revision is expected to fulfil these needs.

Price : Rs. 2.50

Indian Standard for Black Hexagonal Bolts (6 to 39 mm) (IS : 1363—1960).

The Indian Standards Institution has recently brought out an Indian Standard Specification for Black Hexagonal Bolts (6 to 39 mm) with Nuts and Black Hexagonal Screws (6 to 24 mm) (IS : 1363—1960).

The specification covers requirements in respect of mechanical properties, grade, designation, leading dimensions and tests.

Price : Rs. 2.00

Indian Standard for Platform Weighing Machines (IS : 1435—1960).

The Indian Standard Specification for Platform Weighing Machines (IS 1435—1960) is the latest addition to a series of Indian Standards on commercial weights and instruments being prepared by ISI at the instance of the Standing Metric Committee, Government of India. Standards covering general requirements for weighing instruments and specifications for counter machines, beam scale, weigh-bridge, crane weighing-machines, steelyards etc., have already been published.

Price : Rs. 2.00

Indian Standard for Weigh-Bridges (IS : 1436—1960)

The latest addition to the series of Indian Standards on commercial weighing instruments being prepared by ISI at the instance

of the Standing Metric Committee, Government of India, in connection with the introduction of the metric system of weights and measures in the country is IS : 1436—1960 Specification for Weigh-Bridges. Other standards published so far in the series cover general requirements for weighing instruments, and specifications for beam scales, counter machines, platform weighing machines, automatic weighing machines, crane weighing machines and steelyards.

Price : Rs. 2.00

Indian Standard for Metric Scales for General Purposes (IS : 1480—1960).

The Indian Standards Institution has recently published an Indian Standard Specification on Metric Scales for General purposes (IS : 1480—1960).

The Indian Standard recognizes wooden scales of denominations 10, 15, 20, 30, 50 and 100 cm, and plastic scales of denominations 50 and 100 cm may be designed either end measuring or edge measuring. When intended to be used for end measuring, the scales may be designed either foldable or rigid whereas, when intended for use for edge measuring, the scales shall be designed rigid only. The type of scale required should, therefore, be indicated clearly in the enquiry or order.

This standard is primarily meant to cover scales divided into metric units. Non-metric values to which industry has been accustomed are also given, wherever necessary, for the sake of smooth change-over by December, 1966.

Price : Rs. 4.00

Indian Standards for Iron Pressure Pipes for Water, Gas and Sewage (IS : 1536 and 1537—1960).

The Indian Standards Institution has just published the following two specifications

concerning pressure pipes for water, gas and sewage :

IS : 1536—1960 Centrifugally Cast (Spun) Iron Pressure Pipes for Water, Gas and Sewage.

IS : 1537—1960 Vertically Cast Iron Pressure Pipes for Water, Gas and Sewage.

The two standards cover the requirements for the respective pressure pipes covered by each. They are applicable to pipes with sockets (for lead joints) flanges. They may also be made applicable to other types of joints, specially rubber joints, where overall measurements are adhered to for ensuring interchangeability.

Price : Rs. 4.50

Indian Standard Specification for Untrimmed (Raw Stock) Paper Sizes and Substances of Paper and Pulp Board (Doc: CDC 15(1318) and Doc: CDC 15(1319).

The Indian Standards Institution has issued the following two draft Indian Standard Specifications for the paper industry :

- (1) Untrimmed (Raw Stock) Paper Sizes (Doc: CDC 15(1318) and
- (2) Substances of Paper and Pulp Board (Doc: CDC 15(1319).

Paper and pulp board are being manufactured in the country in a variety of sizes and substances which calls for an attempt to reduce and rationalize the uneconomical varieties. Both the draft standards have been prepared with this objective and they also reflect the present international trend of thought as prevailing in the Technical Committee for standardization of Paper and Paper Products of the International Organization for Standardization (ISO/TC6).

The draft standard dealing with untrimmed paper sizes prescribes the sizes of raw

stock paper, that is the sizes in which paper should be manufactured and stocked by mills and dealers. The second draft standard which deals with substances lays down a rational series of substances in which raw stock paper should normally be available. It is hoped that producers and consumers of paper in India will now be able to adopt the metric sizes of paper which have been internationally recognized and have been found not only rational but also advantageous and economical in actual use.

Draft Standard Specification for Mild Steel Wire for Machine Screws (IS : 1673—1960).

The Indian Standard Specification for Mild Steel Wire for the manufacture of Machine Screws (by Cold Heading Process) (IS : 1673—1960) has been prepared by ISI on the recommendation of the Tariff Commission, Government of India.

This standard covers the requirements for two grades of cold drawn mild steel wire up to 20 mm diameter, suitable for the manufacture of machine screws by the cold heading process.

Price : Rs. 1.50

Indian Standard for Spring Balances (IS : 1702—1960).

The Indian Standard Specification for Spring Balances (IS : 1702—1960) belongs to a series of Indian Standards on commercial weighing machines, being prepared by ISI at the instance of the Standing Metric Committee, Government of India, in connection with the introduction of metric system of weights and measures in the country. Other standards in the series cover general requirements for weighing instruments and specifications for beam scales, counter machines, platform weighing machines, weigh-bridges, crane weighing machines and steelyards.

Price : Rs. 1.50

Licensed Manufacturers, Dealers and Repairers of Weights and Measures(13)

Metric Measures has been publishing a series of lists of manufacturers, dealers and repairers of weights and measures, weighing and measuring instruments licensed by the Governments in the various States and Union Territories under their Weights and Measures (Enforcement) Acts in their respective jurisdictions. This is the thirteenth list. The first list appeared in the March 1959 issue.

Progressively steps are being taken for licensing manufacturers, dealers and repairers in all States and further lists of licensees would be published in *Metric Measures* as this work progresses.

The number in brackets against the name of the State or Union Territory indicates the particular instalment number of the list of that State or Union Territory. The issues of *Metric Measures* in which previous lists appear are also shown suitably.

An analysis of the licensees, including the present list, shows that the total number of licensees in 14 States and 3 Union Territories is 678 manufacturers, 2376 dealers, and 500 repairers. The details of published information are as follows :

Sl. No.	State/Union Territory	Licensees		
		Manufac-turers	Dealers	Repairers
(1)	Andhra Pradesh	44	67	37
(2)	Assam ..	10	17	7
(3)	Bihar ..	20	69	34
(4)	Delhi ..	22	76	19
(5)	Gujarat ..	45	226	55
(6)	Himachal Pradesh ..	1	7	1
(7)	Kerala ..	9	219	12
(8)	Madhya Pradesh	99	310	4
(9)	Madras ..	79	210	37
(10)	Maharashtra	60	162	106
(11)	Mysore ..	75	399	41
(12)	Orissa ..	14	17	1
(13)	Punjab ..	27	96	22
(14)	Rajasthan ..	16	69	18
(15)	Tripura ..	0	10	0
(16)	Uttar Pradesh	92	222	51
(17)	West Bengal	65	200	55
		678	2376	500

LICENSED MANUFACTURERS, DEALERS & REPAIRERS OF WEIGHTS & MEASURES (13)

MADHYA PRADESH (4)

In the May 1960 and July 1960 & January 1961 issues of *Metric Measures* list of manufacturers, dealers of weights and measures in Madhya Pradesh State were published. The following is a list of manufacturers and dealers subsequently licensed under the Madhya Pradesh Weights and Measures (Enforcement) Act, 1959.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured.
(1)	Agents & Co., Birla-nagar, Gwalior	Weights.
(2)	Agarwal Tin Manufacturing Co. & Engineering Works, Sultanganj, Agra.	Weights.
(3)	Agricultural Industries, G.T. Road, Batala ..	Weights.
(4)	Alloy Founders, Jamuna Road, Jeoni-Mandi, Agra ..	Weights.
(5)	A.M. Master, 178-81, Janjekar Street, Bombay-3 ..	Weights, Measures Weighing and Measuring Instruments.
(6)	Anant Rai Hirachand Deshi, Scales & Chain Manufacturers, Savarkundla (Saurashtra).	Measures, Weighing and Measuring Instruments.
(7)	Associated General Engineers, 14-Napier Town, Jabalpur ..	Weights.
(8)	Associated Industrial Corporation, 1278 Bharion, Belanganj, Agra.	Weights.
(9)	Banarsidas Mahabirprasad Varma, 1073—Gali Raja Uggar, Sain Bazar, Sitaram, Delhi.	Weights.
(10)	Bansal Engineering Co., Industrial Estate, Gwalior ..	Weights.
(11)	Bansal Iron Foundry Agra, Near Railway Goods-shed, Belanganj, Agra.	Weights.
(12)	B.S. & Co., Gwalior ..	C.I. Weights.
(13)	B.C. Iron Foundry, Sultanganj, Agra ..	Weights.
(14)	Bharat Engineering Works, Hat Road, Gunga ..	Weights.
(15)	Bharat Metric Industries, 20 Jain Mandir Road, Chowk, Bhopal	Weights.
(16)	Bright Industrial Corporation, 15-Industrial Estate, Gwalior	Weights.
(17)	Brij Metal Industries, Langra-Ki, Choki, Agra ..	Weights.
(18)	Dhatu Nirman Udyog Champbag, Nai Sadak, Lashkar	Weights.
(19)	Ferrous Founders Fabricators, Niwar, (Katni) ..	Weights.
(20)	Gargh Industrial Corporation, 1965-Freeganj, Road, Agra	Weights.
(21)	Gulab Rai Chhoteylal, Pathwari, Belanganj, Agra ..	Weights.
(22)	Indian Iron Industries, 819, Belanganj, Agra ..	Weights.
(23)	India Iron Foundry, Sultanganj, Agra ..	Weights & Measures.
(24)	International Steel Foundry, Indore ..	Weights.
(25)	Jain Industries, Belanganj, Agra ..	Weights.
(26)	J.K. Mistry & Brothers 24, New-Dewas-Road, Indore ..	Beam Scales of Class 'C' & 'D'.
(27)	Jaya Krishna Iron Industrial Works, Dowlaishwaram (A.P.)	Weights.
(28)	Jupiter Motors 19/1, Palasia Point, Bombay Agra Road, Indore	Weights.
(29)	Kashi Iron Foundry, Freeganj Road, Agra ..	Weights.
(30)	K.B. Industries, Lashkar, Gwalior ..	Weights.
(31)	K.R. Industries, 3832 Ajkawali Gali, (Noorigate), Agra ..	Weights.
(32)	K.R. Sharma Iron Foundry, Pathwari, Belanganj, Agra ..	Weights.
(33)	Krishna Iron Foundry, Freeganj, Agra ..	Weights.
(34)	Laxmi Engineering Works, Raipur ..	Weights & Measures.
(35)	Madhya Pradesh Nails Manufacturing Co., Mandsaur ..	Weights.
(36)	Memorial Bhudhu Metal Works, 20-Hari Nagar, Aligarh	Weights & Measures.
(37)	Modern Manufacturers, A-11-G, Industrial Estate, Polo ground, Indore.	Weights.
(38)	Motilal & Co., Freeganj, Agra ..	Weights & Measuring Instruments.
(39)	Multan Engineering Works, VI/1773, Mir Jumla Lal Kuan, Delhi-6.	Weights & Measuring Instruments.
(40)	Multi Industries, C 166/2, Civil Lines, Bhopal ..	Weights.
(41)	Narendra Iron & Steel Works, 517, Silnath Camp, Indore.	Weights.
(42)	New M.P. Mechanical Industries Station Road, Durg ..	Weights.
(43)	Om Iron Foundry, Pathwari Belanganj, Agra ..	Weights.

Manufacturers—(Contd.)

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(44)	Palomi Industries, 5, Hamidia Road, Bhopal..	Brass Weights.
(45)	Prakash Engineering Co. & Rolling Mills, Freeganj Street, Agra	Weights & Measures.
(46)	Pratap Mechanical Engineering Works, Mahatma Gandhi Road, Sagar.	Weights.
(47)	Pratibha Industries, 163-North Vijaya-Nagar Colony, Agra..	Weights, Measures, Weighing & Measuring Instruments.
(48)	Rajaram Brothers, Lesses Gwalior Maize Production Ltd., Mhow Neemuch Road, Mandasaur.	Weights.
(49)	Rajesh Mukesh Manufacturers, Lohia Bazar, Lashkar	Weights & Measures.
(50)	Raman Iron Foundry & Steel Rolling Mills, Delhi (Darwaja-Mathura).	Weights.
(51)	Ramchandra Chhotelal, Daulatganj, Lashkar, Gwalior	Weights.
(52)	Ramkrishna Iron Foundry Sultanganj, New Paliwal Park, Agra.	Weights.
(53)	Ratlam Metal Foundry, Ratlam.	Weights.
(54)	Riaz & Brothers Sarai Allahawala, Sadar Bazar, Delhi	Weights, Measures, Weighing & Measuring Instruments.
(55)	Saify Iron and Engineering Works, Indore City	Weights.
(56)	Jagdamba Iron Foundry Belanganj, Agra	Weights..
(57)	Laximinarayan Metal Industries, 9-Toli Bakhal, Malhar-ganj, Indore.	Weights.
(58)	Modi Foundry & Engineering Works, Morena.	Weights.
(59)	Seetha Rama Engineering Works, Dowlaishwaram, East Godawari (A.P.).	Weighing Instruments.
(60)	Singhal Iron Foundry, Farah Distt., Mathura	Weights.
(61)	S.S. Iron Foundry & Engineering Works, Yamuna Bridge Rambagh, Agra.	Weights.
(62)	Standard Flour & Oil Mills Private Ltd., Ganj Baroda	Weights.
(63)	Standard Steel & Iron Foundry, Founders & Engineers, Agra.	Weights.
(64)	Standard Engineering Corporation, Lane-Gaushala Path-wari, Agra.	Weights.
(65)	Sterling Engineering & Transport Co., (Private) Ltd., Janak Bagh, Agra,	Cast Iron Weights.
(66)	Swantra Bharat Iron Foundry, Narain Bhavan, Motilal Nehru Road, Agra.	Weights.
(67)	U.P. Iron Foundry, Pathwari, Belanganj, Agra	Weights.
(68)	Yadav Metal Industries, A/G-II Industrial Estate, Polo Brass Ground, Indore.	Brass Weights.

Dealers

BHOPAL DIVISION

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Agar General Sahkari Bhandar, Ltd.	Weights, Measures, Weighing & Measuring Instruments.
(2)	Azad Cooperative General Store Sanchi Road, Raisen	Weights & Measures.
(3)	Baxilal Ratanchand Jain, Madhoganj, Vidisha	Weights, Measures, Weighing Instru-ments.
(4)	Chatarlal Tulsi Ram, Bazar Road, Rajgarh	Weights & Weighing Instruments.
(5)	Glass Corporation Private Ltd., 8/9 Shah Building, Hamid-dia Road, Bhopal.	Weights, Measures, Weighing & Measuring Instruments.
(6)	H. Kurwan Husain Abdul Hussain, Bhopal Road, Sehore	Weights, Measures, Weighing & Measuring Instruments.
(7)	Jagannath Bhagwandas, Mandi Ganj, Baroda.	Weights, Measures & Weighing Instruments.

Dealers (Contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(8)	Jain Motor Hamidi a Road, Opposite Bus Stand, Bhopal ..	Weights, Measures, Weighing & Measuring Instruments.
(9)	Kirana Merchants Association, Mandi Bazar, Nasrullaganj	Weights, Measures, Weighing & Measuring Instruments.
(10)	Kishan Vipnan Sahkari Samiti, Nasrullaganj	Weights, Measures & Weighing Instru-ments.
(11)	Kishanlal Anandilal Agrawal, Biora	Weights, Measures & Weighing Instru-ments.
(12)	Laxmi Stores, Hard	Weights, Measures, Weighing & Measuring Instruments.
(13)	Laxminarayan Dhannalal, Machalpur.. ..	Weights, Measures, Weighing & Measuring Instruments.
(14)	Liaquatali Sabirali Jumerati Bazar, Bhopal	Weights, Measures Weighing & Measuring instruments.
(15)	Madanlal Shrikishan Mundra, Budhwaria Bazar, Zirpur Dist-riect Rajgarh.	Weights, Measures, Weighing & Measuring Instruments.
(16)	Maheshwari Brothers, Unani Hospital Road, Bhopal	Weights, Measures, Weighing & Measuring Instruments.
(17)	R. C. Mittal Allahabad Bank, Bhopal	Weights, Measures, Weighing & Measuring Instruments.
(18)	Mohgal Hussain Imdad Ali, Lohabazar, Bhopal	Weights, Measures, Weighing & Measuring Instruments.
(19)	Mulla Ismailjee, Moosabhai, Ichhawar Bazar	Weights, Measures Weighing & Measuring Instruments.
(20)	Mulla Quadar Ali Mulla Musaji, Vidisha	Weights, Measures, Weighing & Measuring Instruments.
(21)	Popular Co-operative Marketing Society, Betul	Weights, Measures, Weighing & Measuring Instruments.
(22)	Parkash Kumar, Shrimal, Pargana Iron & Steel Dealer, Sarangpur.	Weights, Measures, Weighing & Measuring Instruments.
(23)	P.S. Mohta, Piparia	Weights, Measures, & Measuring Instruments.
(24)	Pyarelal Tarachand Mahalwar Main Road, Hanuman Chowk, Ganj, Baroda.	Weights, Measures, Weighing & Measuring Instrument.
(25)	Ramanand Shri Kishan, Shujalpur, Mandi	Weighing & Measuring Instruments.
(26)	Sehore Chemicals, Prop. Nanilal Shah, Sehore	Weights.
(27)	Kishandas Omparkash, Samsabad	Weights, Measures, Weighing & Measuring Instruments.
(28)	Shri C.P. Shah & Bros., Shujalpur Mandi	Weights, Measures, Weighing & Measuring Instruments.
(29)	Shriyans Kumar, Rajkumar Jain, Kurwal	Weights, Measures & Measuring Instruments.
(30)	Shree Krishan Das Jeewan Das, Sarraf, 72 Sarrafa Bazar, Bhopal.	Weights, Measures, Weighing & Measuring Instruments.
(31)	Subhash Stores, Chintaman Chowk, Bhopal	Weights, Measures, Weighing & Measuring Instruments.
(32)	Vishanji Shivji Gandhi Chowk, Ganj, Baroda	Weights, Measures, Weighing & Measuring Instruments.

GWALIOR DIVISION

Dealers

Sl. No.	Name and Address of Dealers	Details of Articles Sold
(1)	Abhayachand Moolchand Subhashganj, Ashoknagar ..	Weights, Measures, Weighing & Measuring Instruments.
(2)	Agarwal Iron Stores, Sabalgarh	Weights, Measures, Weighing & Measuring Instruments.
(3)	Baboolal Pooranchand, Guna	Weights.

Dealers—(Contd.)

Sl. No.	Name and address of Dealers	Details of Articles Sold
(4)	Barjatia Brothers, Dana Oil, Lashkar	Weights & Measures.
(5)	Birla Pipe Fitting & Sanitary Store Daulatganj, Lashkar	Weights, Measures, Weighing & Measuring Instruments.
(6)	Bishanram Ishardas, Shivpuri	Weights & Measures.
(7)	Bhagwandas Jagdishprasad, Kailarash	Weights, Measures, Weighing & Measuring Instruments.
(8)	Bhagwati & Sons Dal Bazar, Aba-Maharaj, Lashkar	Weights, Measures, Weighing & Measuring Instruments.
(9)	Bhai Gulamah Adamji Iron Merchant, Shipurkalan	Weights, Measures & Measuring Instruments.
(10)	Bhargava Stores, Sheopurkalan	Weights, Measures, Weighing & Measuring Instruments.
(11)	Durgaprasad Babulal Iron Merchant, Lohia Bazar, Lashkar	Weights & Measures.
(12)	Chironjilal Ramjilal Vaishya, Naya Bazar, Lashkar	Weights, Measures, Weighing & Measuring Instruments.
(13)	Ganeshram Kanhaiyalal, Shivpuri	Weights, Measures, Weighing & Measuring Instruments.
(14)	Ganpatram Ramnath Lohia Bazar, Lashkar	Weights, Measures, Weighing & Measuring Instruments.
(15)	Gopal Trading Co., C/o Trilokchand Jain, Birlanagar, Gwalior.	Weights & Weighing Instruments.
(16)	Gotiram Naraindas, Balabai Ka Bazar, Lashkar	Weights.
(17)	Goyal Stores Sadar Bazar, Morena	Weights, & Measures, Weighing & Measuring Instruments.
(18)	Guljarilal Lakhmichand Agarwal, Station Road, Bhind	Weights, Measures, Weighing & Measuring Instruments.
(19)	Gwalior Metric Pranali Supply Co., Lashkar	Weights, Measures, Weighing & Measuring Instruments.
(20)	Ishwardas Kishanlal Jain, Loha-Bazar, Morena	Weights.
(21)	Jagdish Flour & Oil Mills, Guna	Weights, Measures, Weighing & Measuring Instruments.
(22)	Jagdish Prasad Gupta, Kotwali Santar, Morar	Weights.
(23)	Jhaboolal Laxminarayan Toli Bazar, Sheopur Kalan	Weights, Measures, Weighing & Measuring Instruments.
(24)	Jora Cooperative Marketing Society Ltd., Jora Alapur (Morena).	Weights, Measures, Weighing & Measuring Instruments.
(25)	Julfakar Bhai Maganbhai Guna	Weights, Measures, Weighing & Measuring Instruments.
(26)	Keshar Chandra Goyal, Hatroad, Guna	Weights, & Measures.
(27)	Krishna Gopal Lohia Bazar, Lashkar	Weights & Measures.
(28)	Laxminarayan Bharosilal Sarraf, Morena	Weights, Measures, Weighing & Measuring Instruments.
(29)	Laxminarayan Kodarnath Kailarash, Sirff	Weights, Measures, Weighing & Measuring Instruments.
(30)	Laxminarayan Rameshkumar, Iron Merchant, Bhandar	Weights, & Measures.
(31)	Mehra General Stores, Guna	Weights, Measures, Weighing & Measuring Instruments.
(32)	Moolchand Ajudhya Prasad Lohia-Bazar, Morena	Weights.
(33)	Moolchand Ganeshram, Lohia-Bazar, Lashkar	Weights & Measures.
(34)	Morena Jila Chamber of Commerce & Industries, Morena	Weights, Measures, Weighing & Measuring Instruments.
(35)	Motilal Ramsharanlal Agrawal, Bhind	Weights, Measures Weighing & Measuring Instruments.
(36)	Munnalal Garg C/o M/s. Chironjilal Laxmandas Saraffa Bazar, Lashkar.	Weights & Measures
(37)	Murlidhar Bhuramal, Guna	Weights, Measures, Weighing & Measuring Instruments.
(38)	Rajaram Devlal Jain, Abbah	Weights & Measures.
(39)	Ramesh Iron Store, Ambah	Weights.
(40)	Ramkrishna Premprakash, Sadar-Bazar, Morena	Weights, Measures, Weighing & Measuring Instruments.

Dealers—(Contd.)

Sl. No.	Name and address of Dealer	Details of Articles Sold
(41)	Ram Gupta & Co., Chhoti Bazaria, Morena	Weights & Measures.
(42)	Sai Dittamal Ram Lubhaya Mungawali, District Guna	Weights & Measures.
(43)	Sahkari Bhandar Ltd., Sabalgarh	Weights.
(44)	Sarvajanik Sahkari Bhandar, Bijaiapur District Morena	Weights & Measures.
(45)	Sharma Stores, Dana Oil, Lashkar	Weights & Measures.
(46)	Shyamlal Gupta C/o Prem Sadan, Naisada, Lashkar Gwalior.	Weights, Measures, Weighing & Measuring Instruments.
(47)	Sitaram Hiralal Jawaharganj, Dabra	Weights, Measures, Weighing & Measuring Instruments.
(48)	Yashwant Kitab Ghar, Victoria Market, Jayaji Chowk, Lashkar.	Weights & Measures.
(49)	Vaidhya Stores, Nai Sadak, Lashkar, Gwalior	Weights, Measures Weighing & Measuring Instruments.

JABLPUR DIVISION

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Ahinsha Prakash Bandar, Panagar	Weights, Measures, Weighing & Measuring Instruments.
(2)	Bharat Hardware Stores, Jawaharganj, Jabalpur	Weights, Measures, Weighing & Measuring Instruments.
(3)	Cooperative Marketing Society Ltd., Kareli	Weights & Measures.
(4)	Gulabchand Phoolchand, Bada Bazar, Sagar	Weights & Measures.
(5)	Gupta Brothers, Malviyaganj, Katni	Weights, Measures, Weighing & Measuring Instruments.
(6)	Jugalkishore Govindprasad, Meloniganj, Jabalpur	Weighing & Measuring Instruments, Weights & Measures.
(7)	Kallolal Mahadeoprasad, Khitola Bazar, Sihora	Weights, Measures, Weighing & Measuring Instruments.
(8)	Katni Cooperative Marketing Society, Ltd., Katni	Weights, Measures, Weighing & Measuring Instruments.
(9)	Keshavbhai & Co. Gujarati Bazar, Sagar	Weighing & Measuring Instruments, Weights & Measures.
(10)	Shrimati Koushalya House No. 100 P.O. Garha Old Khurma Temple, Jabalpur.	Weights & Measuring Instruments.
(11)	Misthan Vikreta Sangh, Tularam Chowk, Jabalpur	Weights, Measures, Weighing & Measuring Instruments.
(12)	Munna Shop Raghunathganj, Katni	Weights & Weighing Instruments.
(13)	Phutkar Anaj Vikreta Sangh, Jabalpur	Weights & Measures.
(14)	Rajendra Kumar Jain, Sehora	Weights, Measures, Weighing & Measuring Instruments.
(15)	Shahpura Cooperative Marketing Society, Shahpura	Weights, Measures, Weighing & Measuring Instruments.
(16)	Vijaya Hardware Stores, Jawaharganj, Jabalpur	Weights, Measures, Weighing & Measuring Instruments.

INDORE-DIVISION

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Abdulkarim Lukmanji, Chowk-Bazar, Ujjain	Weights and Measures.
(2)	Abdul Hussain M. Lukmanji Chowk-Bazar, Burhanpur (M.P.).	Weights and Measures.
(3)	Alot Co-operative Marketing Society, Ltd., Alot	Weights and Measures.
(4)	A. Patel and Brothers, New Road, Ujjain	Weights and Measures.
(5)	Asha Traders 11, Pipli Bazar, Indore	Weights and Measures.

Dealers—(contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(6)	Babulal Balaram, Sanawad	Weights and Measures.
(7)	Bharat Iron Works Bohra Bazar, Neemuch Cantt	Weights, Measures, Weighing and Measuring instruments.
(8)	Bhikamchand Jankilal Khandwa	Weights and Measures.
(9)	Bhupatlal and Sons, 43 Hathipala Road, Indore City	Weights.
(10)	Burhanpur Hardware Stores, Burhanpur	Weights, Measures, and Measuring Instruments.
(11)	Chandoomal and Sons 63 Siyaganj, Indore	Weighing instruments.
(12)	Chunnilal Pemraj Kasaliwal, Khategaon	Weights.
(13)	Fazalhusen and Brothers, Iron and Hardware Merchant 41 Hathipala Road, Indore.	Weights and Measures.
(14)	Gambhir and Sons, 19, Manoramaganj, Indore	Weights, Measures, and Measuring instruments.
(15)	Gautampura Bahukaryakarni Sahkari Sabha Ltd., Gautampura.	Weights and Measures.
(16)	G.G. Patel & Co. 79 Siya Ganj, Indore	Weights and Measures.
(17)	Gokuldas Kailash Chandra Khargone	Weights.
(18)	Gordhanlal Tarachand, Nagda	Weighing and Measuring instruments.
(19)	Gupta Iron Works, 40 Tijori Gali, Siyaganj, Indore	Weighing and Measuring instruments.
(20)	Haji Abdul Hussain H. Tayebali, Murabbi Siyaganj, Indore.	Weights and Measures.
(21)	H.A. Raja Bombay Bazar, Khandwa	Weights and Measures.
(22)	H. Patel and Co., 81 Siyaganj, Main Road, Indore	Weights and Measures.
(23)	Husaini Hardware Stores, Maheshwar, 118 Gandhi Marg, Jawahar Chowk, (Neemuch).	Weights, Measures, Weighing and Measuring instruments.
(24)	Jainarayan Kiroriram, 59 Hathipala Road, Indore	Weights.
(25)	Jashbhai Mahijibhai Patel, Sadar Bazar, Jaora	Weights.
(26)	Jaora Co-operative Marketing Society, Ltd., Jaora	Weights and Measures.
(27)	Kailash Chandra Umashanker, 81 Mahakal Marg, Hatpi- plya.	Weights.
(28)	Karachi Paint House, 21 Siyaganj, Indore	Weights, Measures, Weighing and Measuring Instruments.
(29)	Kathed Brothers, Hatpiplaya	Weights.
(30)	Khadyann Vyaparik Sanstha, 975-Manik Chowk, Mhow.	Weights.
(31)	Kishan Singh Milkhi Ram Grover Ganj Bazar, Khan- dwa.	Weights and Measures.
(32)	K.K. Shah and Brothers 79, Siyaganj, Telgali, Indore City.	Weights and Measures, Weighing and Measuring Instruments.
(33)	Krishi Upaj Samiti, Shamgarh	Weights.
(34)	Krushni Upaj Mandi Samiti, Kukshi. (Dhar)	Weights.
(35)	Kurban Hussain Gulamali Burhanpur	Weights and Measures.
(36)	Laxmidas B. Patel, 81 Siyaganj, Indore	Weights.
(37)	Laxmilal Vijay Singh Neemuch	Weights, Measures, and Measuring Instruments.
(38)	Madanlal Mohanlal and Co. Siyaganj, Indore	Weights, Measures, Weighing and Measuring Instruments.
(39)	Mahajan Brothers and Co. 481, Mahatma Gandhi Road, Indore.	Weights and Measures.
(40)	Manohar Brothers, Siyaganj Indore	Weights.
(41)	Moonat Brothers, Chandni Chowk, Ratlam	Weights, Weighing and Measuring Instruments.
(42)	Nanuram Bansidhar Jadia Chandni Chowk, Ratlam	Weights and Measures.
(43)	Om Prakash Rajoria, Dolatganj, Ujjain	Weights.
(44)	Pawankumar S/o Mishrilal Sarafa Bazar, Badnagar	Weights and Measures.
(45)	Prahalad Das and Co. C/o Goyal and Brothers 53, Bazar Khana, Indore.	Weights.
(46)	Prahladrai Kripaldas, Ganj Bazar, Khandwa	Weights and Measures.
(47)	Punamchand Permanand and Sons, Tijorigali, Siyaganj, Indore.	Weights, Measures, and Weighing Instruments.
(48)	Rameshchandra Khandelwal, Agra	Weights.
(49)	Rameshwar Trading Co. Manasa	Weights.

Dealers—(contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(50)	Ramlal Rodaji Chhajlani, Mahidpur	Weights.
(51)	Ramrichhpal Kesarimal, Barwaha	Weights and Measures.
(52)	Rasiklal and Sons, Iron merchant Siyaganj, Indore	Weighing and Measuring Instruments.
(53)	Rewa and Co., 65 Siyaganj, Indore	Weighing and Measuring Instruments.
(54)	Satyanarayan Shyamsunder, Sarafa Bazar, Ujjain	Weights, Measures and Weighing Instruments.
(55)	Shantilal S/o Chandmal Mahajan Dalal, Sarafa Bazar, Khach Road, Ujjain.	Weights.
(56)	Soubhagyamal Sardarmal Jain, 121 Laxmibai Road, Malipura Ujjain.	Weights.
(57)	Taherali Ahmadali Iron and Cement dealer, Manasa	Weights.
(58)	Vyapar Niketan, Mandsaur	Weights, Measures, Weighing and Measuring instruments.

RAIPUR DIVISION

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Bastar Steel Trunk Works, Gandhi Chowk, Jagdalpur	Weights, Measures and Measuring Instruments.
(2)	Daulat Ram Gandesh Ram, Rajnandgaon	Weights, Measures, Weighing and Measuring Instruments.
(3)	Dhananjay Kumar Ramdhani, Pulgaon Naka, Gunj Para, Durg.	Weights, Measures, Weighing and Measuring Instruments.
(4)	Kikabhai Mulla Abdul Hussain N.H.6, Rajnandgaon	Weights, Measures, Weighing and Measuring Instruments.
(5)	Kishore Kumar Kantilal Gandhi, Kondagaon, Bastar	Weights, Measures, Weighing and Measuring Instruments.
(6)	Radhe Krishna Dal and Rice Mills, Ramdhan Marg, Rajnandgaon.	Weights, Measures, Weighing and Measuring Instruments.
(7)	Santilal Agarwal, Kirana Merchant, Saraipali	Weights and Measures.

REWA DIVISION

Serial No.	Name and Address of Dealer	Details of Articles Sold
(1)	Gulabchand Seth, Harpalpur	Weights, Measures and Weighing Instruments.

REPAIRERS

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	The Avery Co. of India Private Ltd., Bombay	Weights, Measures, Weighing and Measuring Instruments.
(2)	Indo Arvan Traders, 7173 Vihar Pipe Road, Kurla, Bombay 37.	Weights, Measures and Weighing and Measuring Instruments.
(3)	J.K. Mistra and Brothers, New Dewas Road, Indore	Weights, Measures, Weighing and Measuring Instruments.
(4)	Laxmi Engineering Works, Raipur	Weights, Measures, Weighing and Measuring Instruments.

Licenses of following Manufacturers and Dealers in Madhya Pradesh which have appeared in May and July 1960 issue of *Metric Measures* have since been cancelled.

Manufacturers

Name of Manufacturers.	Page No.	S. No.	Reference to issue of Metric Measures in which published
(1) Bhopal Auto Repairing Works Motia Road, Bhopal.	34	1	May, 1960.
(2) Dalvi Industries Kampoo Gwalior, Gwalior	34	3	May, 1960.
DEALERS			
(1) T. Ibrahim and Sons Siya Ganj, Indore	35	9	July, 1960.
(2) Indore Nagarnivasi Sahkari Sanstha Ltd., 17 Krinpara Indore.	35	11	July, 1960.
(3) Kamsuddin, Mhow	35	15	July, 1960.
(4) Mhow Iron Industries, Mhow	35	21	July, 1960.
(5) J.K. Mistry and Bros. 24, New Dewas Road, Indore	35	22	July, 1960.
(6) Jai Hind Stores Railway Road, Katni, (Dist. Jabalpur)	36	7	July, 1960.
(7) Mughal Hussain Imdad Ali, Loha Bazar, Bhopal	37	9	July, 1960.
(8) Nutan Traders Itwara, Bhopal	37	11	July 1960.
(9) Sagarmal Banwat Gandhi-Chowk, Ashta Dist. Schore.	37	12	July 1960.
(10) Dinanath Badriprasad Lohia Bazar, Lashkar	37	5	July 1960.
(11) Mukesh & Co. Madhoganj, Lashkar, Gwalior	38	14	July 1960.
(12) Prakash Iron Stores, Lohia Bazar, Lashkar	38	18	July 1960.
(13) Jankiprasad Laxmi Narain, Iron Merchant Bhindar, Gwalior.	37	29	July 1960.

MYSORE(4)

In the March, May and November, 1960 issues of 'Metric Measures' list of licensed manufacturers, dealers and repairers of Weights and Measures in Mysore State were published. The following is a list of licensed manufacturers and dealers subsequently licensed by the Government of Mysore under the Mysore Weights and Measures (Enforcement) Act, 1958.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Ahmed Sob Imamsab Tinwal, Durgadbai, Hubli	Litre Measures.
(2)	Agrawal Tin Manufacturing Co., and Engineering Works, Sultanganj (Near Paliwal Park), Agra.	Weights.
(3)	Associated Co., Ltd., Central Workshops, Shahabad (Gulbarga), Mysore State.	
(4)	Bansal Iron Foundry, Near Rly. Goods-shed, Belganjanj, Agra.	C.I. and Brass Weights.
(5)	Bhabavannarayana Iron Balance Works, Prop. Pinninti Janarohanam and Sons, Dowlaishwaram (E.G. Dist.)	Weighing Instruments in Class 'D' and 'C'.
(6)	Central Metal Workshop, Prop: Sarfaraz Khan, House No. 15-1-457, Hyderabad.	Litre Measures.
(7)	Davi Sahai Gopal Das, Iron Foundry, Chhipitola, Agra	C.I. Weights.
(8)	Goyal Industries, Mon Bhavan, 3681, Sultanganj, Agra	Brass Weights.
(9)	India Casting Company, Near Bilochpura Rly. Station, Agra.	C.I. Weights.
(10)	Indian Iron Industries, Mahavir Nagar, Near Water Works, Agra.	C.I. Weights.

Manufacturers (contd.)

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(11)	B.C. Iron Foundry, Engineers and Foundrs, Sultan Ganj, Agra.	C.I. Weights.
(12)	S.K. Iron Foundry and Engineering Co., Rambagh, Agra.	Weights.
(13)	S.S. Iron Foundry and Engineering Works Rombash P.O. Jumma Bridge, Agra.	C.I. Brass Weights.
(14)	Jaiswal, Trading Company, Dari Mohalla, Dhanbad (P.O.) Bihar.	Weights.
(15)	Jain Industries, 1166 Phatak Surajbhan, Agra (U.P.)	C.I. Weights, Measures & Weighing Instruments.
(16)	Jaya Krishna Iron Industrial Works, 3/246, Kothapeth Street, Dowlaishwaram.	Beam Scales.
(17)	Jeewanlal (1929) Ltd., Prop: Sree Ganeshar Aluminium Works, No. 1-2 Singara Garden, 4th Lane Washermanpet, Madras-21.	Litre Measures.
(18)	Karnatak Scales Centre, Prop: Abdul Salam Badal, H. No. 2-1-93, Mylapur Gate, Yadgir.	Litre Measures.
(19)	Krishna Iron Works, Dowlaishwaram, (East Godavari Dist.)	Beam Scales.
(20)	Luhar Khodanath, Savar Kundla, Near River Bank, (Saurashtra).	Beam Scales.
(21)	Luhar Mulgi Naran, Manibhai Road, Savarkundle (Saurashtra).	
(22)	Mital Brass Industries, 4509, Raja Mandi, Agra	Weights.
(23)	Mohd. Afaq., 1362, Bazaar Chitti Qabar, Delhi	Brass and Bullion Weights.
(24)	Narain Singh Babulal Iron Foundry, Behind Police Station, Lohamandi, Agra.	C.I. Weights.
(25)	National Industries, Sri Krishnarajendra Road, Davangere.	C.I. Weights.
(26)	National Metal Industries, Parel Village Road, Bombay-12	Weights and Measures.
(27)	Oriental Metal Pressing Works (P) Ltd., 131 Worli Bombay-18.	Capacity and Linear Measures.
(28)	Panduranga Engineering and Moulding Works, 13/56-A Tadpatri (Andhra Pradesh).	Cast Iron Weights.
(29)	Pappu Veeranna and Sons, Mechanical Engineering Industries, Dowlaishwaram, P.O. Rajamundry.	Beam Scales.
(30)	Pappu Yerakaaya and Sons, Mechanical Engineering Industries, Dowlaishwaram, P.O. Rajamundry.	Beam Scales.
(31)	Riaz Brothers, 6377, Sadar Bazar, Qusabpura Bari Masjid, Delhi.	(1) Bullion and Brass Weights. (2) Beam Scales. (3) Counter Machines.
(32)	Saples Scales Manufacturers Co., (P) Ltd., 180 B. Galiwadi, Girgaum Road, Bombay-4.	Weights and Precision Balances.
(33)	K.K. Sharma Iron Foundry, Pathwari, Belanganj, Agra	Cast Iron and Brass Weights.
(34)	R.K. Sheet Metal Works, Tin Manufacturers and Tin Work Contractors, Door No. 60 of Ward No. 10-7-S. No. 307, Jumma Masjid Road, Bangalore-1.	Litre Measures.
(35)	South India Metal Co., Simco Workshop, Shoranpur	Cast Iron Weights.
(36)	Standard Engineering Corporation, Ganning Factory Buildings, Lane Gaushala, Pathwari, Agra.	Weights and Measures.
(37)	R. Subbiah Setty and Sons, No. 1148/1, 6th Cross, Malleswaram, Bangalore.	Litre Measures.
(38)	Unicorn (P) Ltd., 29, Mount Road, Madras-2	Cast Iron and Brass Weights.

DEALERS

DEALERS LICENCED FOR WEIGHTS, MEASURES, WEIGHING AND MEASURING INSTRUMENTS.

Sl. No.	Name and Address of Dealer	Sl. No.	Name and Address of Dealer
(1)	M. Abdul Rahim & Sons, 198, Avenue Road, Bangalore-2.	(26)	I. Bheemasena Setty, Merchant, Near Vegetable Market, Hospet.
(2)	Abdul Rahman & Bros., Hardware Merchants, Kankapura P.O. Bangalore-2.	(27)	Bhuvaneshwari Stores, Prop. Srinivasa Setty & Sons, Iron Merchants, Kadur.
(3)	P. Abdul Razack Sahib Sons, Hardware & Paint Merchant, 1/1, Gundopanth Street, Bangalore-2.	(28)	Bonafid Traders, 25, St. John's Church Road, Bangalore.
(4)	Adappa Nagappa Balaganoor, Merchant, Muddlebihal, Dist. Bijapur.	(29)	R. E. Bramhadeviah, General Merchant, Chamarajanagar.
(5)	Adigi Raghavendra Shenny & Co., Hardware & Paint Merchant Car Street, Mangalore.	(30)	Calcutta Machinery & Metal Mart, 13-A Gundapanth Street, Bangalore-2.
(6)	P. S. Agricultural Stores, Moodbidri Post Office, S. K.	(31)	Chandras, Ramakrishna Raikar, General Merchant, Karwar.
(7)	Agriculturists Industrial & Commercial Co-operative Society Ltd., Mandipet, Davangere.	(32)	D. D. Chavan Prop. Chavan Industries, Dealers & Repairers, Nipani, Belgaum District.
(8)	A. Ahmedally & Co., Ltd., 14/17, Sri. Narasimharaja Road, P.O. Box 516, Bangalore-2.	(33)	Chikaballapur Taluk Primary Agricultural Produce Cooperative Marketing Society, Ltd., Chikballapur.
(9)	S. Alappa Setty & Sons, Bangalore-Mangalore Road, Sakleshpur, Hassan District.	(34)	H. B. Dharamendrappa, Hardware Merchant, Bellulli Galli, Davangere City.
(10)	V. R. Amble, Hardware Merchant, Nipani, Chokodi Taluk.	(35)	B. Damodar Bhandary, Hardware Merchant, Golikatta Bazar, P.B. No. 96, Mangalore.
(11)	Ambalal Lalchand Shah, Kirana Bazar, Bijapur.	(36)	Davangere Taluk Agricultural Produce Co-operative Marketing Society Davangere.
(12)	C. S. Amewadikar & Sons, 341, Patil Calli-Belgaum.	(37)	District Marketing Co-operative Society Ltd., Hassan.
(13)	Anant Govind Soundaligekar, 398 Saraffi Shop, Guguwarpeth, Nipani District, Belgaum.	(38)	Doddi Abdul Sattar Sahib & Sons, Car Street, Bellary.
(14)	A. R. & Co., Hardware Merchants, 197, Avenue Road, Bangalore-2.	(39)	Dundayya Basaya Karpurmath, Grocery Merchant, Market, Bijapur.
(15)	Shri K. V. Apte, Hardware Merchants, Jamkhandi, Bijapur Dist.	(40)	B. Ganapathi Bhandarkar, Prop. South India Lead Shots Works P.O. Box 41, Market Road, Mangalore-1.
(16)	Arun Machinery & Hardware Stores, Anjuman Buildings, Dharwar.	(41)	G. R. Traders Corporation, Floor Ambika Buildings 116, Avenue Road, Bangalore-2.
(17)	Babu Rao, (Alias Siddapp, N. Dodamanji Rauk Dist. Dharwar.	(42)	Geetha Stores, Prop. Venkataramana & Sons Car Street, Perdur S. K.
(18)	Dadri Venkatesappa Setty, Commission Agent Main Bazar, Kattur, Dist. Bellary.	(43)	General Engineering Works, Fort, Bellary.
(19)	Bagalkot Traders, Extension Bagalkot, Bijapur District.	(44)	G. Ghanteppa Setty, Kirani Merchant, Kudlig, P.O. Bellary Dist.
(20)	K. Balakrishna Setty, Hardware & Paint Merchant, Market Road, Mangalore-1.	(45)	V. G. Gote, Confectioners, Near S. S. High Schools, Bijapur.
(21)	Balheem Bros., Manufacturing Work Dr. Shamparasad Mukarji Road, R. S. No. 317/1, Balgaum-1.	(46)	Government Central Industrial Workshop, Bangalore-18.
(22)	Bander Chinnanana, Commission Agent, Kudligi, Bellary Dist.	(47)	Govind Gopalshet, Auvkar, Shroff & Gold Smith Tools Merchant Khade Bazar, Shahpur, Belgaum.
(23)	Basavaraj Metal Stores, Prop. Kantappa Mahadevappa Sirse, Main Bazar, Kalyan Dist. Bidar.	(48)	Govindya & Sons, Agents Venson Transport, Mandya.
(24)	T. R. Bestwood & Sons, Hardware Merchant, Kuker, Belgaum District.	(49)	Gurunathappa Bondade, Iron & Hardware Merchant, Davangere.
(25)	Bharat New Scale Centre, Prop. Basheer Ahmed S/o Mohamed Ibrahim, Kirana Merchant, Mailapur Road, Yadgir Gulbarga District.	(50)	Hajee Abdul Rahim Sahib Sons, General Hardware Merchant, No. 4, Gundapanth Street, Bangalore-2.
		(51)	Hajee Abdul Subhan Sahib & Sons, Hardware & Paint Merchant, 203-204, Avenue Road, Bangalore-2.

Dealers (Contd.)

Sl. No.	Name and Address of Dealer	Sl. No.	Name and Address of Dealer
(52)	K. Hajee Kader Bath Sabib Sons, Hardware & Paint Merchant, Gundopanth Street, Bangalore-2.	(80)	Malali Venkataramaniah Shetty & Sons, Station Road, Kadur.
(53)	D. D. Hanchate & Sons, Hardware Merchants, Talikoti, Bijapur, Dist.	(81)	R. Mallappa, General Merchant, Car Street, Hospet.
(54)	Harsukh Balkishan Bhutada, General Merchants & Commission Agents, Mahaveer Road, Bijapur.	(82)	Mallikarjanappa, Mahadewappa, Amma-bhave Bazar Road, Sudati P.O. Belgaum Dist.
(55)	P. K. Hedayathulla & Bros., Hardware Merchants, K. 98, Ragipet, Bangalore-2.	(83)	H. K. Manavi, Hardware Merchant, Talikot, Bijapur District.
(56)	S. K. Industries, Shop No. 4/1136, Sharaf Bazar, Gulbarga.	(84)	Mainikalal Vidhya Chandra Bros. S. S. Road, Bijapur.
(57)	Ishwar V. K. Owdi & Sons, Hubli Road, Dharwar.	(85)	Manjunath Laxman Nayak, General Merchant & Manufacturer of Brass & Copper Vessels, Car Street, Mangalore-1.
(58)	B. C. Jakkannavar, Subhas Rd. Dharwar.	(86)	Manunatha Trading Co., Bazar Street Arsikere.
(59)	S. Jaya Ram Roa, 414 Avenue Road, Cross, Bangalore City.	(87)	Maruthi Hardware Stores, Golikatta Bazar, Mangalore-2.
(60)	Jinnappa, Totappa Bagi, Post Hukeri Dist. Belgaum.	(88)	Mehta Brothers, 1827-1, 2nd Cross Road, Malleswaram, Bangalore-2.
(61)	G. G. Kalyani Merchants, Hole-Alar, Dist. Dharwar.	(89)	Mir Kasim Ali, C/o Mysore House, K. R. Market, Bangalore.
(62)	Karkarl Stores, Prop. B. B. Nayak Hardware & General Merchants, Temple Street, Mangalore-1.	(90)	A. Mohamed Ibrahim & Bros., 7/8 Gundopanth Road, Bangalore-2.
(63)	Katta Nanjappa Setty & Sons, P.O. Box No. 27, Hospet, Bellary District.	(91)	Mohamed Ibrahim, Hardware Merchants, Ramanagaram.
(64)	Keshawlal & Co., 71, Narasimharaj Road, Bangalore.	(92)	Mohamed Jehangir, Old Contractor, Weights & Measures, Chanda-bada, Shahabad, Chitapur Taluk (Gulbarga Dist).
(65)	M. Krishna R. Nayak & Sons, P. O. Box No. 20, Mangalore.	(93)	Monthu Pai, Copper Merchants, Coondapoor S. K.
(66)	M. D. Khadesab & Sons, Hardware Merchants, Station Hospet, Bellary Dist.	(94)	Murali & Company, G. 40 Subuvani Buildings, Post Box No. 740, Sir. Narasimharaja Road, Bangalore.
(67)	B. S. Kojagar, Dealer in Weights & Scales Mahaveer Road, Bijapur	(95)	Murthi & Co., General Merchants, Holakere Chitaldrug District.
(68)	Korgal Venkatappa Sethi & Sons Iron & Hardware Merchants Hospet, Bellary Dist.	(96)	Mysore State Hardware, 12, Gowdown Street, Bangalore-2.
(69)	T. T. M. Kotrabasiah Hamasagar, (Via Hospet) Mallapuram Taluk, Bellary Dist.	(97)	S. Nagappa & Bros., Iron Merchants, Car Street, Bellary-2.
(70)	Kottureshwara Stores, Pro. S. S. Varumurti Nehru Market, Ranibennur.	(98)	Nagenahli Kotrappa & Bros., General Merchant, Kottur (Bellary Dist).
(71)	Krishna Trunk Factory, 67, Ragipet, Bangalore-2.	(99)	Naik & Co., 283 Cotton Pet, Main Road, Bangalore.
(72)	Krishna Setty, S/o, M. Eswarappal, Merchant Harihar.	(100)	Narasappa Hanamantappa, Gangoji, C. V. Oil, Agent & Coconut Merchants, Hoel Alur, Taluk Ron; Dharwar Dist.
(73)	Krishna & Co., Paint & Hardware Merchants, Nanjangud.	(101)	R. Narasimba Venkatesh Shenoy, Hardware Merchants, P.O. Korkala, S. K.
(74)	Krishnaya Shah Bhague, Stationery & General Merchants, P. B. Shop, No. 20 W.J. Coondapoor (S. K. Dist.)	(102)	K. Narayana Hedge Sons, General Merchants, Thirthath, Shinga Dist.
(75)	Kusum Jet Stores Prop. Shah Nenshi Maghji Nagada, Dealer in Scales W/M, Grain Market Road, Gadag.	(103)	K. V. Narayana Setty & Co., General Merchants, Gouribidnur (Kolar Dist).
(76)	S. B. Lahoti, Hardware Merchant, Jamj-kandi.	(104)	Neo Hardwares, Golikatta, Bazar, Mangalore-1.
(77)	Laxmi Hardware Stores, 189, Avenue Road Bangalore-2.	(105)	Nipani Hardware Mart, Prop. Gopal Nagesh Purandare, Dalal Peth, Nipani, Belgaum Dist.
(78)	Laxmi Stores, Prop., T. S. Gurulingappa, & Sons, Kottur Bellary Dist.	(106)	K. Padmanabha Kamath, General Merchants, Coondepoor, S. K. District.
(79)	Mahaboob Ali, Mohamed Yakub & Sons, Iron & Hardware Merchants, Gulbarga.		

Dealers—(contd.)

Sl. No.	Name and Address of Dealer	Sl. No.	Name and Address of Dealer
(107)	V. B. Pasmit & Bros, Iron & Hardware Business, Main Bazar Road, Yadgir, Gulbarga Dist.	(138)	Shivanand Manjunath Shetti, General Merchant, Ankola (N. K. Dist.).
(108)	K. S. Paste, Dealer in Stationery & Hardware Etc., Nehru Market, Ranabenur.	(139)	M. S. Shivayoginath, Merchant & Dealer, Muddebihal, Bijapur Dist.
(109)	Patted & Nandihal Comany, General Merchant, & Commission Agent, Gajendragad, Taluk Ron.	(140)	Somlingappa Basappa, Aribenchi Ramd, Belgaum Dist.
(110)	Peeran Saheb, Iron Merchant, Kattur, Bellary Dist.	(141)	Souza & Co., New Market Road, Mangalore-1.
(111)	Pendkur Govindappa Sons, Merchant & Commission Agent, Main Road, Hospet, Bellary Dt.	(142)	Spencer & Co., Ltd., Mahatma Gandhi Road, Bangalore-2.
(112)	Popular Stores, Santhekotte Udipi. S. K.	(143)	A. V. Subbiah Setty & Sons, General Merchant, Koliegal, Mysore Distt.
(113)	C. R. Prabhantha & Sons, Hardware & Paint Merchant, Tumkur.	(144)	Sudrshan, Hardwares, Gandhi Bazar, Shimoga.
(114)	Prakash Trading Co., Hardware Merchants, Chikmangalore.	(145)	B. C. Suryanarayana Setty & Sons, Chemists & General Merchants Sakleshpur, Hassan District.
(115)	Raghvendra Sidramappa, Main Road, Athani Post, Belgaum Dist.	(146)	Suryakant R. Bhatta Iron & Hardware Merchant, 835, Raviwarpeth, Belgaum.
(116)	Ram Hardware Mart. Prop. Shri F. Jadiyappa Setty & Sons, Hospet, Bellary	(147)	C. P. S. Swamy Prop. Laxminarayana Store, New Bus Stand, Chickkanayakanaha yakanahanahally, Tumkur Dist.
(117)	K. B. Ramachandra Gopal Krishna, Shenoy, General Merchant, Karkala (S. K.).	(148)	Swamy Stores, Chikkanayakanahalli Tumkur Dist.
(118)	K. S. Ramaiah Sheety & Sons, General Merchants, Kadur.	(149)	M. Syed Yakub & Sons, 209, Gundopanth, Street, Bangalore.
(119)	Ramakrishna Stores, Mandipet, Davangere.	(150)	Taluk Agricultural Produce Co-operative Marketing Society Ltd., Sira.
(120)	Ramnath Shenoy, General Merchant, Bunder, Bangalore.	(151)	Town Hardware Stores, 5-Godown Street, Bangalore.
(121)	U. Ramanatha Shenoy, Car Street, Coondapoor (S. K.).	(152)	N. M. Traders, Iron & Hardware Merchants, Bangalore Road, Bellary-2.
(122)	Ranga Narasinha Nayak & Sons, General Merchants, Byndoor, S. K.	(153)	Union Hardware, 54, Ragipet, Bangalore-2
(123)	Raja Hardware Paint & Sons Iron Merchant, Tumkur.	(154)	Vani Vilasa & Coy General Merchants., & Commission Agents, Hiriyur Town, Chitradurga Dist.
(124)	Revenna Gurusiddappa, No. 1, Gowdown Street, Bangalore-2.	(155)	Vattam Subramanayam Chetty & Bors Iron Merchats, & Fabricators etc. Bellary.
(125)	Revathi Agencies, C. 30/1, Nehru Nagar, Sheshadripuram, Bangalore-2.	(156)	B. Venkateshprabhu, Hardware Metal & Paints, Goodapoor S.K.
(126)	L. Rasool Sahib & Sons, Cart Street, Ballary-2.	(157)	Veerabhadrashware, General Stores, V. V. Road, Krishnarajanagar, Mysore.
(127)	Rao & Brothers, Maidan West Road, Mangalore-1.	(158)	Veerappa Magundappa Kotagi, General Merchant, Ron Dist. Dharwar.
(128)	Rathna Chand, Bhooraji & Sons, Soji Street, Ashoka Road, Cross, Mysore-1.	(159)	K. L. Venkataravanappa, Merchant Anekal Bangalore Dist.
(129)	Rudrappa Pakirappa Barker, Mulgund, Gadag Taluk.	(160)	Venkiah & Sons, General Merchants, Sira.
(130)	Samed Bros., Bazar Street, Mandya.	(161)	B. N. Vijam & Co., Hardware Merchants, 11 Gundopanth Street Bangalore-2.
(131)	U. Shankareppa & Bros., General Merchant Shikaripur, Shimoga Dist.	(162)	Vijayalaxshmi Trading Co., B. B. Road, Chikballapur.
(132)	Shasty & Co. Hampankatta, Mangalore.	(163)	Vogish Coffee Works & General Stores, Near Post Office, Ranehennur, District, Dharwar.
(133)	A. S. Shettar, Hardware & Tobacco Merchant, Gadag.	(164)	Yadgir Taluk Agricultural Produce Co-operative Marketing Society (Ltd.) Yadgir.
(134)	N. Shikantayya & Sons, 42, Cemenrry Road, Tasker Town, Bangalore-2.	(165)	Yeshwant & Co., Raviwarpeth, Near Pioneer Bank, Belgaum.
(135)	Hon. Shroff Verthakara Sangha (Regd.), Ashoka Road, Mysore.	(166)	M. Zahir Lashkarwala, Druggist, No. 5 Avenue Road, Bangalore-2.
(136)	Siddeshwara Stores, Hardware, Paint & Stationery Merchants, Gandhi Bazar, Shimoga.	(167)	Zanwar, Iron & Hardware Merchants, C.T.S. No. 2520 Gokak.
(137)	Sivaji & Chandranath, Madhakar, Harikur P.O. Dharwar District.		

Repairers

REPAIRERS LICENSED FOR WEIGHTS, MEASURES, WEIGHING AND MEASURING INSTRUMENTS

Sl. No.	Name and Address of Repairer	Sl. No.	Name and Address of Repairer
(1)	M. G. Abdul Khalak, Cutlery Shop, Main, Road, Ramanagaram.	(7)	K. R. Gundu, Nayak & Sons, Car Street, Udipi.
(2)	Ameer Jan, No. 9, Motinagar, Bangalore-2.	(8)	Hiralal & Sons, 681, Raviwarpeth, Belgaum.
(3)	B. M. Bava, Repairer of Weights & Measures, Doddamane Muky P. O. Mangalore Taluk (S.K.).	(9)	S. M. Mahboob Baig, Nallagadda, Bangalore Road, Bellary.
(4)	B. Bhavani Singh, Gun Repairer & Manufacturers, Main Road, Chikmangalur.	(10)	M. Nabi Baig (Seer Maker) Mear Gandhi Chouk, Hospet.
(5)	Chavan & Sons, Prop. D. D. Chavan, Old Motor Stand Nipani, Belgaum District.	(11)	S. B. Pannalkar, No. 558, Theobald Road, Nazerbad, Mysore.
(6)	Government Central Workshop, Mysore Road, Bangalore-18.	(12)	Sangameshwar, Repairing Works, Station Road, Gadag.
		(13)	Savagan, Raviwarpeth, Gokak.
		(14)	S. C. Welling Works, B. C. 85, Belgaum Cantt.

ORISSA (5)

In the March, July and November 1960 and March 1961 issues of *Metric Measures* lists of licensed manufacturers, dealers and repairers of weights and measures in Orissa state were published. The following is a list of manufacturers, dealers and repairers subsequently licensed under the Orissa Weights and Measures (Enforcement) Act, 1958.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles manufactured
(1)	Asiatic Machinery Corporation Private Ltd., 10/1, Kailash Chandra Lane, P.O. Santkagachi, Howrah.	Platform weighing machines.
(2)	National Foundry & Rolling Mills Ltd., Nayabazar, Cuttack-4.	Cast Iron Weights.
(3)	Utkal Metal Industries, P. O. Khetarajpur, District Sambalpur.	Flat Cylindrical Weights and also Bullion Weights.
(4)	Vudatha Subbaiah, Proprietor Sree Seetha Rama Engineering Works, P.O. Dowlais hwaram, Dist. East Godavari.	Beam Scales.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Avery Co. Private Ltd., Station Road, Cuttack-3	Weights, Measures, Weighing and Measuring Instruments.
(2)	Puskarlal Hariprasad, P.O. Baripada, Dist. Mayurbhanj	Weights

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	Avery Company of India Private Ltd., Cuttack-3	Weights, Measures and Weighing and Measuring Instruments.

PUNJAB (9)

In the July and September 1959, March, July, September 1960 and January and March 1961 issues of *Metric Measures* lists of Manufacturers, dealers and repairers of Weights and Measures in Punjab State were published. The following is a list of dealers and repairers subsequently licensed by the Government of Punjab under the Punjab Weights and Measures (Enforcement) Act, 1958.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	S. C. Engineering Company, Amritsar	Weighing Instruments of specified capacities and type. Weigh-bridge capacity 20 tonne, Platform machines capacity 500Kg. counter machine 10 Kg.
(2)	Jagan Nath Kimat Lal, Karnal	Weights, Measures, Beam-scales.
(3)	Sharman Steel works, Ambala City	Cast Iron Weights
(4)	Sujan Singh & Sons, Ambala Cantt.	100 g to 50 kg Weights, Measures, Weighing and Measuring Instruments.

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	Avery Company of India, Private Ltd., Amritsar	Weights, Weighing and Measuring Instruments.

CORRIGENDUM

In the Standards of Weights and Measures (Conversion of Land Areas) Rules, 1960 published in March 1961 issue of *Metric Measures* the following corrections may be carried out on pages 25 to 28 in the relevant entries;—

The word "Acres" appearing in the heading on page 25 under column 50 Cents may be *deleted*.

Against entry		Read		For	
Acres	Cents	Hectares	Ares	Hectares	Ares
7	90	3	19.70	3	19.17
73	20	29	62.29	29	72.29
84	20	34	7.44	34	7.34
1000	100	445	15.30	445	15.36
8000	400	3399	35.05	33.99	35.05
6000	900	2792	32.36	2792	32.37
7000	900	3197	0.82	31.97	0.83
9000	900	4006	37.73	4006	37.75

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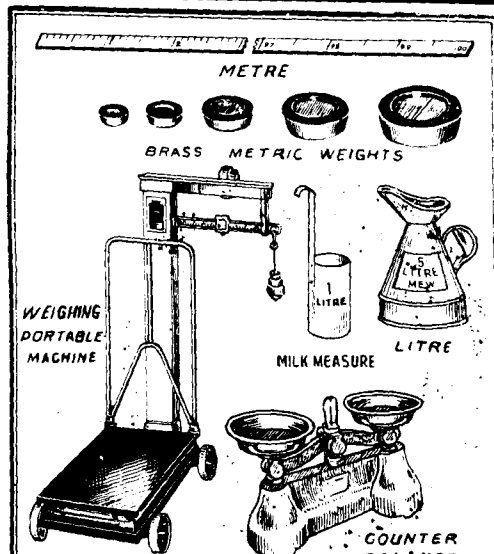
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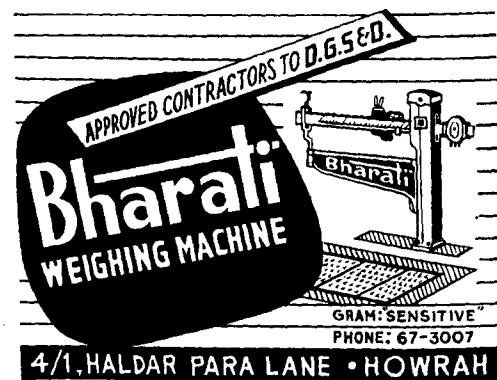
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metric measures

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CONVERSION TABLE FOR PRICES

(Conversion Factor used: 1 Liquid Seer = .937 Litre)

NAYE PAISE PER LIQUID SEER TO NAYE PAISE PER LITRE		RUPEES PER LIQUID SEER TO RUPEES PER LITRE	
nP/L Sr	nP/l	Rs/L Sr	Rs/l
1	1	1.07	1
2	2	2.13	2
3	3	3.20	3
4	4	4.27	4
5	5	5.34	5
6	6	6.40	6
7	7	7.47	7
8	8	8.54	8
9	9	9.60	9
10	10	10.67	10
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22	22	11.74	11
23	23	12.80	12
24	24	13.87	13
25	25	14.94	14
26	26	16.01	15
27	27	17.07	16
28	28	18.14	17
29	29	19.21	18
30	30	20.27	19
31	31	21.34	20
32	32		
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metric measures

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MINISTRY OF COMMERCE AND INDUSTRY

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metric measures

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OBITUARY

DR. K. S. KRISHNAN

We learn with deep sorrow, of the passing away, on June 14, 1961, at his residence in Delhi, of Dr. K. S. Krishnan, noted scientist and scholar. Death was sudden. Dr. Krishnan worked in his laboratory, and on his literary pursuits to the last day of his life. The premature death of a man of his eminence would be felt as a serious national loss in any country. In India, which is beginning to build up scientific services, and establish traditions of scientific research, it is a tragedy of the first magnitude.



2. Born on December 4, 1898, in the village of Watrap near Srivilliputtur in the district of Ramnad, Madras, Kariamanikkam Srinivasa Krishnan, had his schooling in Watrap and Srivilliputtur. Later he studied in the American College, Madurai and the Christian College, Madras, an institution which in our time has produced stalwarts in many fields, politics, administration and science. He worked under Prof. C.V. Raman whom he assisted in researches leading to the discovery of Raman Effect. He taught, and guided research in the Universities of Dacca, Calcutta, and Allahabad. In 1947 he became the first Director of the National Physical Laboratory. The Laboratory is today a monument to his inspiring leadership, industry and zeal.

3. Dr. Krishnan was one of the principal architects of the reform of weights and measures, and has been closely associated with it throughout. When the Joint Select Committee of Parliament was discussing legislation to adopt the metric system, a few members felt misgivings on certain provisions of the Bill. Dr. Krishnan's gentle persuasiveness, thorough grasp of detail and ability to explain technical points with lucidity, helped to dispel their doubts and apprehensions. The Bill received unanimous support from the Committee. In the National Physical Laboratory, Dr. Krishnan organised a Weights and Measures Division to take charge of the National Prototypes of the Metre and the Kilogramme, and to verify standard weights and measures for the State Governments. He represented the Government of India at International Conferences on Weights and Measures. One of the last International Conferences he attended was the 11th General Conference on Weights and Measures on 11 & 12 October 1960 at Sevres, Paris. This Conference approved a new definition of the 'Metre'. Dr. Krishnan made significant contribution to the discussions on the subject. He was in the Editorial Board of 'Metric Measures' and represented the Ministry of Scientific Research and Cultural Affairs on the Standing Metric Committee.

Designs for Kilometre Stones

THE metric system of weights and measures has already been adopted on the Indian Railways in their day-to-day work. Thus freight charges are in Rupees and naye Paise and kilograms and quintals. Passenger fares are being charged in terms of distance travelled in kilometres. Telegraph poles which upto a year back used to show the distance in miles now also show kilometres and new kilometre stones are being fixed along the 57,000 kilometres of rail routes in the country.

Road transport, like the Railways has also to charge for luggage, goods and fares in terms of distance. Thus the roads also would have to be marked in kilometres if metric system has to be adopted. Some steps have already been taken in this direction. For example, the Motor Vehicles (Second Amendment) Act, 1960, (No. 51 of 1960) has been passed. This Act now requires that all data connected with motor transport should be indicated in metric units. Distance also has, therefore, to be expressed in kilometres. Notifications issued by the Government of India prescribe that metric units be used in the Motor transport industry from 1 January 1961 with a period of transition of 1 year. This means that the use of metric system becomes compulsory from 1 January 1962.

There are various kinds of roads in India : national highways, State highways, district roads, village roads, and so on. On all these roads distances are now shown in miles. Often a national highway was marked with

many small villages and towns as the starting points. You travelled, say, 200 miles on a national highway and suddenly for no apparent cause the milestones began showing 1, 2, 3 and so on. The opportunity provided by the need to set up new distance marks, therefore, be taken to rationalize the distance indications on all national highways. It follows also that uniform stones should be fixed on all roads—national as well as others.

Magnitude of Task

The magnitude of the task will be clear when it is realized that roads under the control of the Centre have a length of over 21,000 kilometres. The States have metal roads over 2,02,000 kilometres long and kutchra roads running 4,00,000 kilometres. Union territories have 1,300 kilometres of metal roads and about 7,800 kilometres of kutchra roads. Appendixes 1 and 2 give statewise distribution of national and State highways respectively.

In order to achieve uniformity in the design and fixing of kilometre stones, the Ministry of Transport and Communications, in consultation with the Indian Roads Congress, on which are represented the State's Public Works Departments, have now evolved specifications for kilometre stones to be fixed on national highways, State roads, major district roads, village roads etc.

Designs

Plate I shows the type design for ordinary kilometre stone on national highways, State highways and major district roads.

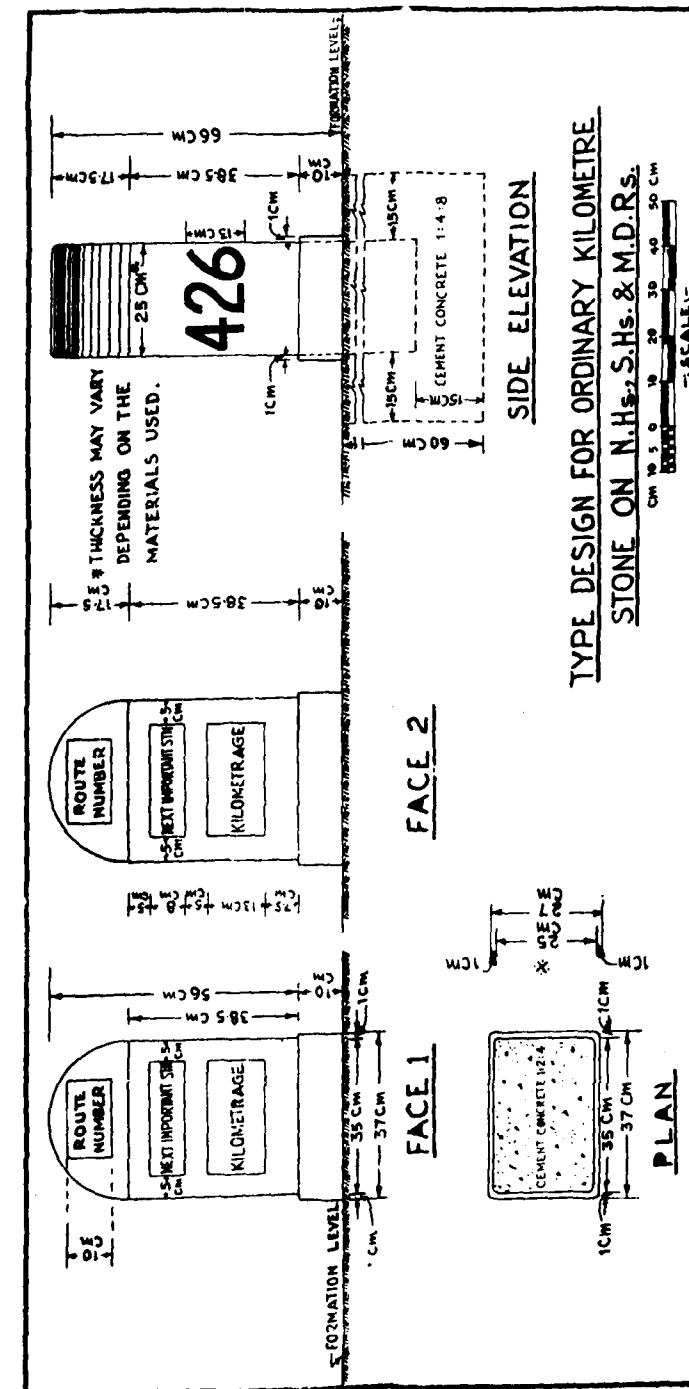


Plate I—Type Design for Ordinary Kilometre Stone on National Highways, State Highways and Major District Roads.

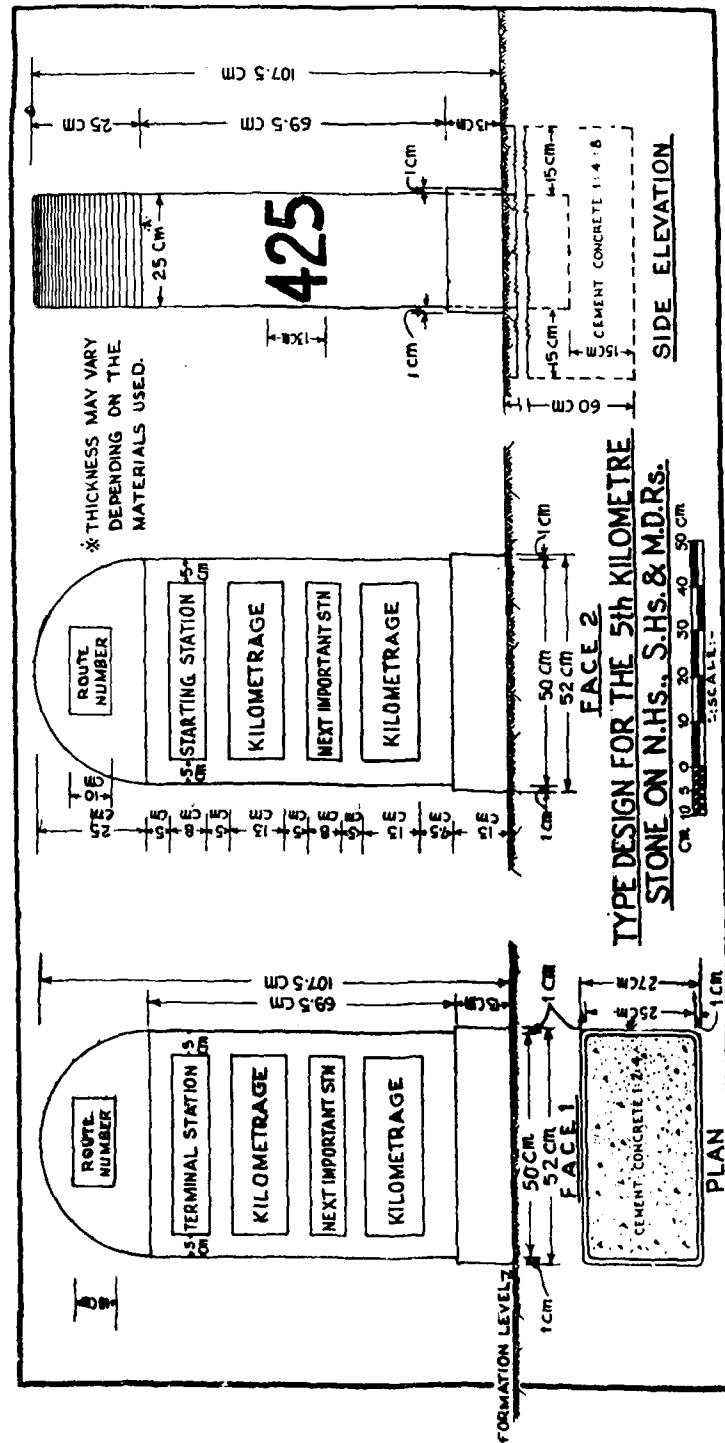


Plate II—Type Design for the 5th Kilometre Stone on National Highways, State Highways and Major District Roads.

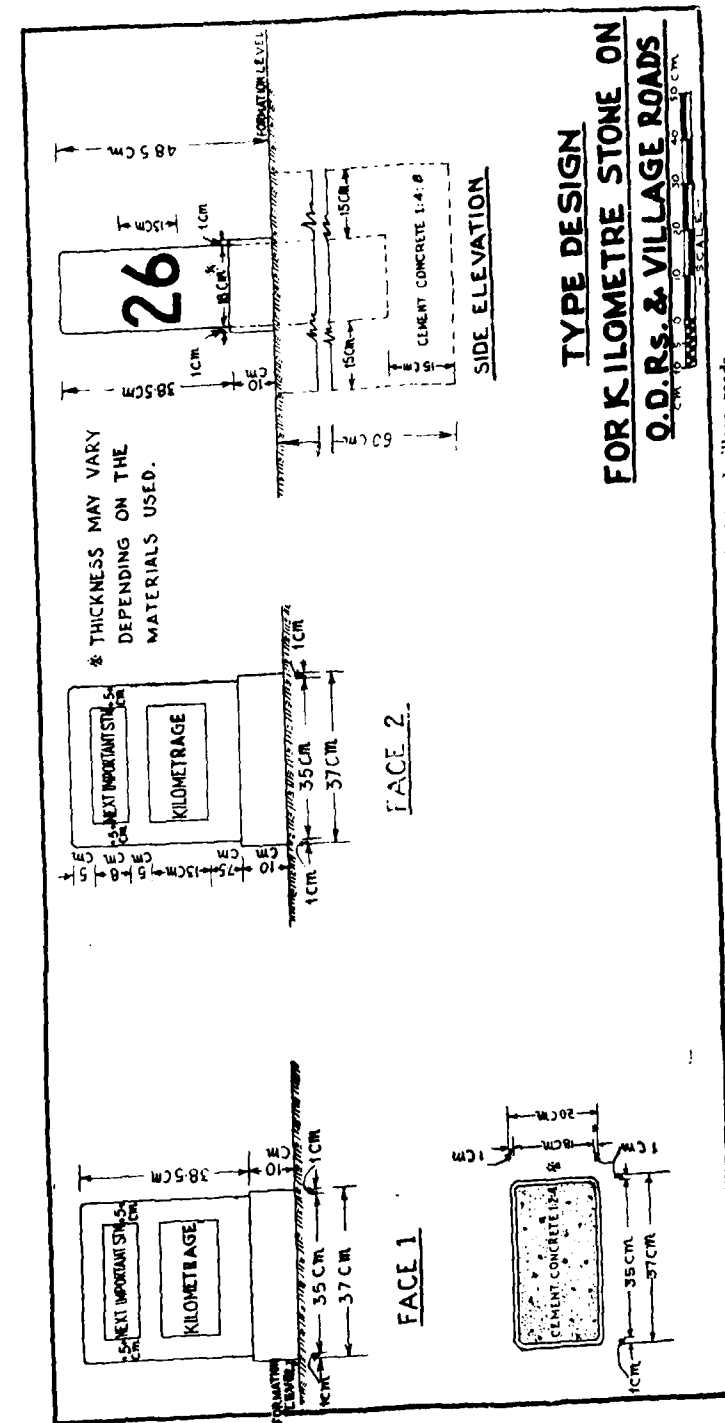
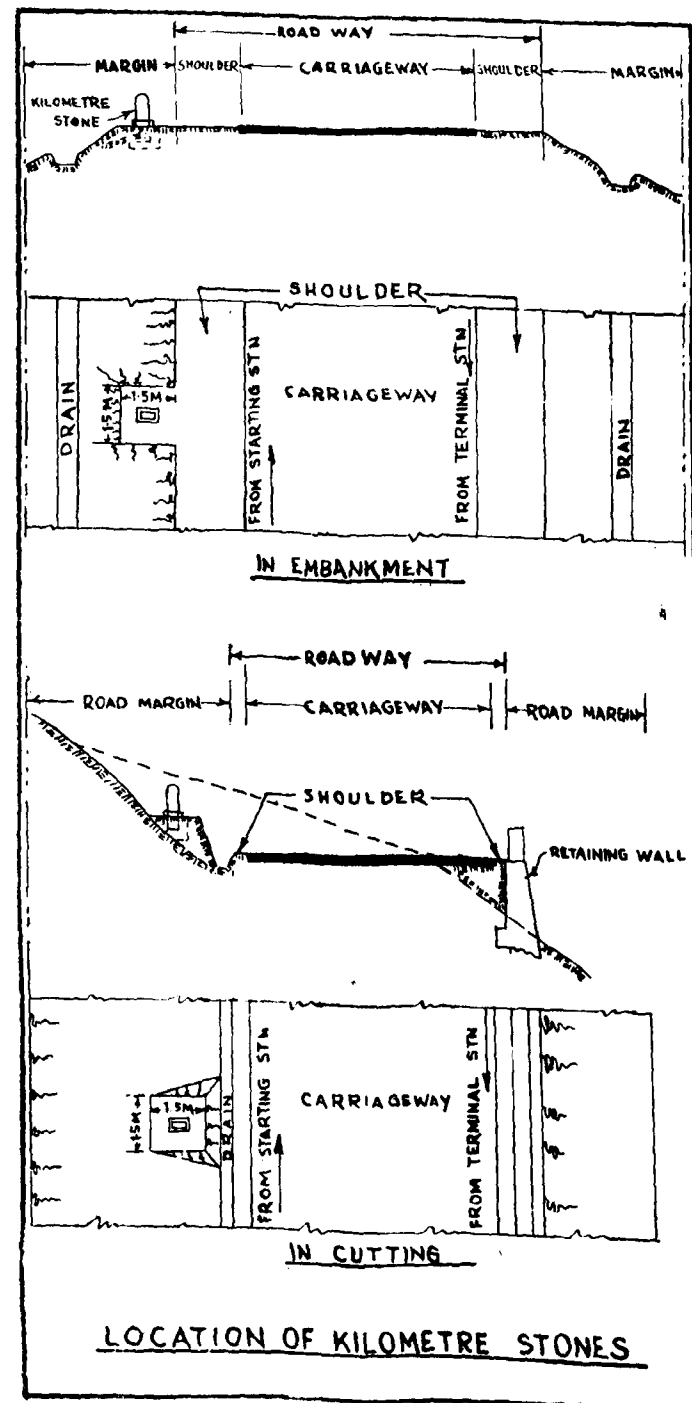


Plate III—Type Design for Kilometre Stones on other District and village roads.



DESIGNS FOR KILOMETRE STONES

Besides prescribing dimensions, the specification gives details of lettering, scripts, inscriptions colour schemes etc.

Inscriptions

One of the important provisions is that kilometres may be made of suitable locally available material. The sizes of letters, numerals and edge clearances have been indicated.

Place names would normally be inscribed in different scripts in the following order, normally only one script being used in any one kilometre stone :

Km No.	Script for Place Names
0	Roman
1	Hindi (Devnagari Script)
2	Local Language
3	Hindi (Devnagari Script)
4	Local Language
5	Roman.

and so on repeated in the same order.

The numerals should in every case be inscribed in the international form of Indian numerals i.e., 1, 2, 3 and so on ; *local or Devnagri numerals should not be used.* (vide article under 343 (i) of the Constitution of India.)

On kilometre stones fixed on other district roads and village roads the inscription may be in the national language, i.e., Hindi in Devnagri script, or the script of the recognised regional language, at the discretion of the local Road Authority. Inscription in the Roman script is not necessary unless such a road leads to a place of tourist or archaeological interest.

Ordinary kilometre stones (See Plate I) would indicate the name and distance of the next (intermediate) important town only, whereas every 5th kilometre stone (See Plate II) would show the name and distance of the terminal or the starting station also inscribed above those of the intermediate towns.

On the side of a kilometre stone facing the carriageway the number of kilometre stone would be inscribed (without the name of any place). In the case of thin stones made of R.C.C. or any other material the digits may be inscribed one below the other, thus :

4
2
6

The design specification also lays down the shape and spacing of letters in the Roman script and of numerals.

On kilometre stones, which are inscribed in a script other than Roman, the style of lettering would be the one in general use.

Colour Scheme

So far as the colour is concerned, the specification prescribes that the background colour should be white with black letters and numerals for names of stations and distances. The semi-circular portions of the kilometre stones on national high ways, State highways and major district roads should be painted canary yellow, brilliant green and white respectively. The route number to be written on the semi-circular portion would be in black on the canary yellow and white background. This would enable easy recognition of the different types of roads.

The stones would be fixed at right angles to the centre line of the carriageway, and on the side of the road other than that on which milestones exist. On new roads they would be located on the left-hand side of the road as one proceeds from the Station from which the kilometre count commences.

Note: Particulars regarding recommendations (i) sizes of letters and numerals and edge clearances (ii) script of the inscriptions (iii) sequence of inscription (iv) the shape and shaping of letters, (v) colour (vi) orientation, etc. are given in a booklet "Type Designs for Highway Kilometre Stones" issued by the Indian Roads Congress and copies of which can be had on payment of the Rs. 0.75 plus postage, etc. from the Secretary, Indian Roads Congress, Jamnagar House, Mansingh Road, New Delhi-11.

APPENDIX-I

Distribution of National Highways* among
States and Union Territories

Serial No.	Name of the State or Union Territory	Length of N.H. in kilo- metres as on 31-3-59
1	Andhra Pradesh	2,173
2	Assam	1,163
3	Bihar	1,321
4	Gujarat	3,474
5	Maharashtra	
6	Jammu & Kashmir	544
7	Kerala	404
8	Madhya Pradesh	2,216
9	Madras	1,659
10	Mysore	858
11	Orissa	1,369
12	Punjab	1,225
13	Rajasthan	697
14	Uttar Pradesh	2,250
15	West Bengal	1,196
		20,549
Total for States		20,549
UNION TERRITORIES		
1	Delhi	71
2	Himachal Pradesh	319
3	Manipur	224
4	Naga Hills Tuensang Area	111
5	Sikkim	63
Total for Union Territories		788
GRAND TOTAL		21,337

*Figures do not include length within Municipal limits, missing links and roads under construction.

Source : Basic Road Statistics-tenth (1959) Supplement—Table J-III (10).

APPENDIX-II

Length of State Roads* as on 31-3-1959

Serial No.	Name of the State or Union Territory	Length of metalled Roads in Km.	Length of Kaccha Roads in Km.
1	Andhra Pradesh	25,471	21,746
2	Assam	1,689	25,450
3	Bihar	10,295	54,666
4	Gujarat	30,876	35,331
5	Maharashtra		
6	Jammu & Kashmir	961	7,187
7	Kerala	8,669	9,563
8	Madhya Pradesh	17,853	18,546
9	Madras	26,775	17,561
10	Mysore	25,978	31,163
11	Orissa	5,740	22,664
12	Punjab	7,908	22,808
13	Rajasthan	12,269	33,824
14	Uttar Pradesh	18,453	67,218
15	West Bengal	9,266	32,356
Total for States		2,02,203	4,00,083
UNION TERRITORIES		1,328	7,788
GRAND TOTAL		203,531	407,871

*These refer to extra Municipal roads maintained by P.W.D., Local Bodies and those constructed in C.D. & N.E.S. Blocks but exclude National Highways.

Source : Basic Roads Statistics—tenth (1959) Supplement—Table J-III (5) & J-III 10).

Metric System & Clothing Trade

GUY KNOCHE

French Economic & Technical Bulletin,
France

THE decimal metric system which is in general use in Europe is applied throughout the clothing industry. However, certain problems arise in this field and are solved in a particular way.

Size Fittings

A single measurement is obviously insufficient for determining the size of a garment. In a general way, the clothing industry produces ready-to-wear garments, alterations being made by the retailer, for every human being has his own dimensional characteristics and two men of the same height, for instance, will not necessarily both have arms or legs of the same length. As a result, the average general measurements of individuals have been established and ready-made garments are altered on sale so as to fit the buyer as well as possible.

Some of the numerous elements which must be known to ensure that a ready-made garment will hang well have been listed. And the averages deduced by comparing these elements on a large number of individuals have enabled a coherent set of measurements to be drawn up: a given waist measurement is usually matched by a given arm length, a given bust measurement, a given shoulder-to-shoulder breadth, etc.

Each set of measurements has been given a number (from 36 to 54), which is only a

size reference and corresponds to an average. The lowest numbers represent the smallest sizes, the highest numbers the largest sizes. According to the part of the body measured, a given element increases more or less steeply according to whether it is a part of the body subject to considerable variations (hips, for instance) or only to small variations (length of back or length of shoulders). In extreme sizes, one of the elements may even remain unchanged. This, as we shall see, is the case with women's sleeve lengths.

The following table shows the principal basic measurements used in women's clothing manufacture for each so-called 'standard size'.

TABLE I

Principal Basic Measurements in Women's Clothing
(Sizes are given in centimetres)

Size Fitting Number	Bust	Waist	Hips	Shoulder Breadth back	Length Back	Shoul- der Length	Sleeve Length
36	80	60	85	35	108	11	60
38	82	63	88	35.5	108	11.5	60
40	85	66	92	36	108	12	60
42	88	69	96	36.5	110	12.5	60
44	92	72	100	37	110	13	60
46	96	76	104	37.5	112	13.5	60
48	100	80	109	38	112	14	60
50	104	85	114	38.5	115	14.5	60
52	108	90	119	39	115	15	60
54	112	95	124	39.5	115	15.5	60

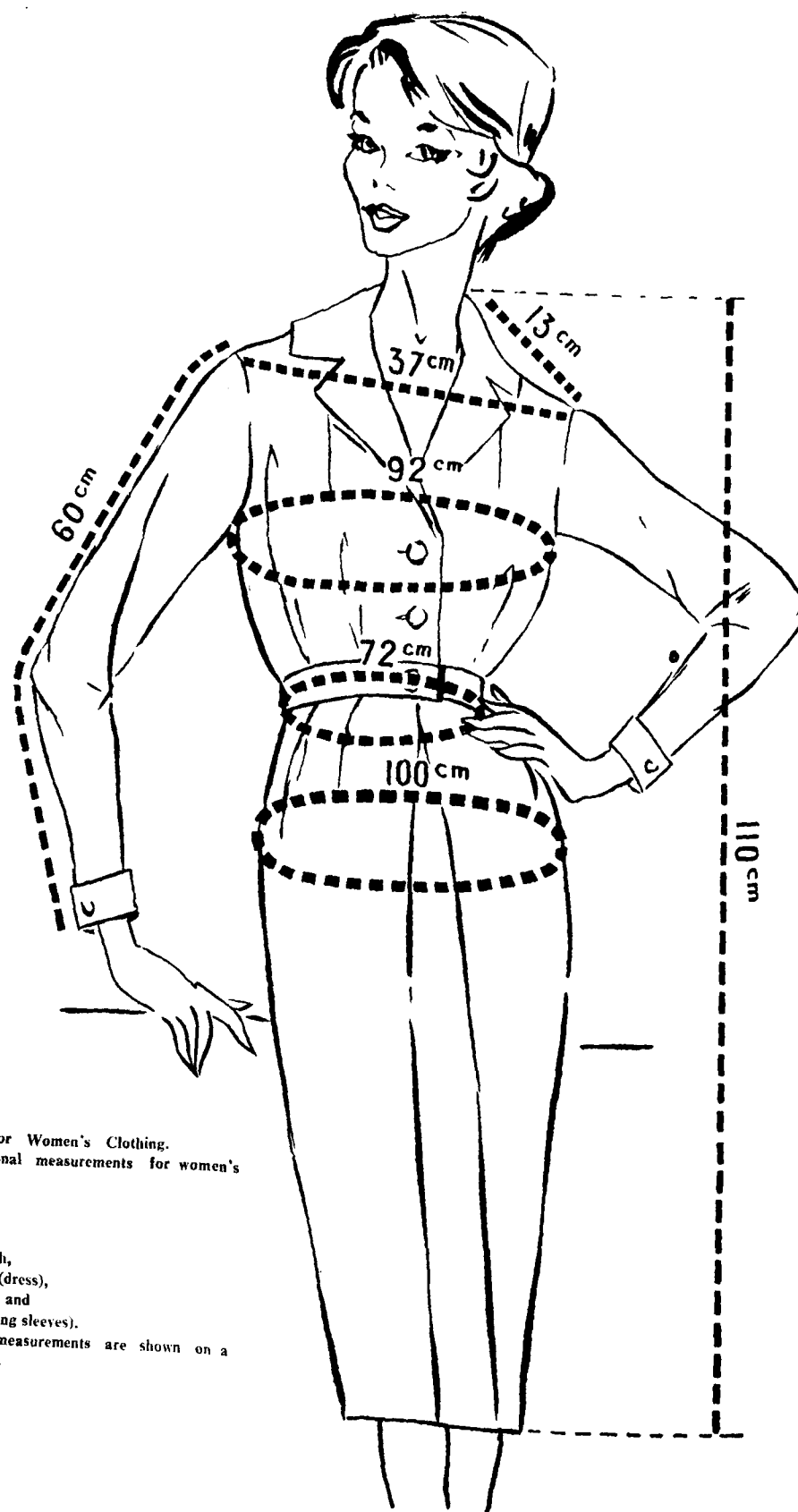


Fig. 1—Measurements for Women's Clothing.
The seven traditional measurements for women's clothing are:

- (1) Bust,
- (2) Waist,
- (3) Hips,
- (4) Shoulder breadth,
- (5) Length of back (dress),
- (6) Shoulder length, and
- (7) Sleeve length (long sleeves).

The seven foregoing measurements are shown on a dress for '44' size-fitting.

This table requires an explanation. We see that the sleeve length does not change, as it is one of the easiest elements to alter. It is also one of those which vary most in women whose other measurements would be fairly similar. Three elements, on the contrary, are fundamental and difficult to alter. They are those for which measurements vary to the greatest extent from one size to another,—bust, waist, and hips. Other measurements do not vary very much. For instance, back shoulder-to-shoulder breadth and shoulder length only increase by 0.5 cm (5 millimetres) from one size to another, while only 4 different measurements are found in length at back for 11 different sizes, i.e., 108 cm for size fittings 36, 38 and 40; 110 cm for size fittings 42 and 44 (the most usual in France); 112 cm for size fittings 46 and 48; 115 cm for outsizes 50 to 54.

The above table, therefore, shows the measurements in centimetres corresponding to the size fittings of a very large number of women's ready-to-wear garments.

In Figure 1 and 2 are shown the principal measurements of women's clothes and the pattern of the dress.

Shoes

In some other sectors of the clothing industry a special terminology has been adopted. One of these sectors is the boot and shoe trade where sizes in France are defined by "pointures". The 'pointure' unit is approximately 22 centimetres. It is divided into 33 points (hence the term 'pointure') each of which is, therefore, about 6.6 millimetres long. For adults sizes, this basic figure of 33 (which corresponds to the smallest normal size) is increased by additional points according to the length of the shoe. For children whose 'pointure' is less than these 33 points (i.e., whose foot is less than 22 centimetres long), sizes are given by age—1 year, 2 years, etc.

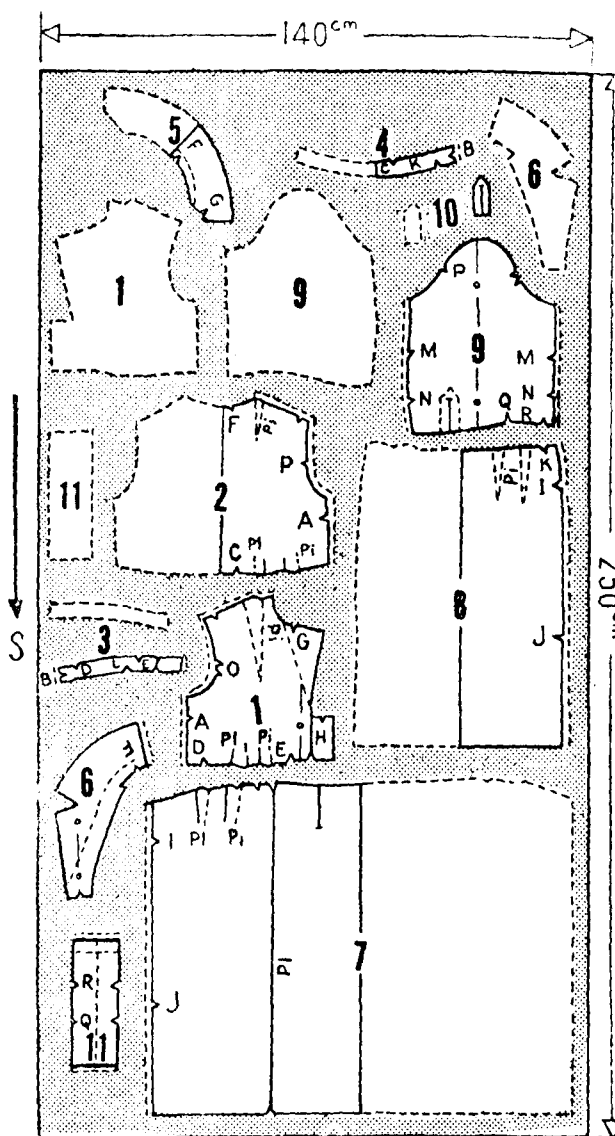


Fig. 2—Pattern of Dress Shown in Fig. 1.
Drawings of the various pieces cut out of a 2.50 m length of woollen fabrics, width 140 cm.

- (1) Front of bodice (2 pieces: right half and left half)
- (2) Back of bodice (cut in one piece)
- (3) Belt, front
- (4) Belt, back
- (5) Collar lining
- (6) Collar facing (2 pieces)
- (7) Front of skirt
- (8) Back of skirt
- (9) Sleeve (2 pieces)
- (10) Cuff facing (2 pieces)
- (11) Cuff (2 pieces)
- (S) Way of fabric
- (PI) Pleats
- (Pi) Darts

Letters A to R indicate places where several pieces are to be assembled.

'Pointures' below 33 also exist for little boys' and little girls' shoes. Adding or subtracting one unit to or from 33 means manufacturing a shoe measuring 6.6 millimetres more or less than size 33. Women's shoe fittings range on an average from 35 to 42 (i.e., from $33+2$ to $33+9$, or $22\text{ cm}+6.6\text{ mm}\times 2$ and $22\text{ cm}+6.6\times 9$). Men's fittings range from 39 to 46.

The following table is based on this system of size fittings:

'Pointure'	20	30	36	38	40	42	43	54
Length in cm	13.4	20	24	25.3	26.6	28	28.6	29.3

A difference of 6.6 mm in length (corresponding to one 'pointure') is too much in some cases to ensure perfect fit of a shoe and for several years now French manufacturers have made more and more half-sizes, reducing the difference to 3.3 mm from one type of shoe to another. Likewise, as foot width is not strictly proportional to length, shoes of 2 or 3 different widths are now made in each 'pointure'.

Gloves

The glove industry also uses 'pointures'. Length of the hand is measured from the bend of the wrist to the tip of the middle finger. It is expressed in 'pouces' (an old French unit of measurement) of 27 mm. For instance, glove fitting 7-1/2 corresponds to gloves whose length, measured as above, is $27\text{ mm}\times 7.5=20.25\text{ cm}$, or approximately 20 cm.

Socks and Stockings

Like shoes, socks and stockings are sized in 'pointures', supplemented in the case of stockings by an additional dimension corresponding to length of leg,—'small women', 'large women', etc.

Men's Clothing

Although men, like women, buy their ready-to-wear suits by size fittings, for shirts

the metric system is reverted to. Shirt fittings are shown by numbers, which are the size neck expressed in centimetres.

Examples of the cut and patterns of shirts, trousers and jackets are given in Fig. 3 to 5.

On the other hand in the case of hats, sizes are given in 'hatter's points' corresponding to head measurement. Each point represents 2 centimetres, point zero corresponding to a 47 centimetres head size. The following table is thus obtained:

	Hatter's Points	Head Size in cm
Children	1	48
	1 1/2	49
	2	50
	2 1/2	51
	3	52
Youths	3 1/2	53
	4	54
Men	4 1/2	55
	5	56
	5 1/2	57
	6	58
	6 1/2	59

Beret sizes, on the contrary, are expressed in centimetres.

Finally, for ancillary items of clothing—braids, ribbons and hat brims—the width is expressed in 'lines', an old French unit of measurement corresponding to 2.2558 millimetres. Thus, a '4 lines' ribbon will be a little less than 1 centimetre wide (9.0232 mm).

Metrologists regret the absence of a totally unified system of measurement. It must be recognized, however, that in the ready-to-wear clothing trade, the system of size fittings facilitates mass production, as a whole set of measurements is involved and not a single one

(Continued on page 30)

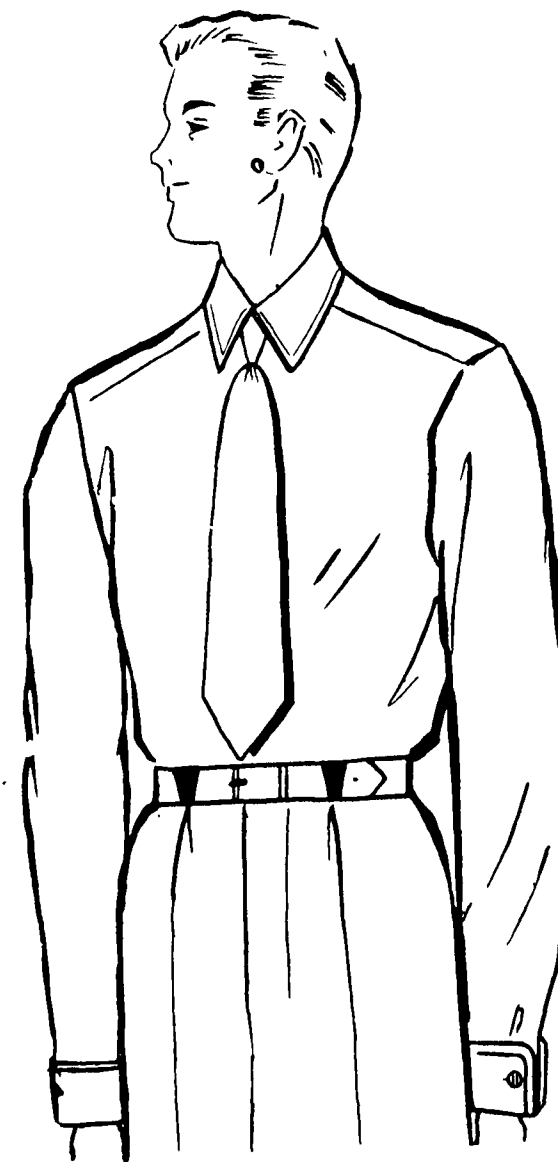
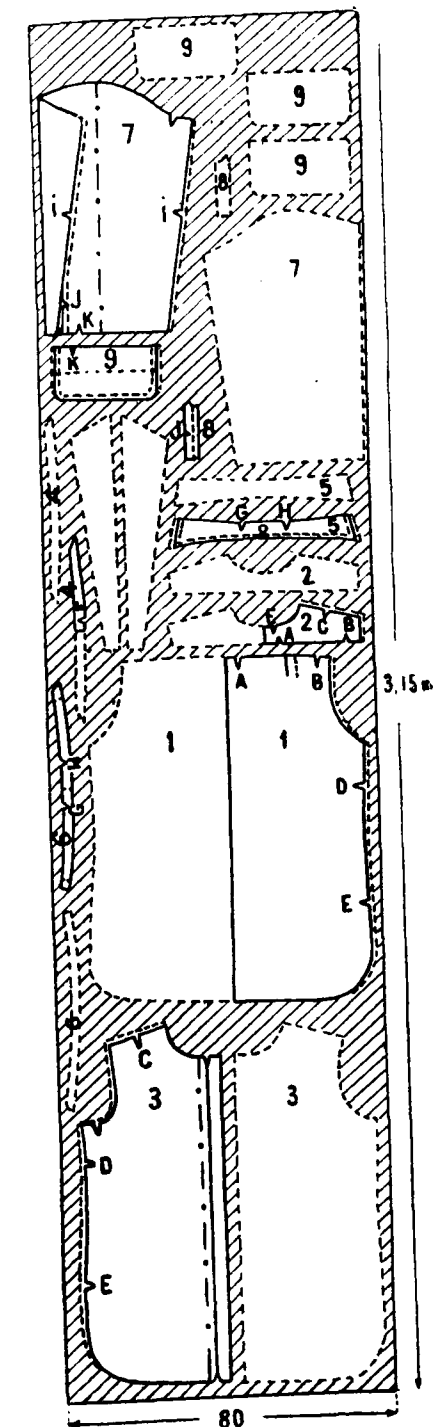


Fig. 3—Shirt—Size 44—Collar size 38.
Material required: 3.15 m, 80 cm wide.
Cutting-out details:

- (1) Back
- (2) Yoke (top of back) (4 pieces)
- (3) Front (2 pieces)
- (4) Shirt neck band (4 pieces)
- (5) Collar (2 pieces)
- (6) Collar band (2 pieces)
- (7) Sleeve (2 pieces)
- (8) Sleeve tab (2 pieces)
- (9) Cuff (4 pieces).



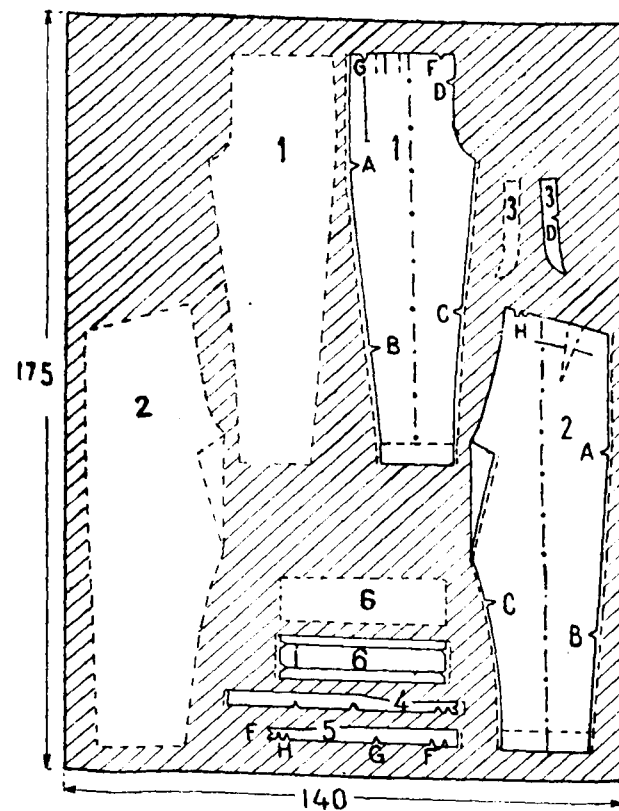
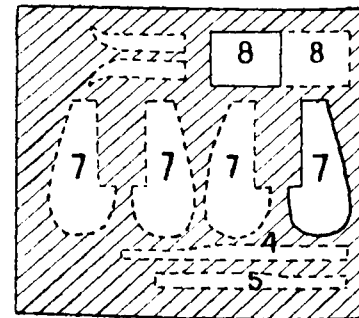


Fig. 4—Trousers—Size 44. Length measured on side seam: 102cm
Material required : 1.75 m, 140 cm wide
For pockets: 70 cm, 80 cm wide
Cutting-out details:
(1) Front (2 pieces)
(2) Back (2 pieces)
(3) Tab (2 pieces)
(4) Belt, left side
(5) Belt, right side
(6) Cuff (2 pieces)
(7) Pocket (4 times)
(8) Revolver pocket (2 pieces)

For the lining, pieces No. 3, 4 and 5 must also be marked out twice on the material for pockets and lining.

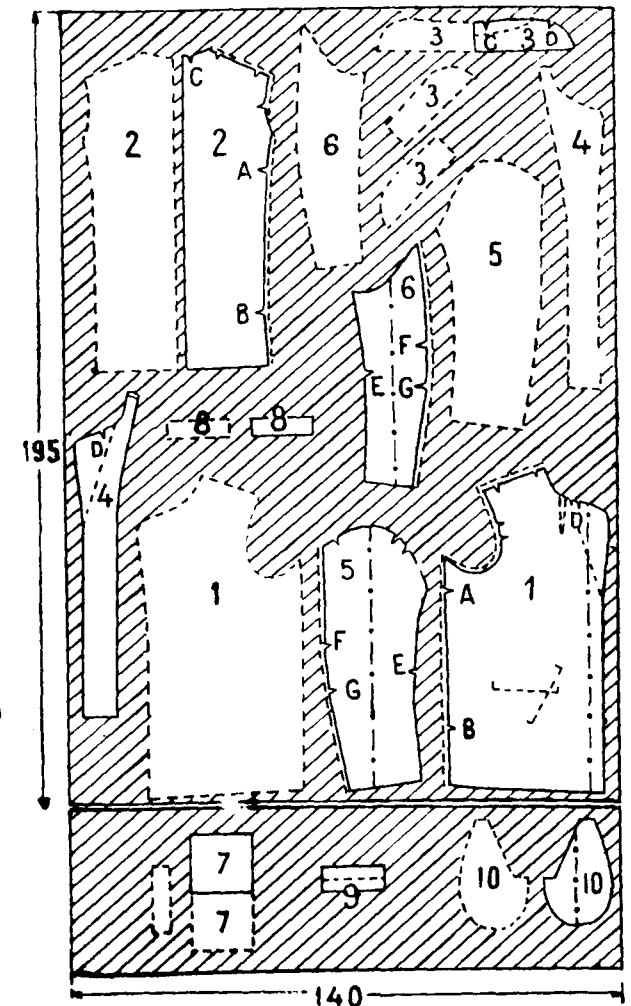


Fig. 5—Jacket—Size 44.
Material required (not including lining):
1.95 m, 140 cm wide.

- Cutting-out details:
(1) Front (2 pieces)
(2) Back (2 pieces)
(3) Collar (4 pieces)
(4) Lapels (2 pieces)
(5) Top sleeve (2 pieces)
(6) Under-sleeve (2 pieces)
(7) Straight-cut pocket (2 pieces)
(8) Flap of straight-cut pocket (2 pieces)
(9) Flap of bias-cut pocket (2 pieces)
(10) Bias-cut pocket (2 pieces).

Thinking in Tens*

J. B. S. Haldane

* Professor

FROM October 1, 1958, we have started using the metric system for practical purposes. I have no doubt that this is a wise change. We must certainly abolish many of our old weights and measures, for the very good reason that a seer, for example, is not the same weight throughout India. And we had much better adopt a planned system rather than the unplanned system of yards, pounds, acres, and so on still current in the USA and England. Such a change is not very serious for ordinary people. It is difficult for managers of factories. But it will cause far less trouble now than it would have done if postponed for another twenty years when our industries will be more developed.

I dare say some people are asking 'why copy other nations, why not devise our own Indian system?' The answer to them is simple. The metric system was not invented in India, but it is the natural development of ideas which were invented in India. Once you learn to think in powers of ten you will naturally want a measure which is a thousand times the measure used in buying cloth or measuring a house, namely, the metre, and another which is a thousandth part of it. And it is reasonable to have simple connections between measures of length, area, volume and weight. But why think in tens? Some traditional measure systems, both

Indian and European, are arranged so that one unit is two, four, eight, or sixteen times the unit of which it is a multiple. The answer is that India has imposed the decimal system of arithmetic on the world and must take the consequences. Until seven hundred years or so ago we often used the scale of sixty in Europe. But as early as the Yajurveda, India had words for powers of ten up to at least a hundred million, and in classical Sanskrit these go up to the mahaksauhini, which is twenty three tens multiplied together. This is in fact quite a useful number in modern science. A gram of hydrogen contains just over six mahaksauhini of atoms. The ancient Greeks, on the other hand, had no names for powers of ten above ten thousand.

India imposed the decimal system of arithmetic on the world after inventing the symbol for zero which made it possible to represent any number with ten symbols. No doubt the inventors of this system were helped by the fact that in Devanagari and related scripts the meaning of a symbol may depend on its position in the word. The Romans had the same idea. For example in their system I meant one, and V five, while VI meant five plus one, or six and IV five minus one, or four. But this proved much less fruitful than the Indian idea that I may mean

one, ten, a hundred or even a mahaksauhini according to its position.

Aryabhata's System

The great Aryabhata invented a system in which the consonants represented the numbers from 1 to 25, and the multiples of ten from 30 to 100, while the vowels, including of course the cerebral R, and diphthongs, gave powers of a hundred. Thus *ga* means three, *gi* three hundred, and so on, up to *gau* which signifies three multiplied by ten to the power of sixteen. This system sufficed for all the numbers which an astronomer needed fourteen centuries ago and could still be useful. For example, the speed of light is very nearly *ge* centimetres per second. However modern astronomers need numbers ever larger than *hau* which was Aryabhata's largest.

Aryabhata is perhaps born again as my former colleague Professor C. W. Allen, of University College, London, who has invented the convenient word *dex*, meaning decimal exponent, for a ratio expressed as a power of ten. For example, the ratio of the distance which a flash of light traverses in a second to a metre is about eight and a half dex. For this distance is three hundred million metres.

Dex and the World

When we look at the world from this point of view, the interval between a human height and the diameter of an atom is about ten dex, and another four must be added to get down to the diameter of an atomic nucleus. The interval between a human height and the largest distance yet measured with anything approaching accuracy is twenty four and a half dex. So man is one of the smaller features of the universe. The whole range of measurement, whether of distance or time, is about forty dex, or a little less. One might think that the range of masses would be a

hundred and twenty dex. And so it would be if it were not for the fact that the larger the volume we study the less is the density of matter in it. Atomic nuclei are very dense, but even in the heaviest substances they only occupy a tiny fraction of the whole space. Stars, such as the earth or the sun, are moderately dense, but again the distances between them are enormous. So the range from the lightest particle yet weighed, namely, an electron, and all the matter whose existence is known, is about eighty dex. These figures give us the present range of science. Of course, it may be extended in future. If, as is not impossible, the human mind consists of finer sorts of matter than have yet been investigated by physicists, which was the teaching of the Sankhya and other ancient Indian philosophies, the scale may be extended downwards.

Learning Science

One minor advantage of the metric system is that it will make it easier for Indians to learn science. In the first place the metric system is always used in scientific work. And secondly the time wasted in learning about piculs, furlongs, and the like can be spent in learning how to deal with decimals, which are needed in all scientific work.

We still cling to old-fashioned measures of time. And I think this is inevitable for some generations. The metre is defined as the distance between two marks on a bar of metal in Paris. You cannot keep a standard piece of time one minute long. The day is not a good enough standard. It certainly varies in length, and is lengthening at present. Some physicists hope to replace the earth as a clock based on atomic vibrations. There is a real difficulty here, for people will certainly continue to use the day as a unit, even though its length is increasing. I think, however, that thirty years or so hence we shall be

*Reproduced with permission from the 'Hindu', Madras.

able to make proposals for a simpler and more scientific system of measuring time.

However, that may be, the adoption of the metric system is not only a step in the emancipation of India, it is a step in the conquest of the world by the idea of thinking in powers of ten, which originated in India. This is perhaps the only kind of conquest worth making. I hope that cricket and football in India will survive when the British dominion in India shall have long ceased to

exist, and when the sources which it once yielded of wealth and power are lost to remembrance'. The quotation by the way, is from Warren Hastings, who may have been a cruel ruler, but was not such a fool as to ignore the lesson of history that empires are more ephemeral than ideas. So with the adoption of the metric system in India the ideas of Aryabhata, after conquering Europe, are returning in triumph to their native land.

Abbreviations For Engineering Units

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THE Standards of Weights and Measures Act, 1956, lays down a period of 10 years for the complete change-over to the metric system in all spheres of activities. During the transition period we are slowly changing over to the metric system; but it appears that enough attention is not being given to the correct and uniform usage of the abbreviations. It is not very uncommon to see abbreviation of kilometre as "Km" instead of "km" and of millimetre as "MM" in place of "mm". This article describes the abbreviations for metric engineering units based on international recommendations by ISO (International Standardization Organisation) and IEC (International Electrotechnical Commission) for guidance.*

*For inter-relationship amongst various metric units and comprehensive conversion tables refer *Handbook for Building Engineers in Metric System*—under preparation—compiled and edited by J. K. Varshneya—to be published by National Buildings Organisation, 11-A, Janpath, New Delhi.

TABLE-1

Abbreviations for Prefixes of Sub-multiples and Multiples of Metric Units

Prefix	Numerical value	Abbreviation
pico	10^{-12}	p
nano	10^{-9}	n
micro	10^{-6}	μ
milli	10^{-3}	m
centi	10^{-2}	c
deci	10^{-1}	d
deca	10	dk
hecto	10^2	h
kilo	10^3	k
mega	10^6	M
giga	10^9	G
tera	10^{12}	T

ABBREVIATIONS FOR ENGINEERING UNITS

TABLE 2

Abbreviations for Metric Engineering Units

(1) Length		
millimetre	.. .. .	mm
centimetre	.. .. .	cm
metre	.. .. .	m
kilometre	.. .. .	km
10^{-6} m or micron	.. .. .	μ m or μ
nautical mile (international)	.. .. .	(n mile)
(2) Area		
square millimetre	.. .. .	mm ²
square centimetre	.. .. .	cm ²
square metre	.. .. .	m ²
hectare	.. .. .	ha
square kilometre	.. .. .	km ²
(3) Volume		
cubic millimetre	.. .. .	mm ³
cubic centimetre	.. .. .	cm ³
cubic metre	.. .. .	m ³
(4) Capacity		
millilitre	.. .. .	ml
litre	.. .. .	l
kilolitre	.. .. .	kl
(5) Time		
second	.. .. .	s
minute	.. .. .	min
hour	.. .. .	h
day	.. .. .	d
year	.. .. .	a
(6) Velocity		
(a) Velocity Rotation		
radian per second	.. .. .	rad/s
degree per second	.. .. .	°/s
revolution per minute	.. .. .	rpm
revolution per second	.. .. .	rps
(b) Linear Velocity		
metre per second	.. .. .	m/s
kilometre per hour	.. .. .	km/h
nautical mile (international) per hour or international knot	.. .. .	kn
(c) Angular Velocity		
reciprocal second	.. .. .	s ⁻¹
(7) Acceleration		
(a) Angular acceleration		
reciprocal second squared	.. .. .	s ⁻²
(b) Linear Acceleration		
Gal—1 gal = 1 cm/s ²	.. .. .	cm/s ²
metre per second per second	.. .. .	m/s ²
(8) Mass		
microgram	.. .. .	μ g
milligram	.. .. .	mg
gram	.. .. .	g
kilogram	.. .. .	kg
quintal	.. .. .	q
tonne	.. .. .	t
carat	.. .. .	c
(9) Density		
(a) Linear Density		
kilogram per metre	.. .. .	kg/m
(b) Density (Mass/Volume)		
gram per cubic centimetre	.. .. .	g/cm ³
gram per millilitre	.. .. .	g/ml
kilogram per cubic metre	.. .. .	kg./m ³
(10) Moment of Inertia		
(a) Dynamic		
kilogram metre squared	.. .. .	kg. m ²
(b) Geometrical		
centimetre ⁴	.. .. .	m ⁴
metre ⁴	.. .. .	m ⁴
(11) Section Modulus		
centimetre cubed	.. .. .	cm ³
metre cubed	.. .. .	m ³
(12) Bending Moment		
kilogram force metre	.. .. .	kg f m
kilogram force centimetre	.. .. .	kg f cm
(13) Momentum		
kilogram metre per second	.. .. .	kg. m/s
(14) Moment of Momentum		
kilogram metre squared per second	.. .. .	kg. m ² /s
(15) Stress and Pressure		
kilogram force per square metre	.. .. .	kg f/m ²
Newton per square metre	.. .. .	N/m ²
kilogram force per square centimetre	.. .. .	kg f/cm ²
kilogram force per square millimetre	.. .. .	kg f/mm ²
tonne per force square metre	.. .. .	t/m ²
(16) Work and Energy		
Joule	.. .. .	J
kilowatt hour	.. .. .	kwh
kilogram force metre	.. .. .	kg f m

(17) Power

Watt	W
Kilowatt	KW
kilogram force metre per second	kgfm/s

(18) Fuel Consumption (Volume/Length) of Automobiles

litre per kilometre	l/km
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(19) Fuel Consumption (Length/Volume) of Automobiles

kilometre per litre	km/l
-----------------------------	------

(20) Temperature

degree Centigrade (Scale)	C
degree Centigrade (Interval)	deg C

(21) Quantity of heat

calorie	cal
kilocalorie	kcal

(22) Calorific Value

Joule per gram	J/g
calorie per gram	cal/g

(23) Heat Flow Rate

calorie per second	cal/s
kilocalorie per hour	kcal/h

(24) Density of Heat Flow Rate

calorie per square centimetre second	cal/cm ² s
kilocalorie per square metre hour	kcal/m ² h

(25) Thermal Conductivity

calorie per second centimetre degree C	cal/(s. cm. deg C)
kilocalorie per hour metre degree C	kcal/(h.m. deg C)

(26) Thermal Conductance

calorie per square centimetre second degree C	cal/cm ² s deg C
kilocalorie per square metre hour degree C	kcal/m ² h deg C

(27) Specific Heat

joule per gram degree C	J/g deg C
calorie per gram degree C	cal/g deg C

(28) Luminous flux

lumen	lm
---------------	----

(29) Illumination

lux	lx
phot	phot

(30) Brightness

Lambert	L
stilb	sb

(31) Intensity of a Luminous Source

Candela	cd
-----------------	----

(32) Luminous Efficiency

lumen per watt	lm/W
------------------------	------

(33) Sound Power Level

decibel	db
-----------------	----

(34) Sound Pressure Level

decibel	db
-----------------	----

TABLE 3

Symbols and Abbreviations for Practical Electrical Quantities and Units

Quantity	Symbol	Practical Unit	Abbreviation of Practical Unit
Electromotive force	E	volt	V
Resistance	R	ohm	Ω
Current	I	ampere	A
Quantity of Electricity	Q	coulomb	C
Capacitance	C	farad	F
Inductance	L	henry	H
Energy	W	joule	J
Power	P	watt	W

Note :

- (1) Abbreviations should be written without full stop e.g. for centimetre write cm and not cm.
- (2) Do not add 's' after abbreviation to signify plural number; e.g. for 10 kilograms, write 10 kg and not 10 kgs.

News & Views

Recent Notifications

Amendment of Indian Power Alcohol Rules, 1950.
No. S. O. 2693, dated 7th November 1960.

In pursuance of the provisions contained in Rule 9 of the Indian Power, Alcohol Rules, 1950, the Central Government hereby makes the following amendments in the Notification of the Government of India in the Ministry of Commerce and Industry No. SRO 1601 dated 17th September, 1952, namely:—

In the said Notification,—

- (1) in paragraph 1, for the second sentence, the following sentence shall be substituted, namely:—

“The rate of such handling charges shall be 10 nP. (ten naye paise only) per litre until further orders.”

- (2) for the words, figures and brackets “As. -/14/- (annas fourteen only) per bulk gallon”, the figures, words and brackets 19 nP. (Naye Paise nineteen only) per litre” shall be substituted.

No. S.O. 689, dated 21st March 1961.

In pursuance of the provisions of Rule 9 of the Indian Power Alcohol Rules, 1950 the Central Government hereby makes the following further amendment in the notification of the Government of India in the Ministry of Commerce and Industry No. SRO 1601 dated the 17th September, 1952, namely:—

In the said Notification as amended in this Ministry's Notification No. S. O. 2693,

dated the 7th November, 1960, for the figures, words and brackets “19 nP. (Naye Paise nineteen only) per litre”, the words, figures and brackets “Rs. 19.25 (Rupees nineteen and Naye Paise twenty five only) per hectolitre (100 litres)” shall be substituted.

Introduction of Capacity Measures in U.P. & M.P.
No. 984, dated 28th April 1961.

In exercise of the powers conferred by subsection (3) of section 1 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby appoints the first day of May 1961 as the date on which the provisions of the said Act in so far as they relate to units of capacity shall come into force in the areas specified in column 2 of the Table below in the State specified in corresponding entry in column 1 thereof:—

TABLE

State	Areas in which Metric Units of Capacity are introduced
Uttar Pradesh	Municipal areas of Meerut, Agra, Lucknow, Bareilly, Moradabad, Varanasi, Kanpur, Jhansi, Allahabad and Gorakhpur.
Madhya Pradesh	Districts of Bhopal, Indore, Gwalior and Jabbalpur. Market areas notified under the Central Provinces and Berar Agricultural Produce Market Act, 1935 (XXIX of 1935), the Central Province and Berar Cotton Market Act, 1932 (IX of 1932), and the Madhya Bharat Agricultural Produce Markets Act, 1952 (17 of 1952).

No. S. O. 985, dated 28th April 1961.

In exercise of the powers conferred by section 14 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby permits, in respect of the areas referred to in the Notification of the Government of India, in the Ministry of Commerce and Industry S. O. No. 984 dated the 28th April, 1961, the continuance of the use for a period of one year from the 1st day of May, 1961 of any unit of capacity which immediately before that date was in use in respect of the said areas.

No. S. O. 1219, dated 30th May 1961.

In exercise of the powers conferred by subsection (3) of section 1 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby appoints the 1st day of June, 1961 as the date on which the provisions of the said Act shall come into force in the whole of India except the States of Orissa and Bihar in respect of :—

- (a) undertakings engaged in the manufacture of alcohol in so far as they undertake the sale of alcohol, and
- (b) Departments of Government in so far as they undertake the levy of duties of excise on alcohol.

No. S.O. 1220, dated 30th May 1961.

In exercise of the powers conferred by section 14 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby permits, in respect of the undertakings and departments of Government referred to in the notification of the Government of India in the Ministry of Commerce and Industry, S. O. 1219, dated the 30th May 1961 the continuance of the use, for a period not exceeding one year from the 1st day of April 1961, of any weight or

measure which, immediately before that day, was in use in respect of the said undertakings or departments of Government.

No. S. O. 1221, dated 30th May 1961.

In exercise of the powers conferred by subsection (3) of section 1 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby appoints the 1st day of June, 1961 as the date on which the provisions of the said Act shall come into force in the State of Bihar in respect of :—

- (a) departments of Government in so far as they undertake the regulation and control of the import, transportation, manufacture, possession or sale of liquids consisting of or containing alcohol and the levy of excise duties on such liquids; and
- (b) undertakings engaged in the import, export, transportation, manufacture, possession or sale of such liquids.

No. S.O. 1222, dated 30th May 1961.

In exercise of the powers conferred by section 14 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby permits, in respect of the departments of Government and the undertakings referred to in the notification of the Government of India in the Ministry of Commerce and Industry S.O. 1221, dated 30th May 1961, the continuance of the use, for a period not exceeding one year from the 1st day of June 1961, of any weight or measure which, immediately before that day, was in use in respect of the said undertakings and the departments of Government.

No. S.O. 1223, dated 30th May 1961.

In exercise of the powers conferred by subsection (3) of section 1 of the Standards of Weights and Measures Act, 1956 (89 of

1956), the Central Government hereby appoints the first day of June, 1961 as the date on which the provisions of the said Act shall come into force in the State of Orissa in respect of :—

- (a) undertakings engaged in the manufacture or sale of alcohol, and
- (b) departments of Government in so far as they undertake the levy of duties of excise on alcohol.

S.O. 1224, dated 30th May 1961.

In exercise of the powers conferred by section 14 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby permits, in respect of the undertakings and the departments of Government referred to in the notification of the Government of India in the Ministry of Commerce and Industry S.O. 1223 dated the 30th May 1961, the continuance of the use, for a period not exceeding one year from the first day of June, 1961, of any weight or measure which, immediately before that day, was in use in respect of the said undertakings or the departments of Government.

Petroleum Industry

No. S. O. 471, dated 25th February 1961.

In exercise of the powers conferred by section 14 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby makes the following amendment in the Notification of the Government of India in the Ministry of Commerce and Industry No. S. O. 479, dated the 18th February 1960 relating to the permission of the continuance of the use of any weight or measure which, immediately before the 1st March, 1960 as was in use in respect of crude petroleum and petroleum products, namely :—

In the said Notification, for the words “a

period of one year”, the words, “for a period of two years” shall be substituted.

(The original notification No. S. O. 479 dated 18th February 1960 appeared in May 1960 issue of *Metric Measures*)

Railways Adopt Metric Paper Sizes

The Railway Board has informed all the General Managers of the Indian Railways that the sizes of publications printed and used by the Railways would now be changed over to the metric paper sizes, as shown below :—

- (1) A-4 (210×297 mm)
- (2) A-5 (148×210 mm)
- (3) A-6 (105×148 mm)

The Railway Board has also instructed that the change over of the publications into metric sizes should be done as early as possible and in any case not later than January 1963.

So far as time-tables are concerned, it is necessary to effect the change-over in all the Railways at the same time so as to produce a uniform time-table. It has, therefore, been suggested that the October 1962 issue should be printed in size A-5 (148×210 m).

Regarding other publications, the change-over would be so programmed that the stock of existing sizes of paper would be utilized without wastage. The existing sizes of publications which are to be changed to A-4, A-5 and A-6 are as follows :

- A-4 .. Crown Folio, Royal Quarto, Foolscap Folio, Demy Quarto, Imperial Quarto and similar sizes.
- A-5 .. Crown Quarto, Royal Octavo, Foolscap Quarto, Demy Octavo, Imperial Octavo and similar sizes.
- A-6 .. Crown Octavo, Royal 16 mo, Foolscap Octavo, Demy 16 mo, Imperial 16 mo and similar sizes.

It is expected that other Central and State Departments would also follow the Railways.

Packages for Lac and Lac Products

It is understood that the Indian Lac Cess Committee has suggested the following metric sizes for packing shellac, seedlac etc., for internal transactions:—

Shellac, Sticklac and Buttonlac –50 kg.
Seedlac, Kirilac, Refuselac etc. –75 kg.

So far as export is concerned, the present 164 pounds pack equivalent to 74.40 kilogram would continue for the time being.

Weights and Measures in Sudan

The Sudan had a weights and measures system based upon the Egyptian system. Separate system existed nearly for every class of trade. In order to rationalise these various systems, the Government in 1955, passed a Weights and Measures Ordinance which sought to replace the existing systems by the metric system. Although many Government Departments and private traders have adopted the metric system, the traditional system is to remain permissive for a certain period and will be replaced by the new system gradually.

In 1957, certain traditional measures such as Rotl and Oke were declared illegal and were replaced by litres and kilograms respectively. The Government also announced that as from 1 January 1958, the old heaped measure of capacity (dry) would become illegal and would be replaced by cylindrical measures. The Standards Section of the Ministry of Commerce Industries and Supply, gives every encouragement and assistance to traders and all concerned to adopt the metric system.

Redetermination of Half-Life of Carbon 14

A more accurate value for the half-life of carbon 14—important in geological and archeological dating—has recently been obtained by the National Bureau of Standards, USA. The new value is 5,760

years with an overall probable error of 1 per cent, and is about 4 per cent greater than the previously adopted value of 5,568 years.

The redetermined value is not inconsistent with the value of $5,900 \pm 250$ years obtained at the NBS in 1953. The value of 5,568 years that has been in use was somewhat arbitrarily chosen. Because of the wide range in measured values of the half-life of carbon 14—from 4,700 to 7,200 years—the above weighted average of three selected values determined by gas counting and by mass spectrometric analysis was tentatively adopted for the purpose of radiocarbon dating of archeological samples. The present measurements have led to the conclusion that the spread in the values obtained previously may have arisen almost entirely from absorption effects.

In performing the redetermination, the research workers quantitatively diluted high specific activity carbon dioxide for counting in compensated internal gas counters in the Geiger and proportional regions. Mass spectrometric analyses of parts of the undiluted gas sample were made to determine the isotopic abundance of carbon 14, which was found to be approximately 44 atoms per cent. Intercomparative measurements of the isotopic abundance were also carried out with the United Kingdom Atomic Energy Authority.

(From *NBS Technical News Bulletin*, February 1961)

International Exhibition and Congress on Measurement Techniques

An international exhibition devoted to measurement, control, regulation and automation was held in Paris from 9 May to 17 May 1961. It was organised by the Mesucora Association (which groups the various professional bodies relating to the sectors concerned.) and exhibited instruments from all the important countries in the world. It

is understood that some 700 firms displayed the latest theoretical and experimental apparatus and equipment, methods and materials for measurement, control regulation and automation together with their industrial applications.

Equipment exhibited included that required for measurement and telemeasurement of weights, masses, pressures, work, time energy, electrical and optical properties, etc.

Simultaneously, an International Congress was arranged with the collaboration of the scientific associations concerned. The general theme of the Congress was 'Recent advances in the field of measurement, Control and Automatic Regulation obtained by the interaction of mechanical, electrical, electronic and nuclear techniques'.

Among the subjects for the International Congress were new factors in measurement instrumentation, the application of new measuring procedures, the measurement

of the physical properties of materials, quality control in industrial production, the recording and exploiting of measurement data, servo systems and their component element, industrial applications of automation and measurement in the field of nuclear energy.

Use of Metric Steel Sections

It is understood that the steel mills in India have started rolling of steel in metric sections. Inch sections have now been largely replaced by corresponding metric sections. Consumers of steel sections have been advised that all future planning must be based on metric sections as far as possible. Even projects relating to the expansion of existing undertakings during the Third Five Year Plan, would base their expansion programmes on metric sections. If this is not done the project authorities will find themselves in difficulty as inch sections may not be easily available in the quantity required.

CORRECTION

On pages 30 and 31 of March 1961 issue under "News & Views—Working Standard Length Measures" the following corrections may be made:—

Item (12)—the words "with slight taper" may be deleted

Item (14)—the words "right through, on the under side" may be deleted.

CORRIGENDUM

In regard to the list of Controllers appearing on page 31 of January issue of Metric Measures, the following corrections may be made:—

(8) MADRAS

Shri S. A. Sundrarajan,
Controller of Weights and Measures,
19-A, Woods Road, Mount Road,
Madras-2

(10) MYSORE

Shri Muhammad Sami Uddin, I.A.S.,
Joint Secretary to Government, Food & Civil Supplies Dept.
& Controller of Weights and Measures,
Uttar Pradesh, Lucknow.

Standards News

(Indian Standards which have a particular bearing on the change-over to the metric system are indicated here. Copies would be available from the Indian Standards Institution, Manak Bhavan, 9, Mathura Road, New Delhi or their branch offices at Bombay, Calcutta and Madras)

Sixth Indian Standards Convention

The Sixth Indian Standards Convention will be held at Kanpur from 25-31 December 1961.

The following nine technical Sessions will be held :—

- S-1 Productivity in Building Design and Construction.
- S-2 Review of Indian Experience with Certification Marking
- S-3 Packaging
- S-4 Company Standardisation Practices.
- S-5 Introduction of Metric System in Engineering Industries.
- S-6 Adoption of Universal Count System in Textiles.
- S-7 Housing and Preservation of Documents.
- S-8 Safe Use of Electricity in the Home.
- S-9 Non-Destructive Testing Metals.

The three main Sessions of direct interest from the point of view of the adoption of the metric system are S-3 Packaging, S-5 Introduction of Metric System in Engineering Industries, and S-6 Adoption of Universal Count System in Textiles. These are further sub-divided as follows :—

S-3 Packaging

The following topics will illustrate the scope of the Sessions :

- (i) Standardisation of packages and packaging materials, such as containers, boxes, crates, bags, etc.
- (ii) Standardisation of packaging devices and equipment, such as fastenings and closures, productive wrappings, etc.
- (iii) Rationalization of packages and packaging materials with a view to conserving the raw materials and promoting their economic use.
- (iv) Codes of practices for packaging to ensure safety in transport and handling and protection against corrosion, rot and fire hazard of the materials packed.
- (v) Methods for the evaluation of packages and packaging materials for the purposes they are intended.
- (vi) Marking and labelling, handling instructions, warning against dangerous contents, etc.

S-5 Introduction of Metric System in Engineering Industries

Problems which may arise in changing designs and drawings and adapting existing machinery to produce in metric terms, with suggested solutions for such problems. The need for immediate planning

and programming to carry out the change-over in design and manufacture.

The following topics will illustrate the scope :

- (i) Procedure to be followed in changing drawings.
- (ii) Review of Indian Standards in metric system published or under preparations.
- (iii) Utilization of existing machinery to produce in metric terms.
- (iv) Requirements of metric gauges and instruments, their production and supply.
- (v) Organizational planning and programming for the changeover in production.
- (vi) Training of workers at various levels to think and work in metric terms.
- (vii) Review of progress made by individual firms.

S-6 Adoption of Universal Count System in Textiles.

The following topics are suggested to illustrate the scope of the Session :

- (i) Need for and desirability of adopting a universal count system.
- (ii) Introduction of Universal count system in (a) Cotton, (b) Wool, (c) Silk, (d) jute, (e) Man-made fibre, and (f) other sectors of textile industry.
- (iii) Problems that may be created by the changeover to universal count system and their solution.
- (iv) How would the adoption of universal count system affect textile testing procedures.

Draft Indian Standards Specifications for Nickel Silver Sheet and Strip for General Purposes and Copper Tubes for General Purposes (Doc: SMDC 11/232: DOC:SMDC 11/209)

The Indian Standards Institution has prepared draft Specifications for Nickel

Silver Sheet and Strip for General Purposes, Doc: SMDC 11(232) and Copper Tubes for General Purposes, Doc: SMDC 11(209).

The nickel silvers are a family of alloys composed of copper, nickel and zinc. A major property of these alloys is their colour which ranges from a soft ivory to silvery white, depending on the nickel content. These alloys have been used for centuries under a variety of names, the most common being German silver. However, they are known as nickel silvers in modern commercial practice. With the exception of cupro-nickels, these are the only alloys of copper that are white.

The draft standard for copper tubes for general purposes covers two grades of copper used for manufacturing copper tubes required for general purposes. For each application, the user will have to select the composition grade required and specify the outside diameter, thickness of wall and length of tubes.

Draft Indian Standards Specification for Dial Gauges (Doc: EDC 43 (499):

The Indian Standards Institution has prepared a draft specification for dial gauges.

The draft standard deals with commonly used dial gauges of unit of measurement 0.01 mm and also gives information on high accuracy dial gauges required in the inspection of machine tools.

Indian Standard Specifications for Metric Scales for use with Drafting Machines (IS: 1482—1960)

The latest edition to the series of Indian Standard Specifications on metric scales being prepared by ISI in connection with the changeover to the metric system is IS: 1482—1960 Specification for Metric Scales for Use with Drafting Machines. Other standards published in the series

cover metric scales for general purposes and metric scales for architectural purposes.

The present specification covers the requirements for metric scales of 50 cm and 30 cm lengths with four ratios, namely, 1 : 1, 1 : 2.5, 1 : 5 and 1 : 20, for use with drafting machines. A 50 cm scales and a 30 cm scales constitute a set. The specification does not cover the design and dimensions of the device meant for fixing the Scales to the drafting machines.

Price: Rs. 2-00

Draft Indian Standard Specification for Wire Nails (Docs: BDC 15(566) and (567))

The Indian Standards Institution has prepared draft revisions of two Indian Standards which were published in 1956, namely, IS : 723—1956 Mild Steel Wire Nails and IS : 725—1956 Copper Wire Nails. These drafts are contained in documents BDC 15(566) and BDC 15(567), respectively.

Originally, these Indian Standards specified the shank sizes of nails in Standard Wire Gauge, lengths in inches and packing requirements in lbs. With a view, however, to helping the manufacturers in smooth changeover to the metric system, the various dimensions of nails and packing requirements

have now been specified in metric units. Advantage has also been taken of this opportunity to incorporate certain modifications in respect of tolerance on head diameters of copper wirenails.

Draft Indian Standards Specification for Wood Screws

The Indian Standards Institution has prepared a draft revision of the Indian Standard Specification for Wood Screws which was first published in 1953.

Originally the shank sizes of wood screws were specified in terms of Screw Gauges, lengths in inches and packing requirement in gross. The revision of this standard has been prepared with the object of helping the manufacturer in the smooth changeover to metric system. It now specifies the sizes of wood screws in millimetres and packing requirement by 200 number and 100 number depending upon the length of screws to be packed. The Screw Gauge Numbers have been replaced by Screw Designation numbers. Opportunity has also been taken to simplify the range of mild steel specified in the standard and in the revised draft reference has been made to the Indian Standard Specification for Mild Steel Wire for Manufacture of Wood Screws which has already been finalized.

Metric System and Clothing Trade

(Continued from page 14)

(such as the length of a shoe or glove). In reality, size fitting does not mean a single length, but a set of closely related length. It, therefore, does not seem possible to adopt any other system in this particular case. What is

essential is that a given size fitting should correspond to a set of invariable measurements, always expressed in centimetres, that is to say, in a unit of the decimal metric system.

Licensed Manufacturers, Dealers and Repairers of Weights and Measures (14)

Metric Measures has been publishing a series of lists of manufacturers, dealers and repairers of weights and measures weighing and measuring instruments licensed by the Governments in the various States and Union Territories under their Weights and Measures (Enforcement) Acts in their respective jurisdictions. This is the fourteenth list. The first list appeared in the March 1959 issue.

Progressively, steps are being taken for licensing manufacturers, dealers and repairers in all States and further lists of licensees would be published in *Metric Measures* as this work progresses.

The number in brackets against the name the State or Union Territory indicates the particular instalment number of the State or Union Territory. The issues of *Metric Measures* in which previous lists appear are also shown suitably.

An analysis of the licensees, including the present list, shows that the total number of licensees in 14 States and 3 Union Territories is 747 manufacturers, 2,606 dealers, and 575 repairers. The details of published information are as follows :

Sl. No.	State/Union Territory	Licensees		
		Manu- fac- turers	Dealers	Re- pairers
1	Andhra Pradesh ..	84	151	68
2	Assam	10	17	7
3	Bihar	20	69	34
4	Delhi	22	76	19
5	Gujarat	64	315	80
6	Himachal Pradesh ..	1	7	1
7	Kerala	13	248	28
8	Madhya Pradesh ..	99	310	4
9	Madras	79	210	37
10	Maharashtra ..	60	163	106
11	Mysore	75	399	41
12	Orissa	14	17	1
13	Punjab	32	128	25
14	Rajasthan	16	69	18
15	Tripura	1	5	0
16	Uttar Pradesh ..	92	222	51
17	West Bengal ..	65	200	55
		747	2,606	575

KERALA (5)

In the November 1959, March and November 1960 and January, 1961 issues of *Metric Measures* lists of licensed manufacturers, dealers and repairers of weights and Measures in Kerala State were published. The following is a list of manufacturers, dealers and repairers subsequently licensed by the Government of Kerala under the Kerala Weights and Measures (Enforcement) Act, 1958.

Manufacturers

Sl. No.	Name and address of Manufacturer	Details of articles manufactured.
(1)	Jayaraj Foundry & Engineering Works, Maller Road, Tellicherry.	Cast Iron Weights.
(2)	Jupitor Engineers, Metind Nagar, Shoranur	Weights.
(3)	Shanker paint & oil Mills (P) Ltd., 4, Cullen Road, Alleppey	Weights.
(4)	Narayana Engineering Industries (Private) Ltd., Shoranur	Cast Iron Weights.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	K.K. Abdul Kadir, Merchant, Municipal Market, Ernakulam	Weights.
(2)	M. Aboobacker, Hardware Merchant, Main Road, Tellicherry.	Weights, Measures, Weighing & Measuring Instruments.
(3)	P. Aboobacker Sons, Hardware Merchants, Camp Bazaar, Cannanore.	Weights, Measures, & Weighing Instruments.
(4)	Associated Traders Private Ltd., 4, Cullen Road, Alleppey	Weights, Measures, Weighing & Measuring Instruments.
(5)	A. P. Balan, Chirakkara, Tellicherry	Weights & Measures.
(6)	A. Ganapathy Nayak, General Merchant, Court Road, Kasargod.	Weights & Measures.
(7)	Haji P. K. Kassim, Hardware Merchant, Robinson Road, Calicut.	Weights.
(8)	Haridas Purushothaman & Co., Merchants, 4/6 Bazaar Road, Mattancherry, Cochin.	Weighing Instruments.
(9)	A. Janardhana Kini, General Merchant, Kizhakkenada, Haripad P.O., Alleppey Dt.	Weights & Measures.
(10)	Joseph Rodrigues & Sons, Metal Merchants, Kasargod	Weights, Measures & Measuring Instruments.
(11)	Kerala Traders, Main Road, Near Police Station, Tellicherry	Weights, Measures & Weighing Instruments.
(12)	Krishna Genreral Stores, Hardware Merchants, Tirur	Weights.
(13)	N. Krishna Kini, Logams Road, Tellicherry	Weights, Measures, Weighing & Measuring Instruments.
(14)	C. Kunhamoo & Co., Main Road, Tellicherry	Weights, Measures & Weighing Instruments.
(15)	P. Meera Sahib, Rasheedia Stores, Nedumangaud	Weights & Measures.
(16)	Mookan Devassy Ouseph & Sons, Burmah Shell "A" Agents Mattancherry, Cochin-2.	Weights, Measures, Weighing & Measuring Instruments.
(17)	C.V. Murugesan, Mahalakshmi G.S. Tools Stores, Mullackal, Alleppey.	Weights & Measures.

Dealers (Contd.)

Serial No.	Name and Address of Dealer	Details of Articles Sold
(18)	G.S. Pai & Co., Jewellers, Broadway Ernakulam	Bullion weights.
(19)	C.J. Palu & Bros., Chirankandath, High Road, Trichur	Weights, Measures, Weighing & Measuring Instruments.
(20)	K. Ramchandra Krishna Pai & Bros., Hardware & General Merchants, Kottacherry, Kanhangaud.	Weights & Measures.
(21)	N. Ramaswamy Achari, Jyothi Jewellery Mart, Broadway, Ernakulam-1.	Bullion Weights.
(22)	A. Shihabudeen Kunju, Hardware Merchant, Akbar Stores, Main Road, Kayamkulam.	Weights & Measures.
(23)	T.K. Soopy & K. Moosa, Stationery Merchants, Villiappally, Kozhikode Dist.	Weights.
(24)	K.N. Sreedharan Nair, T.C. 23/749, Perunthanni, Trivandrum-8.	Weights & Measures.
(25)	H. Subraya Nayak, Proprietor, Ramnath Stores Hardware Merchants, Hosdrug P.O., Kanhangaud.	Weights & Measures.
(26)	Tholath Ipe Ittoop, Hardware Merchant, Ponnani, Palghat District.	Weights, Measures, Weighing & Measuring Instruments.
(27)	Varkey Yohannan & Bros, Merchants, Ittyappara, Ranni, Quilon Dist.	Weights, Measures, & Weighing & Measuring Instruments.
(28)	K.K. Varughese, Hardware Merchant, Mallappally West, Alleppey Dist.	Weights & Measures.
(29)	Vettoor Scales Servicing Co., M.L. Road, Kottayam	Weights, Measures & Weighing Instruments.

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	P. Antony, Balance Repairer, Thengana, Perumpanchi P.O. Changanacherry.	Platform Balances.
(2)	Avery Co. of India (P) Ltd., 110, Silk Street, Calicut.	Weighing Instruments and Weights.
(3)	Avery Co. of India (P) Ltd., 6/78, Kalvetty Road, Cochin-1	Weighing Instruments and Weights.
(4)	M.S. Damodaran, Manjimal House, Near Pandarachira, Palluruthy P.O. Ernakulam Dt.	Weighing Instruments.
(5)	T. P. Gopalan, Metal Works, Prabha Sadanam Paingana Mundakayam.	Weights & Weighing Instruments.
(6)	T.M. Hameed, Balance Repairer, Manglavu Parambil, Market, Changanacherry.	Weights, Measures, Weighing & Measuring Instruments.
(7)	P.K. Jalaludeen, Thattakattu Thekkethil Veedu, Padanayarkulangara North, Karunagappally.	Weights, Measures, Weighing & Measuring Instruments.
(8)	C.P. Janardhanan, Kallil Veedu, Moondalam Moodu, Quilon.	Weights, Measures, Weighing & Measuring Instruments.
(9)	G. Raman Achari, Kuititthekkethil, Padanayarkulangara North, Karunagappally.	Weights, Measures, Weighing & Measuring Instruments.
(10)	E. Ramon Menon, M.A., (Retd., Professor in physics, Maharajah's College), Eladath House, 70 ft. Road, Ernakulam.	Weighing Instruments.
(11)	Scales & Services, "Sreevilas", New Road Calicut-6	Weighing Scales.
(12)	Scales & Services, Catholic Syrian Bank Buildings, Market Road, Cochin-2.	Weighing Instruments.
(13)	K.P. Varughese, Mill View Estate, Nedumkayom, Punallur	Weights, Measures, Weighing & Measuring Instruments.
(14)	N. Vasudevan, Kizhakkekalluvila Veedu, Cherupoika, Karpumpuzha P.O. Kottarakara.	Weights, Measures, Weighing & Measuring Instruments.
(15)	Vetor Scales & Servicing Co., M. L. Road, Kottayam	Weights, Measures & Platform Balances.
(16)	William Goodacre & Sons Ltd., PB. No. 6, Alleppey	Weighing Instruments.

PUNJAB (10)

In the July and September 1959, March, May, July, September and November 1960 and March and May 1961 issues of *Metric Measures* lists of Manufacturers, dealers and repairers of Weights and Measures in Punjab State were published. The following is a list of manufacturers, dealers and repairers subsequently licensed by the Government of Punjab under the Punjab Weights and Measures (Enforcement) Act, 1958.

Manufacturers

Serial No.	Name and address of Manufacturer	Details of Articles Manufactured
(1)	R.K. Gupta Metal Works, Bahadurgarh	Cast iron Weights 100 g to 50 kg
(2)	Parkash Foundry Works & Iron Mills, G.T. Road, Phagwara	Cast Iron Weights 100 g to 50 kg
(3)	Raj Mechanical Industries, Madhopur, Ludhiana	Yard Measures.
(4)	Raj Industries, G.T. Road, Rajpura	Cast Iron Weights 100 g to 50 kg
(5)	Tulsi Ram Pyare Lal Jain, Guru Nanak Street, Patiala ..	Litre Measures 5 litre to 100 ml

Dealers

Serial No.	Name and address of Dealer	Details of Articles Sold
(1)	Arjan Dass Charanjit Lal, Raman, District Bhatinda ..	Weights, Measures, Weighing and Measuring Instruments.
(2)	Attar Singh Gurmukh Singh, G.T. Road, Ludhiana ..	Weights, Measures, Weighing and Measuring Instruments.
(3)	Balak Ram Milkhi Ram, Jaitu	Weights, Measures, Weighing and Measuring Instruments.
(4)	British India Chemical Works, Ambala Cantt. ..	Weights, Measures, Beam Scales and Measuring Instruments.
(5)	Hans Raj Mangat Rai, Faridkot	Weights, Measures, Weighing and Measuring Instruments.
(6)	Haryana Foundry Private Ltd., Rohtak	Cast Iron Weights 100 g to 50 kg and Brass weights 10g-50g.
(7)	Hoshier Singh Tara Chand, Bahadurgarh	Weights, Measures, Weighing and Measuring Instruments.
(8)	Jagat Singh & Sons, Ambala Cantt.	Measures.
(9)	Kabli Mal Najran Parshad, Grain Market, Ambala City	Weights, Measures, Weighing and Measuring Instruments.
(10)	Karnail Singh Saggu, Railway Road, Kokapura ..	Weights, Measures, Weighing and Measuring Instruments.
(11)	Kesho Ram Deokinandan, Bichla Bazar, Bhiwani ..	Weights, Measures, Weighing and Measuring Instruments.
(12)	Kirpa Ram Sohana Mal, Railway Road, Kaithal ..	Weights, Measures, Beam Scale and Measuring Instruments.
(13)	Madan Gopal Kashmiri Lal, Gidarbha	Weights, Measures and Beam Scales.
(14)	Mansa Ram Jagan Nath, Rampur Phul Mandi ..	Weights, Measures, Weighing and Measuring Instruments.

LICENSED MANUFACTURERS, DEALERS & REPAIRERS OF WEIGHTS & MEASURES (14)

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(15)	Mohan Lal Brij Lal, Mandi Dabwali	Weights, Measures, Weighing and Measuring Instruments.
(16)	Mool Chand Bahadur Chand, Iron Merchants, Taraori ..	Weights, Measures and Beam Scales.
(17)	Motu Ram Sadhu Ram, Iron Merchant, Bhiwani	Weights, Measures, Weighing and Measuring Instruments.
(18)	National Metal Works, Ambala Cantt.	Cast Iron Weights. 100 g to 50 kg Brass Weights. 10 g to 50 g.
(19)	Naurata Ram Mukandi Lal, Iron Merchants, Jakhal Mandi, Hissar.	Weights, Measures, Weighing and Measuring Instruments.
(20)	Puran Chand Langa & Brothers, Baijnath Pehrul Mal Mehar Chand Kulu.	Weights, Measures and Beam Scales.
(21)	Raja Ram Mithan Lal, Malout Mandi	Weights, Measures, Weighing and Measuring Instruments.
(22)	Ramji Dass Banarsi Dass, Bernala	Weights, Measures, Weighing and Measuring Instruments.
(23)	Sangat Singh Roshan Lal, Iron Merchants, Kapurthala ..	Weights, Measures, and Beam Scales.
(24)	Sansar Engineering Co., Aliwal Road, Batala	Cast Iron Weights. 100 g to 50 g.
(25)	Sham Brothers, 5196 Gali Alam Chand, Ambala City ..	Brass weights 10 g to 50 g.
(26)	Sh. Ram Parkash Sharma, Utensil Dealer, Batala ..	Weights, Measures, and Beam Scales.
(27)	Siri Ram Ram Partap Sirsa, Hissar	Weights, Measures, Weighing and Measuring Instruments.
(28)	Sis Ram Ram Niwas, Gohana Mandi	Weights, Measures, and Beam Scales.
(29)	Sukhoo Ram Hans Raj, Abohar	Weights, Measures, Weighing and Measuring Instruments.
(30)	Walati Ram Jharu Mal, Mandi Gobindgarh	Weights, Measures, Weighing and Measuring Instruments.

Repairers

Serial No.	Name and Address of Repairer	Details of Articles Repaired
(1)	Lachhman Dass, Islam Ganj, Ludhiana	Weights, Measures of length and capacity.
(2)	Marchu Ram Khajana Ram, Hata Beni Parshad, Kalka, Distt. Ambala.	Weights.
(3)	Sagan Lal Sethi, Mistri, Abohar	Weights, Measures of length and capacity.

TRIPURA (4)

In the March and November 1960, and March 1961 issues of *Metric Measures* lists of licensed dealers of Weights and Measures in the Union Territory of Tripura were published. The list of dealers appearing therein are obsolete as the validity of all

licenses issued during the year 1960-61 expired on 31-3-61. The following are the lists of Manufacturers, dealers and repairers licensed during the current financial year.

Manufacturer

Serial No.	Name and Address of Manufacturer	Details of Articles manufactured
(1)	Sri Was Dev, Prop. National Mechanical Works, Kashaari Patti, Agartala.	Weights and Capacity Measures,

Dealers

Serial No.	Name and Address of Dealer	Details of Articles Sold
(1)	Das Gupta & Sons, Mogra Road, Agartala	Weights, Measures, Weighing and Measuring Instruments.
(2)	Kamal Stores Supply, Sakuntala Road, Agartala	Weights.
(3)	Pareesh Ch. Kar & Co., Central Road, Agartala	Weights, Measures, Weighing and Measuring Instruments.
(4)	Parimal Aluminium Stores, Mogra Road, Agartala	Weights, Measures, Weighing and Measuring Instruments.
(5)	Tripura Central Marketing Cooperative Society Ltd., Mogra Road, Agartala.	Weights, Measures, Weighing and Measuring Instruments.

ADDENDUM

In the Vol. 3, November 1960 (No. 5) issue of *Metric Measures* on page 35 under Dealers of Maharashtra State, please add the following as:
item 163A,
Saran & Co., Liberty Building, Residency Rd., Sadar, Nagpur-1. Weights, Measures and Scales.

CORRECTION

In the Vol. 3, No. 6—November issue of *Metric Measures* under Maharashtra State, on page 31 :
For the item (49), Gourhar Soni etc., please read Gourkar & Sons, Wani, Dist. Yeotmal.

Conversion Table : Liquid seer to Litre
Conversion factor used:—1 L. Seer = .937 litres

L. Seer	Litres	Millilitres (to nearest ml)
1/64	—	15
1/32	—	29
1/16	—	59
1/8	—	117
1/4	—	234
1/2	—	469
		(to nearest 10 ml)
1	—	940
2	1	870
3	2	810
4	3	750
5	4	690
6	5	620
7	6	560
8	7	500
9	8	430
10	9	370
20	18	740
30	28	110
40	37	480
		(to nearest litre)
50	47	—
60	56	—
70	66	—
80	75	—
90	84	—
100	94	—

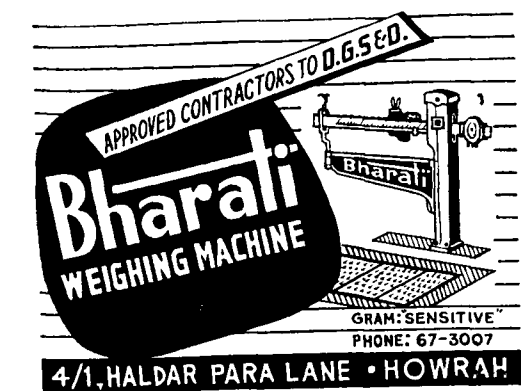
Conversion Table : Litre to Liquid Seer
Conversion factor : 1 litre = 1.067 liquid seer

Millilitres	L. Seer	Tolas (to nearest tola)
10	—	1
20	—	2
30	—	3
40	—	3
50	—	4
60	—	5
70	—	6
80	—	7
90	—	8
100	—	9

Millilitres	L. Seer	Tolas (to nearest tola)
200	—	17
300	—	26
400	—	34
500	—	43
600	—	51
700	—	60
800	—	68
900	—	77
1000	1	5

Litres	L. Seer	Tolas (to nearest 5 tola)
1	1	5
2	2	10
3	3	15
4	4	20
5	5	25
6	6	30
7	7	40
8	8	45
9	9	50
10	10	55

Litres	L. Seer	Tolas (to nearest 5 tola)
20	21	30
30	32	—
40	42	50
50	53	30
60	64	—
70	74	60
80	85	30
90	96	—
100	106	60





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metric measures

JOURNAL OF WEIGHTS AND MEASURES

THE PUBLICATIONS DIVISION

ABBREVIATIONS FOR METRIC UNITS

(1) DECIMAL MULTIPLES AND SUBMULTIPLES

Prefix	Value in Terms of Unit	Abbreviation
kilo ..	1,000	k
centi ..	0.01 (10 ⁻²)	c
milli ..	0.001 (10 ⁻³)	m
micro ..	0.000 001 (10 ⁻⁶)	μ

(2) WEIGHTS

Denomination	Value	Abbreviation
tonne ..	1,000 kg	t
quintal ..	100 kg	q
kilogram ..	1 kg	kg
gram ..	1 g	g
milligram ..	1 mg	mg
carat ..	200 mg	c

(3) CAPACITY

kilolitre ..	1 000 l	kl
litre ..	1 l	l
millilitre ..	1 ml	ml

(4) VOLUME ..

cubic metre	m ³	m ³ or cu m*
cubic centimetre	cm ³	cm ³ or cu m*
cubic millimetre	mm ³	mm ³ or cu mm*

(5) LENGTH

kilometre ..	1 000 m	km
metre ..	1 m	m
centimetre ..	1 cm	cm
millimetre ..	1 mm	mm
micron ..	1/1 000 mm or 10 ⁻³ mm	μ m

(6) AREA

square kilometre	1 000,000 m ²	km ² or sq km*
square metre	1 m ²	m ² or sq m*
square centimetre	1 cm ²	cm ² or sq cm*
square millimetre	1 mm ²	mm ² or sq mm*

(7) LAND MEASURE

are ..	100 m ²	a
hectare ..	100 a	ha
centiare ..	m ²	ca

*Both these abbreviations are current, but the first set should preferably be used. The former abbreviation is used more commonly internationally than the latter.

Rules for Abbreviations:

- (1) Do not make any change, such as addition of 's' to indicate plurality e.g. write 1 kg, 10 kg, 20 g, 5 g, 10 t, 20 ml, 27 l, 165 km, 2 mm, 100 cm³, 66 km²;
- (2) Do not capitalize the abbreviations. For example, do not write 1 Kg, 2Kg, 20 MM, 50 MM; the right way is to write 1 kg, 2 kg, 20 mm, 50 mm, etc.
- (3) Do not use any other abbreviations except those given above.

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metric measures

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STANDING METRIC COMMITTEE
MINISTRY OF COMMERCE AND INDUSTRY

Vol. 4 SEPTEMBER 1961 (BHADRA 1883) No. 5

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metric measures

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Clothes in Metric System

(Miss) SHAMA MAHAJAN

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New Delhi

METRIC length measures will be introduced all over India from 1 October 1961 with a transition period of one year. Length measures have already been compulsorily introduced in the textile industry so far as wholesale transactions by the mills are concerned. As a result many textile mills which have their own retail shops and show-rooms spread all over the country would like to change over to the sale of cloth by the metre as early as possible after October 1961, so that their complete sales organization would have changed over to one system of accounting.

Retail Purchases

The impact of this change-over would be felt by the general public late this year. It is, therefore, necessary that we should examine the metric requirements of cloth for various items of clothing. It is but natural that nobody would like to purchase more cloth than he has been buying so far. However, there are limitations to actual conversions and a certain amount of rounding off is necessary.

The simplest way is to round off the requirements to the nearest convenient 5 centimetres (cm). The metre rod with which the salesman would measure out cloth would also be marked only at every 5 cm except the first 10 cm which would be marked at

every centimetre. Rounding off to the nearest 5 cm would thus have the advantage of facilitating measurement of cloth.

Tables showing the normal length of cloth required for various types of apparel and the converted lengths are given at the end of this article.

There are certain items whose lengths cannot be rounded off according to the above general consideration. Sarrees, dhoties, ready-made wear etc. come under this category.

Sarees

Sarrees and dhoties are sold in predetermined lengths. In these cases the rounding off should be such that the lengths can be expressed in suitable easy-to-understand fractions of the metre. Sarrees are supposed to be sold usually by nominal lengths. Thus a 5-yard saree may measure even $4\frac{3}{4}$ or $5\frac{1}{4}$ yards though it would be normally sold as a 5-yard saree. It would appear that the best way of rounding off in this case would be the nearest $\frac{1}{4}$ metre. The industry would have to lay down what tolerance in length should be allowed on each nominal length of the saree.

Ready-to-Wear Clothes

In view of the possibility of the early change-over by well-established textile mills it is also likely that tailoring houses which

market ready-made clothes may follow suit early. In some of the faster selling wear like shirts, bush-shirts, manilas etc. the change-over would involve considerable adaptation. For example, the measurements of a shirt are related with a basic neck size. The industry would have to give due thought to the problem of rationalizing the neck sizes and the other related measurements. It is obvious that the present range of shirt sizes which increase in steps of $\frac{1}{2}$ inch cannot be converted to steps of 1.27 cm. A little thought would suggest that a 1 cm range would be desirable. Similar rationalization would be necessary for bush-shirts, manilas, trousers, etc. It should also be kept in mind that the range of measurements in which ready-to-wear clothes are made may vary from one firm to another. In this article only the normal ranges are covered. If sizes other than those covered in the table are produced, they could be converted in the same way as suggested for other similar products.

Children's Clothing

Children's clothing is the department where cloth requirements cannot be easily laid down. The variation of cloth requirements of growing children from month

to month and year and year as also from baby to baby and child to child are so variable that what is applicable to one child may not necessarily be good enough for another.

A simple rule could, however, be suggested: for every yard of cloth, purchase 90 centimetres. Remember that one metre has 100 centimetres in it. The actual conversion of one yard is about 91 $\frac{1}{2}$ cm but it will be difficult to buy that length of cloth; therefore 90 cm is suggested.

As every mother knows, the best way to get a good fit of ready-to-wear clothes for a child is to take it to the shop and try on the various sizes

Caution

The cloth requirements and other measurements given in the tables are those for an 'average' person. Ultimately it is the tailor who will have to be the judge. If he says that you have bought 5 cm less cloth than he requires, he may refuse to stitch your clothes and, what is worse, he may throw the blame for bad fitting on that small strip of 5 cm cloth. This article only suggests average requirements and the temperament of the tailor may necessitate a change in them!

TABLE 1
Cloth Requirements for Men's Apparel

Sl. No.	Item	Present requirements (yds)	Converted metres	Rounded metres
(1)	Shirt	3	2.74	2.75 or 2 $\frac{3}{4}$
(2)	Bush-shirt, manila, etc.	(i) 2 $\frac{1}{2}$ (36 in. width) (ii) 3 (29-31 in. width)	2.29 (91 cm width) 2.74 (74-76 cm width)	2.30 (90-91 cm width) 2.75 (74-75 cm width)
(3)	Trousers Cotton	3	2.74	2.75
(4)	Trousers Woollen	1 $\frac{1}{2}$ (double width)	1.37	1.40
(5)	Coat Cotton	3 $\frac{1}{2}$	3.43	3.45
(6)	Coat Woollen	1 $\frac{1}{2}$ (double width)	1.60	1.60
(7)	Suit Woollen	3 $\frac{1}{2}$ (double width)	2.97	3.00
(8)	Ordinary Pyjama	2 $\frac{1}{2}$ -3	2.29-2.74	2.30-2.75
(9)	Night Suit	5 $\frac{1}{2}$	5.03	5.00
(10)	Half 'Pant'	2	1.83	1.80
(11)	Dhotie	5	4.57	4.50 (nominal)

TABLE 2
Cloth Requirements for Ladies' Wear

Sl. No.	Items	Present Requirements (yds)	Converted metres	Rounded metres
(1)	Saree	5 5 $\frac{1}{2}$ 6 7 8 9	4.57 5.03 5.49 6.40 7.32 8.23	4.50 i.e. 4 $\frac{1}{2}$ 5.00 i.e. 5 5.50 i.e. 5 $\frac{1}{2}$ 6.50 i.e. 6 $\frac{1}{2}$ 7.25 i.e. 7 $\frac{1}{4}$ 8.25 i.e. 8 $\frac{1}{4}$
(2)	Blouse	1 (36 in. width) $\frac{3}{4}$ (45 in. width)	0.91 (91 cm) 0.69 (114 cm)	0.90 (90-91 cm) 0.70 (114-115 cm)
(3)	Salwar	3 $\frac{1}{2}$ (36 in. width) 3 (45 in. width)	3.20 (91 cm) 2.74 (114 cm)	3.20 (90-91 cm) 2.75 (114-115 cm)
(4)	Kameez	2 $\frac{1}{2}$ (36 in. width) 2 $\frac{1}{4}$ (45 in. width)	2.29 (91 cm) 2.06 (114 cm)	2.30 (90-91 cm) 2.05 (114-115 cm)
(5)	Petticoat	2 $\frac{1}{2}$ (36 in. width)	2.29 (91 cm)	2.30 (90-91 cm)
(6)	Ladies' Coat Full (Woollen)	2 $\frac{1}{2}$ -2 $\frac{3}{4}$ (double width)	2.06-2.29	2.05-2.30
(7)	Ladies' Coat Half (Woollen)	2 (double width)	1.83	1.85

TABLE 3
Ready Made Apparel

Sl. No.	Items	Present Sizes inches	Converted Sizes cm	Suggested Sizes cm
(1)	Shirts	Collar sizes 13 $\frac{1}{4}$ -17 ($\frac{1}{2}$ in. range)	34.3-43.2 (1.27 cm range)	34-43 (1 cm range)
(2)	Bushshirts, manilas, etc.	Chest sizes 32-44 (2 in. range)	81.3-111.8 (5.08 cm range)	80-110 (5 cm range)
(3)	Trousers	Length 38-46 (2 in. range) Waist 28-36 (1 in. range)	96.5-116.8 (5.08 cm range) 71.1-91.4 (2.54 cm range)	95-115 (5 cm range) 70-92 (2 cm range)

Metric Building Products : Part 1

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New Delhi

THE Standards of Weights and Measures Act, 1956, envisages a period of ten years for the complete change-over to the metric system in all spheres of activities. During the transition period the building industry is gradually adapting itself to the metric system. The Indian Standards Institution has formulated standard specifications for a number of building products and many of them are being manufactured according to the new standards.

During the transition period the building engineer is faced with many problems regarding the nominal dimensions of metric building products. What will be the nominal thickness of sheet glass for glazing? What will be the nominal diameter of cast iron or asbestos pipes? In what thickness and size plywood will be available? These are some of the questions he will be constantly facing. The aim of this article is to acquaint the building engineer with the nominal dimensions of metric building products. For detailed information the reader may refer to the Indian Standards quoted or to the Handbook for Building Engineers in Metric System to be published by the National Buildings Organisation, New Delhi.

A—STRUCTURAL STEEL SECTIONS

- (1) *Rolled steel beams, channels and angle sections:* see IS : 808—1957.
- (2) *Rolled steel tee bars*—see IS: 1173—1957.
- (3) *Rolled steel bulb angles*—see IS: 1252—1958.
- (4) *Rolled steel bulb plates*—see Doc: SMDC 6(283)F.
- (5) *Mild steel flats* (IS: 1731—)
(a) Nominal thickness of flats in mm
3·15, 4·0, 5·0, 6·0, 8·0, 10·0, 12·0, 16·0, 18, 20, 25, 32, 40.
(b) Width of flats in mm
10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 90, 100, 110, 120, 130, 150, 200, 250, 300, 400.
- (6) *Mild steel plates* (IS: 1730—)
Nominal thickness of plates in mm
5, 6, 8, 10, 12, 14, 16, 18, 20, 22, 25, 28, 32, 36, 40, 45, 50, 56 and 63.
- (7) *Mild steel sheets* (IS: 1730—)
Nominal thickness of sheets in mm
0·40, 0·50, 0·63, 0·80, 0·90, 1·00, 1·12, 1·25, 1·40, 1·60, 1·80, 2·00, 2·24, 2·50, 2·80, 3·15, 3·55, 4·00.
- (8) *Mild steel strip* (IS: 1730—)
Nominal thickness of strip in mm
1·60, 1·80, 2·00, 2·24, 2·50, 2·80, 3·15, 3·55, 4·00, 4·50, 5·00, 6·00, 8·00, 10·00.
- (9) *Round and square steel bars*—see IS: 1732—

Properties of Reinforcing Round Bars

Diameter mm	Sectional Area sq cm	Perimeter cm	Weight per Metro Length kg
5·0	0·20	1·57	0·15
6·0	0·28	1·88	0·22
8·0	0·50	2·51	0·39
10	0·79	3·14	0·62
12	1·13	3·77	0·89
16	2·01	5·03	1·58
20	3·14	6·28	2·47
25	4·91	7·85	3·85
28	6·16	8·80	4·83
32	8·04	10·05	6·31
36	10·18	11·31	7·99
40	12·57	12·57	9·86
45	15·90	14·14	12·49
50	19·64	15·71	15·41

B—PIPES, TUBES AND ALLIED PRODUCTS

- (1) *Sheet metal rain water pipes* (IS 1728—1960)
Nominal diameter of pipes in mm
50, 60, 80, 90 and 100
- (2) *Sheet metal gutters and fittings*—see IS: 1728—1960
- (3) *Cast iron rain water pipes* (IS: 1230-1957)
Nominal bore of pipes in mm
50, 75, 100, 125 and 150.
- (4) *Mild steel tubes (galvanized and black)* (IS: 1239—1958)
Nominal bore of tubes in mm
6, 8, 10, 15, 20, 25, 32, 40, 50, 65, 80, 90, 100, 125 and 150.
- (5) *Steel tubes for structural purposes* (IS: 1161—1958)
Nominal diameter of tubes in mm
15, 20, 25, 32, 40, 50, 65, 80, 90, 100, 125 and 150.
- (6) *Centrifugally cast (spun) iron pressure pipes* (IS: 1536—1960)
(a) Nominal diameter of socket and spigot pipes—class LA, A and B in mm
80, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700 and 750.
Working lengths in metres—3·66, 4, 4·88 and 5·5.
(b) Nominal diameter of flanged pipes with screwed flanges—class A and B in mm
80, 100, 125, 150, 200, 250 and 300.
Working lengths in metres
2, 2·8, 3, 4, 4·88, 5 and 5·5.

(7) Vertically cast iron pressure pipes (IS: 1537—1960)

Nominal diameter of spigot and socket pipes—Class A and B and flanged pipes—Class A and B in mm
80, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 750, 800, 900, 1000, 1100, 1200, 1500.

Working lengths in metres

3·66, 4, 4·88, 5 and 5·5 for spigot and socket pipes and 1 to 4 metres for flanged pipes.

(8) Asbestos cement pressure pipes (IS: 1592—1960)

Nominal bore of pipes in mm

50, 80, 100, 125, 150, 200, 250, 300, 450, 600, 900 and 1000.

Length in metres—3 to 4.

(9) Pre-stressed concrete pipes (IS: 784—1959)

Nominal bore in mm

80, 100, 125, 150, 250, 300, 350,

400

Length

2 metres

450, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1400, 1600, 1800.

(10) Wire gauge for general purposes (IS: 1568—1960)

Gauge designation (size of square opening in decamicros)

160 G, 140 G, 120 G, 100 G, 85 G, 80 G, 70 G, 60 G, 50 G, 40 G.

(11) Diameter of metric screws and bolts—see IS: 1330—1958

(12) Length of bolts and screws (IS: 1363—1960 and IS: 1364—1960)

Length in mm

6, (7), 8, (9), 10, (11), 12, 14, 16, (18), 20, (22), 25, (28), 30, (32), 35, (38), 40, 45, 50, 55, 60, 65, 70, 75, 80, (85), 90, (95), 100, (105), 110, (115), 120, (125), 130, 140, 150, 160, 170, 180, 190, 200, 220, 240, 260, 280, 300, 320, 340, 360, 380 and 400.

Note:— Value within bracket is second choice

(13) Copper sheet and strip—see IS: 1550—1960.

(14) Lead Sheets (IS: 405—1961)

Nominal thickness in mm

0·5, 0·8, 1·0, 1·6, 2·0, 2·5, 3·2, 3·5, 4·0, 4·5, 5·0, 5·5, 6, 7, 8, 9, 10, 12, 14, 16.

C—BRICKS AND BLOCKS

(1) Modular bricks (IS: 1077—1957)

Nominal dimensions

20 cm × 10 cm × 10 cm

20 cm × 10 cm × 5 cm

Actual dimensions

19 cm × 9 cm × 9 cm

19 cm × 9 cm × 4 cm

(2) *Soil cement blocks* (IS: 1725—1960)

Nominal dimensions

20 cm × 10 cm × 10 cm
20 cm × 10 cm × 5 cm
30 cm × 20 cm × 10 cm

Actual dimensions

19 cm × 9 cm × 9 cm
19 cm × 9 cm × 4 cm
29 cm × 19 cm × 9 cm

D—FLOOR COVERING(1) *Clay flooring tiles* (IS: 1478—1959)

Nominal dimensions

15 cm × 15 cm
20 cm × 20 cm
22.5 cm × 22.5 cm

(2) *Linoleum* (IS: 653—1955)

Nominal thickness in mm

6.7, 6.0, 4.5, 3.2, 2.0, 1.6.

(3) *Limestone slabs for flooring*—see IS: 1128—1957(4) *Cement concrete flooring tiles*
(IS: 1237—1959)

Nominal size

20 cm × 20 cm
25 cm × 25 cm
30 cm × 30 cm

Actual size

19.85 cm × 19.85 cm
24.85 cm × 24.85 cm
29.85 cm × 29.85 cm

(5) *Rubber flooring* (IS: 809—1957)

Nominal thickness in mm

3.2, 4.8, 6.4.

Dimension of tiles

20 cm × 20 cm
30 cm × 30 cm
45 cm × 45 cm

E TIMBER PRODUCTS(1) *Plywood* (IS: 303—1960 revised)

No. of Plies	Thickness of mm
3 ply	3, 4, 5, 6
5 ply	5, 6, 8, 9
7 ply	9, 13, 16
9 ply	13, 16, 19
11 ply	19, 22, 25.

(b) Sizes

240 cm × 120 cm
240 cm × 90 cm
210 cm × 120 cm
210 cm × 90 cm
180 cm × 120 cm
180 cm × 90 cm
150 cm × 120 cm
150 cm × 90 cm
120 cm × 120 cm
90 cm × 90 cm

(2) *Blockboards* (IS: 1659—1960)

Nominal thickness in mm

12, 16, 20, 25, 30, 32, 35, 40, 45, 50.

Length in cm

240, 210, 180, 150, 120

Width in cm

120 and 90.

F MISCELLANEOUS(1) *Sheet glass* (IS: 1761—1960)

Nominal thickness in mm

2.0, 2.5, 3.0, 4.0, 5.0, 5.5, 6.5.

(2) *Hardboards* (IS: 1658—1960)

Type of board	Nominal thickness in mm
Semi-hardboard	6, 8, 10, 12.
Hardboard and superhard-board	3, 4.5, 6.

Width

1.2 metres

Length in metres

1.2, 1.8, 2.4, 3, 3.6, 4.8, and 5.5.

* * *

Metric System in Printing & Stationery**D. P. MUKHERJI**

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At present there is in common use a large variety of paper sizes along with their subdivisions and multiples. Rationalization and reduction in the number of sizes of paper was, therefore, a necessity.

A study of the subject by itself and in relation to international practices led to the adoption of the basic A-series of sizes. In fact the use of the A-series of sizes is fairly common in many countries.

The important features of the A-series are that the surface area of the basic format, A0, is one square metre, and the width (841 mm) and length (1189 mm) of size A0 bear the ratio of $1 : \sqrt{2}$. Thus at each doubling or halving lengthwise of any paper size in the A-series, the aspect ratio of $1 : \sqrt{2}$ remains constant. The principal A-series sizes are as follows :

PRINCIPAL A-SERIES SIZES		
Designation	Size in mm	Exact size in in.
4A0 .. 1	682 × 2 378	66.22 × 93.62
2A0 .. 1	189 × 1 682	46.81 × 66.22
A0 ..	841 × 1 189	33.11 × 46.81
A1 ..	594 × 841	23.39 × 33.11
A2 ..	420 × 594	16.54 × 23.39
A3 ..	297 × 420	11.69 × 16.54
A4 ..	210 × 297	8.27 × 11.69
A5 ..	148 × 210	5.83 × 8.27
A6 ..	105 × 148	4.13 × 5.83
A7 ..	74 × 105	2.91 × 4.13
A8 ..	52 × 74	2.05 × 2.91
A9 ..	37 × 52	1.46 × 2.05
A10 ..	26 × 37	1.02 × 1.46

The A-series sizes suitable for various commercial forms are given in Appendix 1.

Besides these sizes, longitudinal half, quarter, eighth etc. of the various sizes of the series can be used whenever required. Provision has also been made for the sizes of cover paper by adding 4 percent in either dimension.

The sizes mentioned are all trimmed sizes. Untrimmed sizes are being standardized. Tentatively the following untrimmed sizes have been recommended:

Raw Stock Sizes for A-Series:

RA0 86 × 122 cm
RA1 61 × 86 cm
RA2 43 × 61 cm and so on.

Special Raw Stock Sizes for Bled Work:

Special RAO—88 × 124 cm and so on

The B-Series Sizes

The B-series sizes are derived from the A-series. In this series the basic size, called B0, is 1000 × 1414 mm. This series is normally used as a supplement to the A-series. The procedure for halving and doubling and the nomenclature is similar to that used for the A-series.

For B-series only one standard raw stock size has been proposed viz.,

RB1—75 × 105 cm and so on.

Substance in Grams per Square Metre (gsm)

With the change-over in sizes of paper it is also necessary to express substance in metric units. Here also the system now in use internationally is being adopted. In this system substance is expressed as the weight in grams per square metre (gsm) of the paper. This system does not require any complicated calculations, is not related to the variable ream and can be applied to all types of paper and pulp board easily.

The following 15 groups of gsm, namely, 40, 45, 50, 55, 60, 75, 90, 110, 130, 150, 175, 200, 225, 275 and 325 will ordinarily serve all the purposes of the printing and stationery trade; printing paper is usually required in 3 substances 45, 60, 75, writing paper in 6 substances 45, 70, 90, 110, 130, 150, wrapping and kraft paper in 7 substances 65, 75, 90, 110, 130, 150, 200 and cover paper in 3 substances 110, 130, 150. The above is yet to be finalized in consultation with the paper mills. But for special work, special-make could also be ordered provided the quantity justifies its manufacture.

The vocabulary of all varieties of paper—printing, writing, wrapping—has now been modified to show the weight of paper in grams per square metre.

Appendix 2 shows the new gsm for a variety of papers. The formula for converting pounds per ream to grams per square metre is :

$$\frac{\text{lb per ream} \times 703,082}{500 \times \text{area of sheet in sq. in.}} = \text{gsm}$$

Description of Article	Present Size in Inches	Proposed Size
Blotting White Demy (40 lbs) ..	17½" × 22½"	—150 gsm
Blotting White Demy (38 lbs) ..		A-2 i.e. 420 × 594 mm
		or
Blotting Pink Demy (40 lbs) ..		—130 gsm
		—150 gsm

All the sizes and gsm have been tentatively decided and final concurrence of the Indian paper mills is shortly expected. It is hoped that even with their present equipment there will be no difficulty in getting supplies of metric sizes of paper in the recommended gsm.

Conversion

As metric weights have now come into use in various fields, presses have already adjusted themselves to the change.

Some presses have paper cutting machines with scales calibrated in feet and inches. New scales have to be fixed to these but the cost of this is negligible.

Mere numerical conversion from the non-metric to the metric system is not what is required. It will also be necessary to determine the metric units for procurement and issue. The metric system is based on the principle of multiplying or dividing the basic unit by 10. In order to derive benefit from this principle, it is suggested that where purchases and issues are made in terms of numbers, the units of dozen and gross should be replaced by 10 and 100 respectively and this procedure should apply for purchasing, stocking and issue of stationery stores and thus accounts could be maintained in a convenient manner.

The Government of India have already standardized several items of manufactured stationery and forms commonly used in all Government departments. There will not be any difficulty in their manufacture with the existing machinery and equipment. The items are :

METRIC SYSTEM IN PRINTING AND STATIONERY

Description of Article	Present Size in Inches	Proposed Size
Typewriting (6 lbs)	13" × 16"	—40 gsm
Books Blank Plain Royal (in different quires) File Books, 250 guards cloth bound	13½" × 19½" 10½" × 14½"	A-3 i.e. 297 × 420 mm
Typewriting (3 lbs)	8" × 13"	—40 gsm
Books blank and ruled in different qrs. Draft Continuation Sheet Buff	8½" × 13"	A-4 i.e. 210 × 297 mm
Note Sheet Blocks in different varieties Draft Sheet pad F cap folio		
Books quarto-ruled, cloth bound 6 qrs. Exercise Books 64 pgs. of different varieties of Note Book, Shorthand Draft sheet pad F cap folio.	6¾" × 8"	A-5 i.e. 148 × 210 mm

Printing Presses

It is likely that in many presses at present jobs are not being printed on such a large format as A0 (33·11 × 46·81 in. trimmed). So we have to consider the next smaller size format, A1. Double Demy formats are widely used and A1 size (23·39 × 33·11 in. trimmed) which is to replace Double Demy is slightly larger in one direction than the Double Demy (22½ × 35 in.) now in use, but most of the printing machines known as Demy, Double Demy, Quad Crown, Double Royal etc. have tolerances in both directions and manufacturers also prescribe the maximum sheet size for each of the machines built by them. It will be noticed from the data furnished below that A1 formats could be conveniently printed on most of the

machines available in our country of size Double Demy and upwards.

The question of printing A1 formats, nearly equivalent to the traditional Double Demy on any printing machines in sizes less than the Double Demy does not arise. Thus, all A1 formats should be printed on all available Double Demy size machines and also on any other bigger size machines now available. This would not necessarily mean any heavy loss of printing capacity. Besides, this position will progressively ease as existing machines of traditional sizes i.e. Foolscap, Crown, Royal, Super Royal and their multiples are gradually replaced by machines built strictly according to the metric system. Even now some presses possess continental printing machines having metric sizes.

Sl. No.	Machine	Maximum sheet size (in.)
(1)	Dawson Payne & Elliot S.W.4 Double Demy	25" × 40"
(2)	Victorial Front DF German	25" × 37½" (640 mm × 960 mm)
(3)	Rhenus	25" × 38"
(4)	Miehle No. 4 (other sizes 1+3 big) Linotype & Machinery Ltd.	28½" × 40½"
(5)	Rex	27½" × 39½"
(6)	Superman	29" × 41"
(7)	Albert	27½" × 39½"
(8)	Grant	27½" × 39½"
(9)	Saturnia	25" × 38"
(10)	Super E 1 by High Speed Cylinder Verwatts V 611	29½" × 41"
(11)	Kelly—Three (George Mann & Co Ltd)	25" × 37" (63·5 cm × 94 cm)
(12)	Chuma's D'Demy C3B	26½" × 38"
(13)	Stop Cylinder Press, C 41, Japan	24" × 37"
(13)	Nebiolo Italian	25-13/32" × 36-7/32"
(14)	G.M.A. TP—110 Two Rev. Sweden	34-5/8" × 44" (880 mm × 1120mm)

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B-series paper sizes, which are to be used for some time, do not create any difficulty as the sizes B1, B2, B3 etc. correspond to Quad Crown, Double Crown, Crown etc. Similarly, however, for ready reference some of the sizes are shown below :

(1) Dawson, Payne & Elliot Ltd.	S.W.5 Dl. Royal S.W.6 Qd. Crown	Usual Maximum Usual Maximum	25"×40" 30"×45" 30"×40" 35"×45" (890×1140 mm)
(2) Purnival Single colour Two Rev.	No. 4 Dl. Royal		28"×40½" (724×1020 mm)
(3) Harrild Otley High Speed Rev. Press in 3 sizes Demy, D' Royal, Qd. Demy 50×40	Dl. Royal	Maximum	30"×44" (762×1118 mm) 30"×42"

Certain presses have confined themselves to only one group of printing machines, namely Crown, irrespective of the fact that some of their publications have been standardized in Royal 8vo and Foolscap folio and all their forms in Royal. Foolscap and their subdivisions. There is a fear that a large portion of the printing capacity of such

It will be clear that excepting Crown 8vo and Crown 4to publications, for which also special provision exists during the interim period, all the other publications and forms, if relaid very carefully to A-series, will yield exactly the same number of

pages in the forme as at present on the existing machines. So the printing capacity will not be rendered useless. Besides, the new sizes are not likely to be either too small or too large as shown already. Text-books in 5×7½ in. sizes (untrimmed) printed on such machine could be printed on B1 paper in B5 (4.9×7 in. trimmed) sizes with

Publications	Untrimmed	Trimmed
Crown 8 vo	(5"×7½") =A-5(6"×8½")	i.e. 16 pages forme of A1
Crown 4 to	(7½"×10") =A-4(8½"×11½")	i.e. 9 pages forme of A1
Royal 8 vo	(6½"×10") =A-5(6"×8½")	i.e. 16 pages forme of A1
F' cap folio	(8½"×13½") =A-4(8½"×11½")	i.e. 8 pages forme of A1
Forms		
F' cap 4to	(6½"×8½") =A-5(6"×8½")	i.e. 16 pages forme of A1
Folio	(8½"×13½") =A-4(8½"×11½")	i.e. 8 pages forme of A1
F' cap	(13½"×17½") =A-3(11½"×16½")	i.e. 4 pages forme of A1
Royal 8vo	(6½"×10") =A-5(6"×8½")	i.e. 16 pages forme of A1
Royal 4to	(10"×13") =A-4(8½"×11½")	i.e. 8 pages forme of A1
Royal folio	(13"×22") =A-3(11½"×16½")	i.e. 4 pages forme of A1
Royal	(20"×26") =A-2(16½"×23½")	i.e. 2 pages forme of A1

machines would be rendered useless. But close examination shows that if during the interim period B-series are adopted for some of the long run publications now in Crown 8vo and Crown 4to, the position would remain unaltered as regards sizes and the number of pages in a forme with their existing Crown group machines.

32 pages per forme as at present. Thus trimmed sizes as well as number of pages in a forme remain unaffected even with the existing printing machines. Some A-series metric size printing machines should be indented at the earliest possible opportunity for discarding the use of B-series paper for such publication work.

Rotaries

As regards rotaries it is presumed that most of them have a cut of 27 in. Even on such rotaries A4 (8.27×11.69 in. trimmed), A5 (5.83×8.27 in. trimmed) and A6 (4.13×5.83 in. trimmed) publications could be conveniently printed by carefully arranging the format so that the side 4.13 in. or 8.27 in. of the page runs along the web and thus with necessary up 6 or 3 as the case may be, along with trimming margins at the head and tail or fore-edge, spoilage of paper will be very little. Even otherwise, the small strip that will be available out of 27 in. cut could be utilized for printing small slips simultaneously and also for slip pads and various other work in binding branches. Thus the existing book rotary of 27 in. cut with 34 in. web will serve the purposes for which it was intended.

Chases

Chases are generally one inch larger in their inside measurements than the untrimmed size of paper. Double Demy chases now in general use have inside measurements of 23½×36 in.; so these chases will not be convenient for A1 formats. Of course, larger size chases now available with the presses could be used, but would require excessive use of imposing furniture. The immediate requirements would be to procure

chases of metric sizes. The expenditure would not be heavy.

Individual Examination Necessary

It is, however, suggested that it will be in the best interest of presses that each press should make its own arrangements for examination of their existing plant and machinery for drawing up a phased programme of replacements. It will also be necessary to have all forms, books, publications, gazettes, periodicals etc. carefully examined and relaid in metric sizes sufficiently in advance so that when paper is supplied in metric sizes there will be quick switch-over to the metric sizes.

Conclusion

It will be seen that the problems involved are not so complicated as apprehended nor is any heavy initial expenditure necessary for the switch-over excepting purchase of a few minor items such as chases, metric scales, imposing furniture etc. nor any appreciable loss of printing capacity. In most presses new and old machines have been working side by side and normal replacements are occurring regularly. So in all cases of replacements and renewals as well as expansion metric size machines should be ordered.

APPENDIX 1

Suggested Sizes of A-Series Suitable for Commercial Formats

(The sizes given in bold are the ones most commonly used)

	A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
(1) Tear Off Calendar Block					A4	A5	A6	A7	A8				
(2) Tear Off Calendar Base			A2	A3	A4	A5	A6	A7					
(3) Directories (General)					A4	A5							
(4) Official Gazette					A4	A5							
(5) Share Scrips				A3	A4	A5							
(6) Advertisement Posters	A0	A1	A2	A3									

APPENDIX 1—(contd.)

(7) Certificates					A4	A5	A6												
(8) Order Forms					A4	A5	A6												
(9) Printing Proof				A3	A4	A5	A6	A7											
(10) Letters (General)					A4														
(11) Half Letter Size (General)						A5													
(12) Books					A4	A5	A6	A7											
(13) Carbon Papers					A4	A5													
(14) Railway Time-Tables	A0	A1	A2	A3	A4	A5	A6												
(15) Telephone Directory					A4	A5													
(16) Scribbling Pads or Note Papers					A4	A5	A6	A7											
(17) Trade Books			A2	A3	A4	A5													
(18) Commercial Letter Papers				A3	A4	A5	A6	A7											
(19) Card Index					A4	A5	A6	A7											
(20) Catalogues					A4	A5	A6	A7											
(21) Advertising Pamphlets	A0	A1	A2	A3	A4	A5	A6	A7	A8	A9									
(22) Hand Bills							A6	A7	A8	A9									
(23) Periodicals, Magazines				A3	A4	A5													
(24) Costing and Posting Sheets					A4	A5													
(25) Maps	A0	A1	A2	A3	A4	A5	A6												
(26) Patent and Standard Drawing Papers				A3	A4														
(27) Posters (Big)	A0	A1	A2	A3															
(28) Drawing	A0	A1	A2	A3	A4	A5	A6												
(29) Post Cards							A6												
(30) Newspaper			A2	A3	A4														
(31) Price Lists					A4	A5	A6	A7											
(32) Receipts						A5	A6												
(33) Instrument Record Sheets (Round)					A4	A5													
(34) Sign Boards	A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12						
(35) Pocket Note Books						A5	A6	A7											
(36) Sand Paper					A4	A5	A6												
(37) Instruction and Rule Sheets				A3	A4	A5	A6												

APPENDIX 2

Weight of Paper in Grams per Square Metre (gsm)

Code No.	Description of Article	Substance in Lbs. per Ream	Substance Converted in Grams per Sq. Metre	Substance to be Indicated i.e. the nearest gsm
(1)	(2)	(3)	(4)	(5)
WRITING PAPER				
B 001	Azure Laid D'ble Long Royal	88	119.02	110
B 002	Azure Laid Long Royal	44	119.020	110
B 003	Azure Laid Imperial	72	151.36	150
B 004	Azure Laid Quad F'cap	48	65.536	75
B 005	Azure Laid D'ble F'cap	34	104.176	110
B 006	Azure Laid D'ble F'cap	24	75.536	75
B 007	Azure Laid F'cap	12	75.536	75
B 008	Azure Laid 19 $\frac{3}{4}$ x 27 $\frac{1}{2}$ "	54	137.5	130
B 009	Azure Laid Medium	34	115.6	110
B 010	Blue Hand Made, 18" x 21"	30	111.00	110
B 011	Blue Hand Made 22" x 18"	18	63.72	60
B 012	Blue Laid Hand Made D. F'cap	30	91.92	90
B 013	Blue Laid Hand Made E" x F'cap	15	91.92	90
B 014	Blue Laid Hand Imperial	72	151.36	150
B 015	Blue Laid Hand Medium	34	115.6	110
B 016	Blue Laid Hand Demy	25	89.3	90
B 017	Blue Laid Hand Super Royal	54	127.98	130
B 018	Blue Laid Hand Royal	44	119.020	110
B 019	Cream Laid D'ble F'cap	40	122.56	130
B 020	Cream Laid F'cap	10	61.28	60
B 021	Cream Laid F'cap	20	122.56	130
B 022	Cream Laid Demy	21	75.012	75
B 023	Cream Toned Hand Made 20" x 28"	22	55.00	60
B 024	Cream Wove Hand Made Bank Medium 18" x 23"	13	44.2	45
B 025	Cream Wove D'ble F'cap	24	75.536	75
B 026	Cream Wove F'cap	12	75.536	75
B 027	Cream Wove F'cap Ruled	12	75.536	75
B 028	Ledger Azure Laid Cambridge D'ble F'cap	30	91.920	90
B 029	Ledger Lancashire D'ble F'cap	30	91.920	90
B 030	Ledger Lancashire D'ble F'cap	15	45.96	45
PRINTING PAPER				
D 001	Art Double Crown	72	168.768	175
D 002	Art Double Crown	60	140.64	130
D 003	Art Double Crown	50	117.20	110
D 004	Art Double Crown	82	75.008	75
D 005	Art Double F'cap	40	112.56	130
D 006	Art Double F'cap	24	75.536	75
D 007	Art Double Medium 23" x 36"	68	115.6	110
D 008	Art Enamelled 13" x 10"	16	181.12	175
D 009	Art Enamelled 10" x 16 $\frac{1}{2}$ "	6 $\frac{1}{2}$	140.660	130

(1)	(2)	(3)	(4)	(5)
PRINTING PAPER— <i>contd.</i>				
D 010	Art Imitation white 40×26"	80	188·20	175
D 011	Art Imitation White 40×30"	96	112·512	110
D 012	Art Imitation White 36"×23"	68	115·6	110
D 013	Art Imitation White 36"×23"	60	102·0	110
D 014	Art Imitation White 36"×23"	50	85·0	90
D 015	Art Imitation White 26½"×20½"	47	150·4	150
D 016	Art Imitation White 22½"×17½"	37	132·164	130
D 017	Art Imitation White 17×27"	43	131·752	130
D 018	Badami Double Large Super Royal	52	61·62	60
D 019	Badami Large Super Royal	26	61·62	60
D 020	Badami D'ble Long Royal	46	62·215	60
D 021	Badami Long Royal	23	62·215	60
D 022	Badami Double Demy	35	62·51	60
D 023	Badami Demy	17½	62·51	60
D 024	Badami Quad F'cap	40	61·28	60
D 025	Badami D'ble F'cap	20	61·28	60
D 026	Badami F'cap 19½×17½	10	61·28	60
D 027	Cream Wove Bank Long Royal	18	48·69	45
D 028	Cream Wove D'ble F'cap	20	61·28	60
D 029	Cream Wove 18×23"	13	44·2	45
D 030	Cream Wove Pink 18"×28"	18	61·82	60
D 031	Bleached D'ble Large Super Royal	52	61·62	60
D 032	Bleached Large Super Royal	26	61·62	60
D 033	Bleached Double Long Royal	46	62·215	60
D 034	Bleached Double Long Royal	40	54·100	60
D 035	Bleached Long Royal	23	62·215	60
D 036	Bleached Quad Crown	52	60·344	60
D 037	Bleached Double Crown	40	93·076	90
D 038	Bleached Double Crown	20	60·344	60
D 039	Bleached Double Crown	24	56·256	60
D 040	Bleached Double Crown	42	98·448	90
D 041	Bleached Double Crown	35	82·040	75
D 042	Bleached Demy	17½	62·51	60
D 043	Bleached Quad F'cap	48	75·536	75
D 044	Bleached Quad	40	61·28	60
D 045	Bleached Quad	32	49·024	50
D 046	Bleached Quad	28	42·896	40
D 047	Bleached Double F'cap	24	75·536	75
D 048	Bleached Double F'cap	20	61·28	60
D 049	Bleached Double F'cap	16	49·024	50
D 050	Bleached F'cap	10	61·28	60
D 051	Bleached F'cap Ruled	10	61·28	60
D 052	Cartridge Semi-bleached 22"×30" Imperial	60	127·8	130
D 053	Cartridge Semi-bleached 21½×28½"	57	135·09	130
D 054	Cartridge 17×27" D'ble F'cap	34	104·176	110
D 055	Cartridge White 26"×20" Long Royal	40	108·20	110
D 056	Cartridge Royal 17"×27" D'ble F'cap	34	104·176	110
D 057	Cartridge White 22½×35" D'ble Demy	64	114·304	110
D 058	Cartridge White 17½×22½" Demy	32	114·304	110

(1)	(2)	(3)	(4)	(5)
PRINTING PAPER— <i>Contd.</i>				
D 059	Cartridge White 22"×30" Imperial	62	132·06	130
D 060	Cartridge White 21½×28½"	50	114·8	110
D 061	Cartridge White 18½×28½"	84	226·80	225
D 062	Coloured Prtg. (Blue, Green, Pink, Salmon, Orange, Yellow and Mottled Grey) Large Super Royal	44	104·28	110
D 063	Coloured Prtg. (Blue, Green, Pink, Orange and Yellow) Long Royal	25	67·625	60
D 064	Coloured (Blue, Green, Pink, Orange and Yellow) Demy	15	53·58	60
D 065	Coloured Printing (Blue, Green, Pink, Orange, & Yellow) Quad F'cap	100	153·20	150
D 066	Coloured Printing (Blue, Green, Pink) F'cap	28	171·584	175
D 067	Coloured Printing (Blue, Green, Pink) D'ble F'cap	60	183·84	175
D 068	Coloured Printing (Yellow, Blue, Green, Pink) D'ble F'cap	24	75·536	75
D 069	Coloured Printing (Lt. Green, Pink) 22"×29"	84	183·12	175
D 070	Dull Enamelled Ptg. Chrome, Coated one side 35"×45"	240	214·320	200
D 071	Litho Rag. D'ble Elephant 27"×40"	67	87·1	90
D 072	Litho Rag. 22"×36"	60	106·2	110
D 073	Litho Rag. 22"×36"	48	84·96	90
D 074	Litho Rag. 17"×27"	30½	93·452	90
D 075	Rag, Bank White Wove 22"×36"	60½	110·4	110
D 076	Rag, Bank White Wove 22"×36"	57	100·89	110
D 077	Rag, Bank White Wove Imperial	38	80·94	75
D 078	Semi-bleached D'ble Large Super Royal	52	61·62	60
D 079	Semi-bleached Large Super Royal	26	61·62	60
D 080	Semi-bleached D'ble Long Royal	46	62·215	60
D 081	Semi-bleached Long Royal	23	62·215	60
D 082	Semi-bleached D'ble Crown	26	60·344	60
D 083	Semi-bleached D'ble Demy	35	61·51	60
D 084	Semi-bleached Demy	17½	62·51	60
D 085	Semi-bleached Quad F'cap	100	153·2	150
D 086	Semi-bleached Quad F'cap	48	75·336	75
D 087	Semi-bleached Quad F'cap	40	61·28	60
D 088	Semi-bleached Quad F'cap	32	49·024	50
D 089	Semi-bleached D'ble F'cap	24	75·536	75
D 090	Semi-bleached D'ble F'cap	16	49·024	50
D 091	Unbleached D'ble Large-Super Royal	52	61·62	60
D 092	Unbleached Large Super Royal	26	61·62	60
D 093	Unbleached D'ble Long Royal	26	62·215	60
D 094	Unbleached Long Royal	23	62·215	60
D 095	Unbleached D'ble Crown	26	60·344	60
D 096	Unbleached D'ble Demy	35	62·51	60
D 097	Unbleached Demy	7½	62·51	60
D 098	Unbleached Quad F'cap	40	61·28	60
D 099	Unbleached D'ble F'cap	20	61·28	60
D 100	White Wove Imperial	38	80·94	75
D 101	White Printing Super Calendered 20"×30"	27	63·288	60
D 102	White Printing Super Calendered 20"×30"	27	63·288	60
D 103	White Printing Super 20"×26"	43	91·970	90
D 104	White Printing Super Royal	41	110·905	110

(1)	(2)	(3)	(4)	(5)
PAPER OF OTHER KINDS				
E 001	Blotting White Demy	40	142.83	150
E 002	Blotting White Demy	38	135.736	130
E 003	Blotting Pink	40	142.88	150
E 004	Brown Kraft, D'ble Imperial 29" x 45"	90	95.85	90
E 005	Brown Kraft, D'ble Imperial 22½" x 29"	66	70.29	75
E 006	Brown Kraft, D'ble Imperial 22½" x 29"	100	231.00	200
E 007	Brown Kraft, D'ble Imperial 22½" x 29"	45	103.65	110
E 008	Brown Kraft D'ble Imperial 28½" x 36"	38	87.78	90
E 009	Brown Kraft, D'ble Imperial 28½" x 36"	156	216.84	200
E 010	Brown Kraft, D'ble Imperial 21" x 26"	40	102.4	110
E 011	Brown Kraft, D'ble Imperial 17" x 27"	38	116.432	110
E 012	Brown Wrapping D'ble Imperial	200	213.0	200
E 013	Brown Wrapping D'ble Imperial	97	106.3	110
F 014	Brown Wrapping Imperial	100	213.0	200
F 015	Brown Wrapping Imperial	50	110.5	110
E 016	Brown Wrapping Imperial	38	80.94	75
E 017	Brown Wrapping Imperial	30	63.9	60
E 018	Brown Wrapping Quad F'cap	80	122.56	130
E 019	Brown Wrapping Quad F'cap	72	110.304	110
E 020	Brown Wrapping Quad F'cap	40	61.28	60
E 021	Brown Wrapping Quad F'cap	127	41.364	40
E 022	Brown Wrapping Demy	60	214.32	200
E 023	Brown Wrapping Demy	30	107.160	110
E 024	Brown Wrapping 21" x 26"	80	204.8	200
E 025	Brown Wrapping 21" x 26"	40	102.4	110
E 026	Brown Wrapping 19" x 30"	60	144.0	150
E 027	Cover Hindustan 20½" x 30½" (Green, blue, pink)	60	130.4	130
E 046	Duplicating white absorbant Folio 13½" x 8½"	6½	79.3	75
E 047	Duplicating white semi absorbant F'cap 13½" x 17"	13	79.3	75
E 048	Duplicating white semi absorbant F'cap Folio 13½" x 8½"	6½	79.3	75
E 049	Duplicating unbleached soft size 13½" x 8½"	5	61.0	60
E 050	Manilla D'ble Imperial	97	102.82	90
E 051	Manilla Imperial	92	193.96	175
E 052	Manilla Imperial	34	72.42	75
E 053	Manilla Double long Royal	60	81.15	75
E 054	Manilla Double Demy	50	89.3	90
E 055	Manilla Azure shed Imperial	170	362.1	325
E 056	Manilla Buff D'ble Imperial	316	336.54	325
E 057	Pulp Boards Superior, Royal White	125	297.29	275
E 058	Pulp Boards Superior, white 22½" x 29"	170	362.7	325
E 063	Surface coloured, double crown brown, chocolate, dark green and vermillion	30	70.32	75
E 064	Target 26" x 40" (Badami and brown)	48	64.92	60
E 065	Target 26" x 40" (Blue)	32	43.29	40
E 066	Target 20" x 40" (Badami)	48	81.6	75
E 067	Target 20" x 30" (Badami and white)	52	120.688	110
E 068	Target 38" x 38" (Black, gray and ochre)	48	81.60	75
E 069	Target 26" x 26" (Black)	34	71.40	75
E 070	Target 24" x 28" (Buff and green)	38	79.8	75

(1)	(2)	(3)	(4)	(5)
PAPER OF OTHER KINDS—Contd.				
E 071	Target 26" x 52" (Green, ochre and white)	45	47.20	45
E 072	Target 24" x 48" (Gray)	36	40.60	40
E 073	Target 26" x 40" (White)	40	64.1	60
E 075	Typewriting 13" x 6" (Brief size)	6	40.57	40
E 076	Typewriting F'cap folio, 13" x 18"	3	40.57	40
E 077	Watermarked Blue Wove D'ble F'cap (480 shts.)	24	75.53	75
E 078	Watermarked Cream Wove 13½" x 8½" (a ream)	7	85.79	90

Fourth Conference of Controllers

METRIC measures of length would be introduced on an optional basis all over India from 1 October 1961 and would become compulsory after one year *i.e.* from 1 October 1962. As is now well-known use of metric weights would be compulsory in the entire country from 1 April 1962. Capacity measures have already been introduced optionally in selected areas in States and would be fully adopted by the middle of 1963.

The recommendation about length measures was made by the fourth Conference of Controllers held at Bangalore on 14-15 July 1961. The Conference was attended by the Controllers of Weights and Measures of the various States and Union Territories as also by representatives of the Ministry of Commerce and Industry, India Government Mints at Bombay and Calcutta, Ministry of Information and Broadcasting as well as Indian Standards Institution, National physical Laboratory and others.

Inauguration

The Conference was inaugurated by Shri Mali Mariyappa, Minister for Co-operation, Government of Mysore. In his inaugural address, the Minister referred to the three ages in the history of weights and measures, *viz.*, the stone age, the medieval age and the modern age. In the stone age, articles were weighed against pieces of stone. This was succeeded by the medieval or the pound and seer age when weights like the pound and seer were in vogue. The modern age began with the adoption of the metric system. This system had now been accepted in India and legislation enacted for its adoption. He praised the Controllers for the progress achieved in enforcing metric weights. He emphasized the need for publicity to make the public and the trade familiar with the new system.

Shri K. V. Venkatachalam, Joint Secretary, Ministry of Commerce and Industry, New Delhi, who presided over the Conference,

reviewing the progress achieved said that legislation to adopt the metric system was enacted in 1956. Earlier it had been anticipated that the completion of the reform of this magnitude would take about a quarter century. Parliament, however, had allowed only 10 years. There had been apprehensions that this period would be far too short. The Central and State Governments had been making efforts to complete the reform within the time-limit laid down by Parliament. All the States had enacted legislation and set up Organizations for enforcing weights and measures. Intensive publicity was being conducted both by the Central and State Governments to familiarize the people with the new system.

Continuing, he pointed out that in October 1958, metric weights were introduced in certain specified areas. The use of metric weights was not made compulsory in the beginning, 2 years being allowed for the continued use of other weights. This period ended in October 1960. The use of metric weights had become compulsory in these areas. Metric weights had come into exclusive use in the wholesale trade and to a very large extent in the retail trade as well in these areas. Most traders have purchased metric weights although some of them continued to use old weights. He hoped that it would be possible to dissuade people from using the old weights against the law without resorting to penal action.

He stressed that the metric system had come into use in Government Departments and undertakings like the Railways, Posts and Telegraphs, Customs and Excise Departments and the Ports. Major industries like cotton and jute textiles, iron and steel, engineering, sugar, cement and paper had adopted the metric system in their transactions.

He referred to certain special problems of the engineering industry. It would take quite some time to redesign products of the engineering industry to conform to the metric system. Till then, the industry would have to continue to work with drawings and specifications on the foot-pound system. This would involve the use of measuring tools and instruments in that system. Engineers and designers would, therefore, have to use both the systems side by side for some time to come. The metric system had also come into increasing use in general and technical education. He hoped that the use of metric weights and measures would be extended to the whole country well before the close of the 10-year period allowed by Parliament.

Some of the important recommendations made by the Conference are given below.

(1) State Weights and Measures Organizations

The Weights and Measures Organization in every State should be a wholetime Organization. Inspectors, Assistant Controllers, Deputy Controllers should be officers exclusively concerned with weights and measures. The possibility of laying down norms for the strength of Weights and Measures Organizations and the status and salaries of Inspectors and other officers should be explored.

(2) Enforcement of Weights

The use of metric weights in trade became compulsory in specified areas on 1 October 1960. Most traders in these areas had adopted metric weights in transactions. In certain States, however, a section of retailers including squatters and hawkers continued to use seer or pound weights side by side with metric weights. Steps should be taken to ensure that all weights other than metric weights were completely eliminated from the markets as soon as possible,

and in any case before the end of the year. The Controllers of Weights and Measures should take such steps as they think necessary for the purpose. Non-standard or unauthorized weights found in the possession of traders should be seized.

Weights seized from traders should be disposed of by auction to licensed manufacturers of weights. An essential condition for the sale should be that every weight was broken up before removal by the buyer, or alternatively, arrangements might be made to have them melted in the presence of an Inspector.

The Controllers should persuade traders in areas where metric weights were not yet compulsory, either directly or through their Associations to buy metric weights and start using them immediately. This would save the traders money and anxiety later when metric weights become compulsory all over India from April 1962. The Controllers should also make efforts to maintain the output of weights and to avoid production tailing off due to the present slackness of demand.

(3) Introduction of Metric Capacity Measures

The use of metric capacity measures had been authorised in selected areas from April 1961. In these areas, they would become compulsory from 1 April 1962. Steps should be taken to ensure the supply of commercial measures to trade in these areas. Manufacturers of measures should be encouraged to maximize their production. They would be given assistance in obtaining supplies of materials and fuels (G.P. sheets and coal). Brass sheets being in short supply in the country, manufacturers should be advised to use aluminium alloy in place of brass as far as possible.

The use of capacity measures would be authorised in further areas on 1 October

1961. In these areas, they would be made compulsory on 1 October 1962. They would be authorized in the remaining part of the country on 1 April 1962 and made compulsory on 1 April 1963.

(4) Introduction of Length Measures

The use of length measures should be authorized throughout the country from 1 October 1961. The length measures now in vogue might be allowed for a period of one year from 1 October 1961.

(5) Tank Lorries and Fees for Verification

Tank lorries should be classified as capacity measures except where there was a metering arrangement for delivering specified quantities of fuel. The metering arrangement should be classified as a measuring instrument.

(6) Verification of Taximeters and Watermeters

The Indian Standards Institution would be asked to recommend specifications and procedure for verification of these instruments for inclusion in the Rules.

(7) Permissible Errors for Prepacked Materials

The net weight has to be marked on every package which is sold by weight or measure. An Inspector may test the weight or measure of any such package to ascertain if it conforms to the quantity marked. It is necessary to specify maximum permissible errors in the net content of packages for commodities like cement, foodgrains, pulses, tea, coffee, biscuits, flour etc. The Ministry of Commerce and Industry, in consultation with the interests concerned, would suggest permissible errors.

(8) Sale of Milk by Volume or Weight

Milk is ordinarily sold in retail trade by volume, but it is common to sell it wholesale by weight. It would not, therefore, be practicable to ban the sale of milk by weight,

(9) *Manufacturers' Selling Agents in States*

A manufacturer could appoint in a State other than his own as many selling agents as he wished for the sale of his weights and measures. The stamping of these weights and measures should, however, be concentrated at specified centres designated by the Controller. The number of such centres would be decided by the Controller in his discretion.

(10) *Verification of Weights Used for Exciseable Commodities*

According to the Excise Manual, such weights had to be verified by the Excise

Inspectors. This was intended to guarantee the accuracy of the weights at a time when there was neither a law nor an agency for enforcing weights and measures in the country. Now that there are such laws and special agencies for administering them, the Excise Inspectors should be divested of this responsibility. The relevant provisions in the Excise Manual should be examined and amended in consultation with the excise Commissioners.

Eleventh General Conference of Weights & Measures

(The Eleventh General Conference of Weights and Measures adopted resolutions on the definitions of the metre, second and the International System of Units. In view of their importance, a translation of the resolutions from the original French is given below.—*Editor*)

Definition of the Metre

The Eleventh General Conference of Weights and Measures,

taking into consideration:

that the International Prototype does not define the metre with a precision sufficient for the actual needs of metrology,

that it is on the other hand desirable to adopt a natural and indestructible standard, decided on 14 October 1960:

- (1) The metre is the length equal to 1650 763·73 wavelengths in vacuum of the radiation corresponding to

the transition between the levels $2p_{10}$ and $5d_5$ of the atom of krypton 86.

- (2) The definition of the metre in force since 1889, based on the International Prototype of platinum-iridium, is abrogated.

- (3) The International Prototype of the metre sanctioned by the First General Conference of Weights and Measures in 1889 will be kept at the International Bureau of Weights and Measures under the same conditions as those which were fixed in 1889.

Definition of the Unit of Time

The Eleventh General Conference of Weights and Measures,

taking into consideration the power given by the Tenth General Conference of Weights and Measures to the International Committee of Weights and Measures to take a decision on the subject of the definition of the fundamental unit of time,

taking into consideration the decision taken by the International Committee of Weights and Measures in its session of 1956, ratifies the following definition:

'The second is the fraction $1/31\,556\,925\cdot974\,7$ of the tropical year for 1900 January 0 at 12 hours ephemeris time'.

International System of Units

The Eleventh General Conference of Weights and Measures,

taking into consideration resolution 6 of the Tenth General Conference of Weights and Measures, wherein it had adopted six units to serve as the basis for the establishment of a practical system of measures for international relations:

Length.....	metre.....	m
Mass.....	kilogram.....	kg
Time.....	second.....	s
Intensity of electric current....	ampere.....	A
Thermodynamic temperature....	degree Kelvin..	°K
Luminous intensity....	candela.....	cd

taking into consideration resolution 3 adopted by the International Committee of Weights and Measures in 1956,

taking into consideration the recommendations adopted by the International Committee of Weights and Measures in 1958 concerning the abbreviation of the name of this system and the prefixes for the formation of multiples and submultiples of the units;

decides:

- (1) the system based on the six basic units given above be designated under the name of International System of Units;
- (2) the international abbreviation of the name of this System is 'SI';
- (3) the names of multiples and submultiples of the units are formed by means of the following prefixes:

Factor by which the unit is multiplied	Prefix	Symbol
$1\,000\,000\,000\,000 = 10^{12}$	tera	T
$1\,000\,000\,000 = 10^9$	giga	G
$1\,000\,000 = 10^6$	mega	M
$1\,000 = 10^3$	kilo	k
$100 = 10^2$	hecto	h
$10 = 10^1$	deca	da
$0\cdot1 = 10^{-1}$	deci	d
$0\cdot01 = 10^{-2}$	centi	c
$0\cdot001 = 10^{-3}$	milli	m
$0\cdot000\,001 = 10^{-6}$	micro	μ
$0\cdot000\,000\,001 = 10^{-9}$	nano	n
$0\cdot000\,000\,000\,001 = 10^{-12}$	pico	p

- (4) to use in this System the following units, without prejudice to other units which may be added in future.

Supplementary Units		
Plane angle	radian	rad
Solid angle	steradian	sr
Derived Units		
Area	square metre	m^2
Volume	cubic metre	m^3

Frequency	hertz	Hz	1/s
Density (mass density)	kilogram per cubic metre	kg/m ³	
Velocity	metre per second	m/s	
Velocity of rotation (rotational speed)	radian per second	rad/s	
Acceleration	metre per second squared	m/s ²	
Acceleration of rotation	radian per second squared	rad/s ²	
Force	newton	N	kg.m/s ²
Pressure (mechanical tension)	newton per square metre	N/m ²	
Dynamic viscosity	newton-second per square metre	N.s/m ²	
Kinematic viscosity	square metre per second	m ² /s	
Work, energy, quantity of heat	joule	J	N.m
Power	watt	W	J/s
Quantity of electricity	coulomb	C	A.s
Potential, potential difference, electromotive force	volt	V	W/A
Electric field strength	volt per metre	V/m	
Resistance	ohm	Ω	V/A
Capacitance	farad	F	A.s/V
Magnetic flux	weber	Wb	V.s
Inductance	henry	H	V.s/A
Magnetic inductance	tesla	T	Wb/m ²
Intensity of magnetic field	ampere per metre	A/m	
Magnetomotive force	ampere	A	
Luminous flux	lumen	lm	cd.sr
Luminosity	candela per square metre	cd/m ²	
Illumination	lux	lx	lm/m ²

*

ERRATUM

The following corrections may be noted in the article 'Abbreviations For Engineering Units' by J.K. Varshneya, appearing in the July 1961 issue of *Metric Measures*.

(1) page 20 Table 1 insert the following table:

TABLE-1
Abbreviations for Prefixes of Sub-multiples and Multiples of Metric Units

Prefix	Numerical value	Abbreviation	Prefix	Numerical value	Abbreviations
pico	10 ⁻¹²	p	kilo	10 ³	k
nano	10 ⁻⁹	n	mega	10 ⁶	M
micro	10 ⁻⁶	μ	giga	10 ⁹	G
milli	10 ⁻³	m	tera	10 ¹²	T
centi	10 ⁻²	c			
deci	10 ⁻¹	d			
deca	10	da			
hecto	10 ²	h			

- (2) : 21 Omit 6(c)
- (3) : 21 In place of 7(a) substitute the following:
'Acceleration of rotation
radian per second per second rad/s²
- (4) : 21 From the abbreviation in 9(b) third line delete the dot after kg
- (5) : 21 For 10(b) read: centimetre⁴ cm⁴
- (6) : 21 Item 15, last line read as
tonne force per square metre tf/m²
- (7) : 21 Item 16 line 2, substitute kWh
- (8) : 22 Item 17 read kW

News & Views

Recent Notifications

Quintal sugar pack

No. G.S.R. 718-ESS. Com./Sugar. dated 20th May 1961.

In exercise of the powers conferred by clause 7 of the Sugar (Control) Order, 1955, as in force in India and as applied to the State of Pondicherry, and in supersession of the notification of the Government of India in the Ministry of Food and Agriculture (Department of Food) No. D.S.R. 117 Ess, Com/Sugar dated the 17th October, 1959, the Central Government hereby directs that, unless otherwise permitted by the Central Government, with effect from the 1st day of November, 1961,

- (a) all sugar manufactured by vacuum pan process shall be sold by the producer packed in new A Twill jute bags, each bag being 112 cm long and 67 cm wide and weighing 1.2 kg;
- (b) every such bag shall contain 100 kilograms sugar net;

- (c) every such bag shall bear on it :—
- the name of the place where the producer carries on the business of manufacturing sugar by vacuum pan process;
 - the quality of sugar at the time of delivery in terms of the Indian Sugar Standards in force at the time of manufacture;
 - the quantitative contents of the bag; and
 - the season of production of the sugar contained therein;
- (d) Each bag containing sugar manufactured at the vacuum pan sugar factories specified in column (1) below shall also bear the name of the place of manufacture and the words specified in the corresponding entries in Columns (2) and (3) respectively :—

Name of Factory (1)	Name of place of Manufacture (2)	Additional words (3)
(1) Sitalpore Sugar Works Ltd., Garaul (Bihar) ..	GARAUL	(SITALPORE)
(2) Maheshwari Khetan Sugar Mills Private Ltd., Ramkola (U.P.).	RAMKOLA	(MK)
(3) The Ramkola Sugar Mills Co. Ltd., Ramkola (U.P.)	RAMKOLA	(RSM)
(4) Nawabganj Sugar Mills Co. Ltd., Nawabganj (U.P.).	NAWABGANJ	(GONDA)
(5) Raza Buland Sugar Co. Ltd., Rampur (U.P.) Raza Factory.	RAMPUR	(RAZA)

(1)	(2)	(3)
(6) Raza Buland Sugar Co. Ltd., Rampur (U.P.) Buland Factory.	RAMPUR	(BULAND)
(7) Shree Vijay Lakshmi Sugar Mills, Tanuku (A.P.).	TANUKU	(VL)
(8) The Andhra Sugar Ltd., Tanuku (A.P.)	TANUKU	(ANDHRA)
(9) The Nizam Sugar Factory Ltd., Shakarnagar Factory No. I.	SHAKARNAGAR	(NSF. I)
(10) The Nizam Sugar Factory Ltd., Shakarnagar Factory No. II.	SHAKARNAGAR	(NSF. II)
(11) The Malegaon Shakari Sakhar Karkhana Ltd., Shivnagar, Baramati (Maharashtra).	MALEGAON	(POONA)
(12) Godavari Sugar Mills Ltd., Sakarwadi (Maharashtra).	SAKARWADI	(GSM)
(13) Godavari Sugar Mills Ltd. Lakshmiwadi, (Maharashtra).	LAKSHMIWADI	(GSM)
(14) The Phaltan Sugar Works Ltd., Sakharwadi (Maharashtra).	SAKHARWADI	(PHALTAN)
(15) Shriram Sahakari Sakhar Karkhana Ltd., Phaltan (Maharashtra).	PHALTAN	(SHRIRAM)
(16) The Mysore Sugar Co., Ltd., Mandya (Mysore)	MANDYA	(MYSORE)

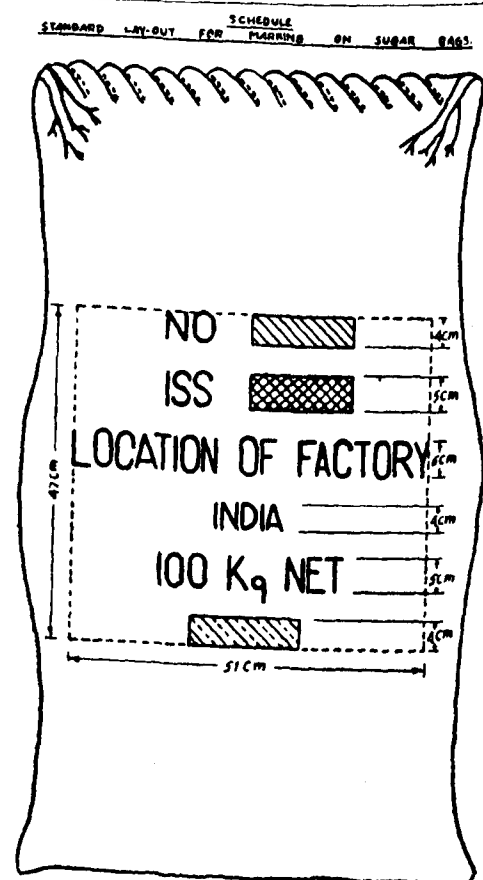
- (e) the lay out of marking shall resemble the layout set out in the Schedule attached hereto; and
(f) no particulars other than those indicated in the lay out mentioned in clause (e) shall be marked on any such bag.

Seizure of Weights

Seizure of old weights has already started in the areas where metric weights have become compulsory from October 1960. The picture given on page 27 shows illegal weights seized from Hyderabad shops.

Large number of old and illegal weights have been seized all over the country from shopkeepers who have been using them for transactions. If the owners of such weights had purchased their metric weights earlier and disposed of the old weights, they would have saved themselves the ignominy of having their weights seized.

Metric weights will become compulsory all over India from April 1962. It is to be hoped that the judicious traders will purchase metric weights much earlier than April 1962 and do away with their old weights well in advance of that date.



NOTE: THE MATTER IN SHADY RECTANGLES WILL HAVE TO BE MARKED AS REQUIRED. THE REST CAN BE PRINTED BEFORE HAND.

REFERENCES
 [Pattern] SERIAL AND/OR LOT NUMBER
 [Pattern] QUALITY IN TERMS OF INDIAN SUGAR STANDARDS
 [Pattern] SEASON OF PRODUCTION



Non-Metric Weights Seized in Hyderabad

ECM and Metrology

Bulletin Belge de Metrologie, May 1961 reports that Chiefs of Legal Metrology Departments of the six Common Market countries, grouped under the name of 'College des Six', held their fourth meeting at Brussels on 21 and 22 February 1961. They continued their examination of the best way to ensure elimination of obstacles resulting from the present or future disparities in the laws, decisions and orders on legal metrology.

The Director of the International Bureau of Legal Metrology took part in this meeting. The Governments committed to the Treaty of Rome are also members of the International Organisation Legal of Metrology; they should, therefore, endeavour to bring about harmony not only among the Common Market countries but also aim at unification at the international level. The two objects

are reconcilable if the pursuit of the latter does not retard the realization of the former.

The next meeting will be held in Brussels in mid-September 1961. It will be accompanied by a meeting of weighing instrument experts from the six countries.

The meeting following that will be held in Rome early in 1962 and the Presidency and the Secretariat will then pass to Italy.

According to the rules in force in the 'College des Six', the Presidency is held by the Head of the Department of the Country in which the meeting takes place, and the Secretariat by one of its collaborators, till the 'College' meets in another country.

Weights and Measures in Israel

The Annual Report of the Weights and Measures Section on the Ministry of Commerce and Industry, State of Israel, for the

period 1 April, 1960 to 31 March, 1961 makes interesting reading.

During the year 1,172 length measures, 3,002 measures of capacity, 790 measuring pumps, 94,472 weights and 19,761 weighing machines were verified giving a grand total of 119,197. Over 4,800 weighing machines which were newly verified were almost all produced locally in Israel. There has been a continuous increase in the average revenue per instrument during the last 10 years as more instruments for which higher fees are charged have been verified than weights etc., for which low fees are charged.

The Department instituted legal action in 267 cases and obtained convictions in 263 of them. The possession for use in trade of false instruments accounted for the largest number of charges followed by possession for use in trade of non-verified and unstamped instruments and negligence in offering instruments for reverification.

The main offence in respect of false instruments was possession, for use in trade, of self-indicating weighing machines which were not properly balanced and indicated weight to the prejudice of the buyer. In these cases it is almost impossible to prove whether there was intent on the part of the user or negligence. As, however, in most of the cases of out-of-balance condition in these scales the false weight indication is to the buyer's disadvantage legal action against the users appears to be unavoidable.

An interesting feature is that in cooperation with other units of the Ministry, Inspectors of Weights and Measures were active in the following fields :

- (1) Inspection of the capacity of glasses used in kiosks for the sale of soft drinks.
- (2) Inspection of the weight of pre-packed articles of food,

- (3) Inspection of the quantities of kerosene sold by kerosene vendors.
- (4) Inspection of the areas of surfaces of leather.
- (5) Weighing of articles of food in cold stores.

Stainless Steel for Standard Weights

Materials Research & Standards, volume 1, number 1, January 1961, issued by the American Society for Testing Materials has published a paper by S. J. Rosenberg and T. P. Royston in which the authors have given an account of a stainless steel they have developed for standard weights. The stainless steel satisfies the requirements of a good material for use as a mass standard, namely, that it should be corrosion-resistant, nonmagnetic, and have a density of 8.4 g per cm³. They believe that the following desired composition and composition range would be suitable for standard weights, subject to experimental determination of mass constancy :

				Composition, per cent	
				Desired	Range or Maximum
Carbon	..	..	..	0.10	0.20 max
Manganese	..	..	..	1.70	2.00 max
Phosphorus	..	..	..	—	0.040 max
Sulphur	..	..	..	—	0.030 max
Silicon	..	..	..	1.25	1.60 max
Chromium	..	..	..	16.5	15.5 to 17.5
Nickel	..	..	..	32.5	31.5 to 33.5
Tungsten	..	..	..	9.5	9.0 to 10.0

Units for Trading in Oilseeds and Oils

It is understood that the Central Organisation for Oil Industry and Trade, Bombay, have recommended that, as a first step towards achieving uniform all-India standards in units of price quotation, units of trading and units of packing under the metric system, prices of oilseeds, oils and oilcakes should

be quoted on a uniform basis throughout the country. They have recommended, after inviting suggestions from the Associations concerned with oilseeds trade and industry that the following units should be adopted :—

Oilseeds	100 kg
Oils	10 kg
Oilcakes	100 kg

However, as regards uniformity in units of trading and packing, the Organisation has expressed the view that though it is desirable to introduce it, its actual adoption may be considered later as a second step in the direction.

Converting Recipes

During the 4th Conference of Controllers, Shri A. A. J. Gomez, Mint Master, Bombay, suggested a novel way of converting cooking

recipes. If the recipe is given in terms of pounds and ounces, assume the pound to be replaced by the kilogram and convert other quantities accordingly. For example, 8 ounces would become 500 grams, 4 ounces 250 grams and so on. One ounce would then be replaced by 62.5 grams, but little harm would be done by rounding it off to 60 grams. He cautioned, however, that before preparing the dish according to this converted recipe, it should be remembered that the quantity would be about 2½ greater than that obtained on the pound basis. It may be reduced proportionately to suit requirements.

If the recipe is given in terms of the seer, there would be no trouble of conversion: simply replace the seer by the kilogram and so on. The extra amount is only 1 in 14.

Readers' Forum

Easy Conversion Tables

(Shri G. S. Sharma, Inspector of Weights and Measures, Narasipatnam, has sent the following tables for easy understanding of the metric system for the common man. Since the tables are interesting, they are published below—Editor.)

(1) Pay by Metric Weights only

Instead of one seer buy 1 kg or	1000 grams (g)
(80 tolas)	
Instead of ½ seer	buy 500 g
(40 tolas)	
Instead of ¼ seer	buy 200 g
(20 tolas)	
Instead of ⅓ seer	buy 100 g
(10 tolas)	
Instead of 1/16 seer	buy 50 g
(5 tolas)	
Instead of 1/32 seer	buy 20 g
(2½ tolas)	
Instead of 1/64 seer	buy 10 g
(1½ tolas)	

Pay in Naye Paise only

If one seer is	Re. 1.00	one kg is	Rs. 1.07
If ½ seer is	Re. 0.50	500 g is	Re. 0.54
If ¼ seer is	Re. 0.25	200 g is	Re. 0.21
If ⅓ seer is	Re. 0.13	100 g is	Re. 0.11
If 1/16 seer is	Re. 0.07	50 g is	Re. 0.06
If 1/32 seer is	Re. 0.04	20 g is	Re. 0.02
If 1/64 seer is	Re. 0.02	10 g is	Re. 0.01

1 Kilogram (kg). = 1000 grams (g)

(2) Buy by Metric Weights only		Pay in Naye Paise only			
Instead of one viss (120 tolas)	buy 1 kg or 1000 g	If one viss is Re. 1.00	one kg is	Re. 0.72	
Instead of $\frac{1}{2}$ viss (60 tolas)	buy 500 g	If $\frac{1}{2}$ viss is Re. 0.50	500 g is	Re. 0.36	
Instead of $\frac{1}{4}$ viss (30 tolas)	buy 200 g	If $\frac{1}{4}$ viss is Re. 0.25	200 g is	Re. 0.14	
Instead of $\frac{1}{8}$ viss (15 tolas)	buy 100 g	If $\frac{1}{8}$ viss is Re. 0.13	100 g is	Re. 0.07	
Instead of $\frac{1}{16}$ viss (7½ tolas)	buy 50 g	If $\frac{1}{16}$ viss is Re. 0.07	50 g is	Re. 0.04	
Instead of $\frac{1}{32}$ viss (3¾ tolas)	buy 20 g	If $\frac{1}{32}$ viss is Re. 0.04	20 g is	Re. 0.01	
Instead of $\frac{1}{64}$ viss (1.87 tolas)	buy 10 g	If $\frac{1}{64}$ viss is Re. 0.02	10 g is	Re. 0.01	
(3) Buy by Metric Weights only		Pay in Naye Paise only			
Instead of one lb. (40 tolas)	buy 500 g	If one lb. is Re. 1.00	500 g is	Rs. 1.10	
Instead of $\frac{1}{2}$ lb. (20 tolas)	buy 200 g	If $\frac{1}{2}$ lb. is Re. 0.50	200 g is	Re. 0.44	
Instead of $\frac{1}{4}$ lb. (10 tolas)	buy 100 g	If $\frac{1}{4}$ lb. is Re. 0.25	100 g is	Re. 0.22	
Instead of $\frac{1}{8}$ lb. (5 tolas)	buy 50 g	If $\frac{1}{8}$ lb. is Re. 0.13	50 g is	Re. 0.11	
Instead of $\frac{1}{16}$ lb. (2½ tolas)	buy 20 g	If $\frac{1}{16}$ lb. is Re. 0.07	20 g is	Re. 0.04	
Instead of $\frac{1}{32}$ lb. (1¼ tolas)	buy 10 g	If $\frac{1}{32}$ lb. is Re. 0.04	10 g is	Re. 0.02	
(4) Buy by Metric Weights only		Pay in Naye Paise only			
Instead of 1 tola	buy 10 g	If one tola is Re. 1.00	10 g is	Re. 0.87	
Instead of $\frac{1}{2}$ tola	buy 5 g	If $\frac{1}{2}$ tola is Re. 0.50	5 g is	Re. 0.44	
Instead of $\frac{1}{4}$ tola	buy 2 g	If $\frac{1}{4}$ tola is Re. 0.25	2 g is	Re. 0.18	
Instead of $\frac{1}{8}$ tola	buy 1 g	If $\frac{1}{8}$ tola is Re. 0.13	1 g is	Re. 0.09	
Instead of $\frac{1}{16}$ tola	buy 500 milli-grams(mg)	If $\frac{1}{16}$ tola is Re. 0.07	500 mg is	Re. 0.05	
Instead of $\frac{1}{32}$ tola	buy 200 mg	If $\frac{1}{32}$ tola is Re. 0.04	200 mg is	Re. 0.02	
Instead of $\frac{1}{64}$ tola	buy 100 mg	If $\frac{1}{64}$ tola is Re. 0.02	100 mg is	Re. 0.01	
Instead of $\frac{1}{128}$ tola	buy 50 mg	If $\frac{1}{128}$ tola is Re. 0.01	50 mg is	Re. 0.01	
		1 Kilogram (kg) = 1000 grams 1 gram = 1000 milligrams			
(5) Buy by Metric Measures only		Pay in Naye Paise only			
Instead of one yard	buy 1 metre or 100 cm	If one yard is Re. 1.00	one metre is	Rs. 1.09	
Instead of $\frac{1}{2}$ yard	buy 50 cm	If $\frac{1}{2}$ yard is Re. 0.50	50 cm is	Re. 0.55	
Instead of $\frac{1}{4}$ yard	buy 20 cm	If $\frac{1}{4}$ yard is Re. 0.25	20 cm is	Re. 0.25	
Instead of $\frac{1}{8}$ yard	buy 10 cm	If $\frac{1}{8}$ yard is Re. 0.13	10 cm is	Re. 0.13	
Instead of $\frac{1}{16}$ yard	buy 5 cm	If $\frac{1}{16}$ yard is Re. 0.07	5 cm is	Re. 0.07	
Instead of $\frac{1}{32}$ yard	buy 2 cm	If $\frac{1}{32}$ yard is Re. 0.04	2 cm is	Re. 0.03	
Instead of $\frac{1}{64}$ yard	buy 1 cm	If $\frac{1}{64}$ yard is Re. 0.02	1 cm is	Re. 0.02	

Quiz On Metric Weights

(Shri J. K. Varshneya, Deputy Director (Metric), National Buildings Organisation, New Delhi has sent the following quiz on metric weights. It is hoped that the readers find it interesting.—Editor.)

How conversant are you with metric units, abbreviations and conversion factors? Answer the following questions and rate yourself:

(1) What are the abbreviations of the following prefixes of metric units?

- (a) Micro
(b) Centi
(c) Deca
(d) Mega

(2) What is the numerical value of the following prefixes of metric units?

- (a) Milli
(b) Deci
(c) Hecto
(d) Kilo

(3) How long is—

- (a) Micron
(b) Nautical mile (international)

(4) What is an are?

(5) What are the abbreviations of—

- (a) Quintal
(b) Metric carat
(c) Metric tonne

(6) How many kilograms are there in a

- (a) Quintal
(b) Metric tonne

(7) What is the metric equivalent of

- (a) Pound
(b) Gallon
(c) Mile

(8) How many milligrams are there in a metric carat?

(9) What is the metric equivalent of—

- (a) Tola
(b) Chhatak
(c) Seer
(d) Maund

(10) What is the net weight of cement in a cement bag?

Answers

- (1) (a) μ (b) c (c) da (d) M.
(2) (a) 10^{-3} (b) 10^{-1} (c) 10^2 (d) 10^3
(3) (a) 10^{-6} metre (b) 1852 metres
(4) 100 square metres.
(5) (a) q (b) c (c) t.
(6) (a) 100 (b) 1,000
(7) (a) 0.454 kilogram (b) 4.55 litres (c) 1.61 kilograms
(8) 200 milligrams
(9) (a) 11.66 grams (b) 58.32 grams (c) 0.933 kilogram (d) 37.32 kilograms.
(10) 50 kg.

Standards News

(Indian Standards which have a particular bearing on the change-over to the metric system are indicated here. Copies would be available from the Indian Standards Institution, Manak Bhavan, 9 Mathura Road, New Delhi or their Branch Offices at Bombay, Calcutta and Madras)

Draft Indian Standard for Mild Steel Wire Rod for Machine Screws

On the recommendation of the Tariff Commission, Government of India, the Indian Standards Institution has prepared a draft specification for mild steel wire rod

for the manufacture of machine screws (by cold heading process).

The draft standard covers the requirements of mild steel wire rod up to 20 mm diameter suitable for the manufacture of machine screws by the cold heading process.

This draft standard will be shortly circulated to interested producers, consumers, and technologists for eliciting technical comments.

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Draft Indian Standard for Butter Tins

The Indian Standards Institution has prepared a draft Indian Standard specification for butter tins, which prescribes the requirements of round open top containers manufactured from tinplate for packing 200 grams and 400 grams.

The draft standard has been prepared at the instance of the Union Ministry of Food and Agriculture with the object of ensuring good quality of the product to the consumer as well as rationalizing the sizes and dimensions of tins in metric units and simplifying large variety of containers. This rationalization and simplification is expected to result in overall economy and assist in standardization work in the allied industries.

The draft standard will shortly be put into wide circulation to all interests concerned for eliciting technical comments.

Draft Indian Standard for Test Sieves (IS: 460-1953)

The Indian Standards Institution has prepared a draft revision of IS : 460—1953 Indian Standard specification for test sieves, which lays down aperture widths of both fine and coarse test-sieves.

The standard was first issued in 1953 and contained quantities in fps system of units. However, in accordance with the decision of the Government of India to switch over to the metric system of units, revision of the standard has been necessitated to give the quantities and dimensions in metric system of units.

The revised draft will shortly be circulated to the interests concerned for eliciting comments.

Indian Standard for Metric Values in Standards (IS: 1722-1960)

The Indian Standards Institution has just published an Indian Standard guide for specifying metric values in standards (IS :

1722—1960). The standard is intended to provide guidance in resolving technical problems concerned with determining and specifying values in terms of the metric system while preparing new standards or converting the existing standards to the metric system.

Pursuant to the decision of the Government of India to adopt the metric system for all weights and measures before December 1966, it has become necessary to convert all existing standards as well as write all new standards in this system. In carrying out this task, many problems are met with, requiring adjustment and co-ordination with the existing practices, within the changing pattern of industry. While no general guide can be laid down for solving the organizational type of problems in switching over to the metric system, an attempt has been made in this guide keeping in view different types of difficulties that one has to come across.

Price: Rs. 3.50

Indian Standard Specification for Precision, and Turned Hexagonal Bolts (6 to 39 mm) with Nuts and Hexagonal Screws (6 to 39 mm) (IS: 1364-1960)

The Indian Standards Institution has just published IS : 1364—1960 specification for precision, and turned hexagonal bolts (6 to 39 mm) with nuts and hexagonal screws (6 to 39 mm), covering the requirements of such bolts and screws of coarse and fine pitches.

This standard belongs to a series of Indian Standards on threaded fasteners, three other Indian Standards in the series having already been published.

Price: Rs. 2.00

Indian Standard Specification for Sheet Metal Rain-Water Pipes upto 100 mm Nominal Size, Gutters, Fittings and Accessories (IS:1728-1960)

The Indian Standards Institution has just published IS : 1728—1960 specification for sheet metal rain-water pipes up to 100 mm

nominal size, gutters, fittings and accessories, which lays down requirements regarding material, shape and dimensions, workmanship, finish, sampling and testing of such articles.

The standard specification for these pipes and gutters will be a valuable guide, specially to the user in specifying his requirements and this standard which covers galvanized sheet metal rain-water pipes, gutter, fittings and accessories, is intended to serve that purpose.

Price: Rs. 3.00

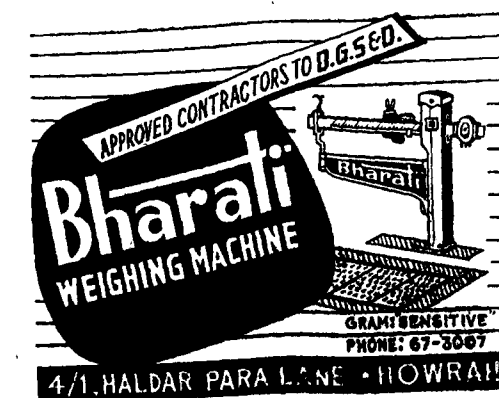
Indian Standard Method Gauging of Petroleum and Liquid Petroleum Products (IS: 1518—1960)

For the purpose of laying down a standard method for gauging of petroleum and liquid petroleum products in tanks, ships and

barges, tank trucks, and pipe-lines, the Indian Standards Institution has just published an Indian Standard method on the subject (IS : 1518—1960).

Accurate gauging of bulk quantities of petroleum and liquid petroleum products is essential for stock accounting, loss control, custom and excise purposes and for blending and similar operations. Methods of measuring the quantity of the material received, stored, delivered or transferred vary with the type of product and construction of the container. The directions given in this standard, therefore, lay down the procedure to be adopted for determining the volume of the material in any of the different types of containers normally employed for the bulk storage of petroleum and liquid petroleum products.

Price: Rs. 8.00



Licensed Manufacturers, Dealers and Repairers of Weights and Measures(15)

Metric Measures has been publishing a series of lists of manufacturers, dealers and repairers of weights and measures, weighing and measuring instruments licensed by the Governments in the various States and Union Territories under their Weights and Measures (Enforcement) Acts in their respective jurisdictions. This is the fifteenth list. The first list appeared in the March 1959 issue.

Progressively steps are being taken for licensing manufacturers, dealers and repairers in all States and further lists of licensees would be published in *Metric Measures* as this work progresses.

The number in brackets against the name of the State or Union Territory indicates the particular instalment number of the State or the Union Territory. The issues of *Metric Measures* in which previous lists appear are also shown suitably.

An analysis of the licensees, including the present list, shows that the total number of licensees in 14 States and 3 Union Territories is 843 manufacturers, 2,690 dealers, and 615 repairers. The details of published information are as follows :—

Sl. No.	State/Union Territory	Licensees		
		Manu- fac- turers	Dealers	Re- pairers
1.	Andhra Pradesh ..	40	84	31
2.	Assam	11	44	16
3.	Bihar	20	69	34
4.	Delhi	22	76	19
5.	Gujarat	83	404	105
6.	Himachal Pradesh ..	1	7	1
7.	Kerala	18	283	34
8.	Madhya Pradesh ..	99	310	4
9.	Madras	79	210	37
10.	Maharashtra	60	163	106
11.	Mysore	75	399	41
12.	Orissa	14	17	1
13.	Punjab	32	128	25
14.	Rajasthan	16	69	18
15.	Tripura	1	5	0
16.	Uttar Pradesh	207	222	88
17.	West Bengal	65	200	55
		843	2,690	615

LICENSED MANUFACTURERS, DEALERS & REPAIRERS OF WEIGHTS & MEASURES (15)

ANDHRA PRADESH (4)

The following is a list of Licenced Manufacturers, Dealers and Repairers of Weights and Measures of the year 1961 to whom licences have been renewed and granted under the Andhra Pradesh Weights and Measures (Enforcement) Act, 1958.

Manufacturers.

Sl. No.	Name and Address of Manufacturer	Details of Articles manufactured
(1)	Avery Co. of India (P) Ltd., Hide Road Extension, Alipur, Calcutta	Weights, Measures, Weighing and Measuring Instruments.
(2)	Bhagwanarayana Iron Balance Works, Dowlaishwaram, East Godavari	Beam Scales.
(3)	Bharat National Foundry, Motia Khan, Delhi	Weights.
(4)	Central Metal Works, Feel Khana, Hyderabad	Brass Weights and Litre Measures.
(5)	Deccan Porcelain and Enamel Works, Bakaram, 2707, Murshidabad, Hyderabad.	Weights and Measures.
(6)	Deccan Moulding and Steel Works, Vidyanagar, Addikamet, Hyderabad	Weights.
(7)	Hercules Engineering Works, Udhynagar, Bombay-22 ..	Counter Scales, Spring Balances.
(8)	Hilal Consumer Goods Manufacturing Works, Joshi, Begum Decar, Hyderabad	Litre Measures.
(9)	Hyderabad Iron and Steel Works, Industrial Area, Azamabad, Hyderabad	Weights.
(10)	S. K. Industries, Bakaram, Murshidabad, Hyderabad ..	Weights.
(11)	S. & P Industries, Factory Unit Industrial Estate, Warangal	Weights.
(12)	Jaya Krishna Industrial Works, 3/236, Kottapata Street, Post Office, Dowlaishwaram, East Godavari	Beam Scales.
(13)	Krishna Iron Works, Dowlaishwaram, East Godavari ..	Beam Scales.
(14)	Lucky Weight Works, Charkavman, Hyderabad	Weights.
(15)	Luhar Mulji Naran, Savarkundla, Sarashtra, Saurashtra	Beam Scales
(16)	Luhar Jiva Gopal, Savarkundla, Saurashtra	Beam Scales.
(17)	Marwadi Moulding Factory, Kasaratta Road, Hyderabad-2	Cylindrical Dipping type Measures (100 ml to 500 ml).
(18)	A. M. Master & Co., 179-81, Janjika Street, Bombay-3	Beam Scales and counter machines.
(19)	Misri Lal Moti Lal, Old Top Khana Road, Osmanganj, Hyderabad	Brass Weights, Linear Measures & Weighing Instruments.
(20)	Majestic Metal Works, Mithka Shair, Begum Bazar, Hyderabad	Brass Weights and Litre Measures.
(21)	National Iron Foundry, Moti Lal Nehru Road, Agra ..	Cast Iron and Brass Weights.
(22)	National Moulding Factory, 1-7-741, Mushirabad, (Near Badi Masjid) Hyderabad	Weights.
(23)	Om Industries, 1-2-539, Azamabad, Hyderabad	Weights.
(24)	Oriental Metal pressing Works (P) Ltd., 131, Worli, Bombay-13	Weights Measures, and Measuring Instruments.
(25)	Panduranga Engineering Works, Tadapatri Anantapur	Weights.
(26)	Pappu Varakayya & Sons, Dowlaishwaram, East Godavari	Beam Scales.
(27)	Pappu Veerana & Sons, Dowlaishwaram, East Godavari	Beam Scales and Cast Iron Weights.
(28)	Ranganayaka Iron Works, Mani Dowlaishwaram, East Godavari	Beam Scales.
(29)	Ravi Engineering Co. 81/1, Rajpur Road, Dehra Dun ..	Weighing Instruments, Weigh Bridges Dormant Machines Platform Weighing Machines, Counter Scales.
(30)	Sadanand Engineering Works, Azamabad, Mushirabad, Azamabad	Cast Iron & Brass Weights.

Manufacturers (Contd.)

Sl. No.	Name and Address of Manufacturer	Details of Articles manufactured
(31)	Safe Scale Co., 22-6-242, Miralam Mandi, Hyderabad	Weights.
(32)	Saraswathi Iron Balance Works, Dowlaishwaram, East Godavari.	Weighing Instruments (Scales).
(33)	Shivarama Engineering Works, Guntur	Weights.
(34)	Sitarama Engineering Works, Dowlaishwaram, East Godavari.	Beam Scales.
(35)	Star Metal Works, Begum Bazar, Hyderabad	Litre Measures.
(36)	Surya Engineering Works, Industrial Estate, Warangal	Weights.
(37)	Swamy Engineering Works, Dowlaishwaram, East Godavari	Beam Scales.
(38)	Venkateswara Light Casting Works, 1-7-176, Bakaram, Hyderabad.	Weights.
(39)	M. Vinayak Metric Moulding Works, Hari Bouli, Chouraha, Mogalpura, Hyderabad. No. 23-2-197.	
(40)	Watan Weight Works, Shop No. 22-6-132, (Prop. M.A. Raheim) Machlikaman, Hyderabad.	Weights.

DEALERS

Dealers Licensed for Weights and Measures, Weighing and Measuring Instruments

(1) Avery Co. of India (P) Ltd., 889/Imperial Post Office Road, Hyderabad.	(18) Deccan Porcelain and Enamel Works, Post Box No. 3, Bakaram, Mushirabad, Hyderabad-20.
(2) Anjaneya Weights and Measures Depot., Vinayaka Street, Tenali, Guntur Dist.	(19) Dawood Baiz, Shop No. 58, Pattabi Market, Mushlipatam, Krishna Dist.
(3) Annavarapu Rama Subha Rao, Gandhi Chowk, Tenali, Guntur Dist.	(20) Everest & Co., Almdil Bazar, Nizamabad Dist.
(4) Amara Subha Rao, Venkata Rao & Co., Morrispet, Tenali, Guntur Dist.	(21) Gelli Krishna Murthy Firm, Mani Road, Vijayawada, Krishna Dist.
(5) K.S. Acharya, Murali Printers, Kadiri, Anantapur Dist.	(22) Guntur Town Rice Dealers Association, Kanyaka Prameshwari Street, Guntur Dist.
(6) Abdul Aziz Sons, Hardware Merchant, Adoni, Kurnool Dist.	(23) Hardware Merchant, (Prop. Chitkashi Vishvanadham Narshimloo), Nirmal.
(7) Abdul Kareem Manyar, Iron Fabricator & Hardware Merchant, Adoni, Kurnool Dist.	(24) Industrial and Agricultural Engineering Company, (Hyderabad) Ltd., Gunfoundry, Hyderabad.
(8) Bombay Scale Works, Barketpura, Nizamabad.	(25) Jamshed Iron and Steel Co., Siddiamber Bazar, Hyderabad.
(9) Bombay Hardware Stores, 15-1-511, Siddiamber Bazar, Hyderabad.	(26) Jaya Metric Stores, 33/2, Netaji Chowk, Jaggayapet, Krishna Dist.
(10) Bombay Scale Adjusting Centre, 22-7-490, Purani Haveli, Hyderabad.	(27) K. Jagganadha Rao, 11/100, Main Road, Visakhapatnam Dist.
(11) K. Basawaraj, Weights and Measures, Dealer, Railway Feeder Road, Yellimanchelli, Visakhapatnam Dist.	(28) J. Joseph, Mandi Bazar, Warangal.
(12) S. Chenariah, S/o Kishtiah, Gunj Bhongir, Nalgonda Dist.	(29) Karana Venkatachalam, Jammala Madugu, Cuddapah Dist.
(13) Chandura Gopala Krishna, Murthy, Repalli Taluk, Guntur Dist.	(30) Kesari Hardware Stores, Tilak Road, Guddvada, Krishna Dist.
(14) Chittuluru Padma Venkata Subbaiah & Co., 18/138, Rasool Bazar, Kurnool Dist.	(31) Konnadula Venkatagiri, Agraharam, Guntur Dist.
(15) Cheethirala Subbairamiah Gupta, Proddatur, Cuddapah Dist.	(32) Kota Pulliah & Sons, 23-12-41, Hazarivari Street, Eluru Bazar, Guntur Dist.
(16) Co-operative Marketing Society, Armur Taluk, Nizamabad Dist.	(33) K. Krishna Murthy, Kankipada, Post Office Vijayawada, Guntur Dist.
(17) Chaudur, Sambiah, Pachipulu Suvari Lane, Guntur.	(34) K. Krishnamurthy, Old Beet Bazar, Warangal
	(35) Lakshmi Iron Stores, 14/175, Main Road, Hardware Merchant, Gudivida, Krishna Dist.

LICENSED MANUFACTURERS, DEALERS & REPAIRERS OF WEIGHTS & MEASURES (15)

Dealers (Contd.)

Dealers Licensed for Weights & Measures, Weighing and Measuring Instruments

(36) Manohare Metric Weights (Prof. G. Yerraswamy) 143/40/Nersingraopet, Kurnool.	(61) Syed Mohiuddin, Market Road, Mahboobnagar Dist.
(37) Markandeylu, M. Kohiah & Co., Broker Bazar, Guntur Dist.	(62) Syed Nadeem Bakaram, Murshidabad, Hyderabad.
(38) Majestic Metal Works Opp : Mittikashar, Begum Bazar, Hyderabad.	(63) Tammanna Bapaniah & Sons, Coir Ropes, Etc., Merchant, Main Bazar, Vijayawada, Krishna Dist.
(39) Mante Subha Rao, Bhimavaram, West Godavari.	(64) Safe Scale Co., 22-6-242, Miralam Mandi, Hyderabad.
(40) Metric Stores (Prop. Grandhi Chanchiah), Kotla Bazar, Chirala, Guntur Dist.	(65) T. Suryanarayan Rao, Mangalagiri, Guntur Dist.
(41) R. Mohan & Bros., Purani Haveli, Hyderabad.	(66) M. S. Sanyasiah & Co., Main Road, Hardware Merchant, Visakapatnam Dist.
(42) Mohd. Yousuf and Bros., 9/72, Mandi Bazar, Warangal.	(67) Syed Hussain Scale Centre, 2-10-86, Shah Bazar, Market Road, Mahboobnagar.
(43) Paluri Narayana Murthy, Iron & Steel Merchant, Railway Station Road, Visakapatnam.	(68) Syed Ibrahim, Kothaguda, Suryapet, Nalganda Dist.
(44) Pappu Veerana & Sons, Dowlaishwaram, Dist. Godavari.	(69) C. Saryanarayana & G. V. Satyanarayana & Co., Main Bazar, Vijayawada, Krishna Dist.
(45) Paramount Scale Centre, 22-8-430 Purani Haveli, Hyderabad.	(70) B. V. Subrahmanyam Sresthi, Bapatla, Guntur Dist.
(46) N. Prabhakara Rao, Tilak Road, (Old Town) Gudivida, Krishna Dist.	(71) Swamy Alavelu Industries, Razole Taluk, East Godavari.
(47) Prakash & Co., 12-1-111, Main Road, Narsaraopet, Guntur Dist.	(72) Telangana Scale Adjusting Centre, Prop. Mohd. Mahboob Ali, Sardar Road, Sadasivepet, Madak Dist.
(48) Pullah Khanduan Pulliah, Son Firm, Kaman Bazar, Khamman.	(73) Union Agency, 4, Vulugandamvari Street, Kothapet.
(49) Raghu Cottage Industries, Main Road, Bapatla, Guntur Dist.	(74) United Weights & Measures, Mittikashar, Begum Bazar, Hyderabad.
(50) T. Rajesham, Mandi Bazar, Warangal.	(75) K. Vercriah, Afzal Gunj, Hyderabad.
(51) Rameshchandra Amrutalal, Ward 13, Door No. 640, Shroff Bazar, Adoni, Kurnool Dist.	(76) K. Veeranjanayya Vara Prasad Rao, Kothapet, Tenali, Guntur Dist.
(52) Ravi Krishtiah, Chintalappa Street, Tadpatri, Anantapur Dist.	(77) Vetcha Gangaraj Sons, 18/245, Main Road, Rajahmun, Vishwanatham, South Street.
(53) Sadanand Engineering Works, Industrial Area, Plot No. 19/1, Azamabad, Mushirabad, Hyderabad.	(78) Veakadara Subha Rayadu Chetty & Co., 17/20, Meady Bazaar, Cuddapah Dist.
(54) T. Shankar Rao, Gautalama Street, Guntur Dist.	(79) Venkonda, Guntur Dist.
(55) Sivarama Engineering Works, K.M.S. Gupta, P. A. Choudry & Co., Post Box No. 116, Sangadiganta, Guntur.	(80) Vijaya Iron Mart, Main Bazar, Adoni, Kurnool Dist.
(56) Scale Adjusting Services, Topkhana Khadeem, Osmangunj, Hyderabad.	(81) Vijaya Weights and Measures (Prop. B. V. Ramaiah), Bungalow Road, Alagapada, Post Office, Kurnool Dist.
(57) Shaik Aziz Mohiuddin, Iron Manufacturing Works, Harding Street, Ongole, Guntur Dist.	(82) Vuruturi Gopala Krishnaiah, Proddatur Cuddapah Dist.
(58) Shaik Abdul Wahab, Wahab Chowk, Tenali, Guntur Dist.	(83) Weighing Instrument and Measuring Instruments, (Prop. Racharla Rama Rao), Netaji Chowk, Jaggayapet, Krishna Dist.
(59) Saggi Venkattarayana Chitty & Co., Jewellers, Diamond Hall, Nandyal, Kurnool Dist.	(84) Ch. Yagnaiah & Sons, 10-363, Park Road, Vijayawada, Krishna Dist.
(60) Sugguna Lakshmi Satyanarayana, Gangana-mad-Tenali, Guntur Dist.	

Repairers

Repairers of Weights & Measures, Weighing and Measuring Instruments	
(1) Andhra Scale Centre, Old Bazar, Market Road, Davaparthi.	(16) J. Joseph, Old Beet Bazar, Warangal.
(2) Arjanaya Weights & Measures Department, Vinayaka Street, Tenali, Guntur Dist.	(17) Jonnadula Venkatagiri, Agrahram, Guntur Dist.
(3) Abdul Wahab, Wahab Chowk, Tenali, Guntur Dist.	(18) K. Lingum Gupta, Siddipet, Medak Dist.
(4) Avery Co. of India (P) Ltd., 889, Imperial Post Office Lane, Tilak Road, Hyderabad.	(19) Misri Lal Moti Lal, Topkhana Khadeem, Osmanganj, Hyderabad.
(5) Sk. Azeed Mohiuddin, Iron Manufacturing Works, Ongole, Guntur.	(20) R. Mohan & Bros., Purani Haveli, Hyderabad.
(6) Burmal Shell & Co., 32, Sarojini Devi Road, Secunderabad.	(21) Paramount Scale Centre, 22-8-430, Purani Haveli, Hyderabad.
(7) Bombay Scale Adjusting Centre, 22-7-490, Purani Haveli, Hyderabad.	(22) Syed Abraham, Kothaguda Suryapet, Nalgonda Dist.
(8) Central Metal Works, 553, Old Topkhana Road, Osmanganj, Hyderabad.	(23) T. Rajesham, Old Beet Bazar, Warangal.
(9) Chunduri Sambiah, Pachipulusuvoir Lane, Guntur.	(24) Scale Adjusting Services, Topkhana Khadeem, Osmanganj, Hyderabad.
(10) S. Chenmiah Son of Kistiah, Gunj, Bhongir, Nalgonda Dist.	(25) Safe Scale Co., 22-6-242, Miralam Mandi, Hyderabad.
(11) Crescent Scale Centre, (Syed Mohiuddin), Market Road, Mahboobnagar.	(26) Syed Hussain Scale Centre, Mount Road, Saabazar, Mahboobnagar.
(12) Dawn Scale Company, 23-1-868, Bibi Bazar, Mir Junla Tank, Hyderabad.	(27) Tehngana Sdale Adjusting Centre (Mohd. Mahboob Ali), Sardar Road, Sadasivepet Medak Dist.
(13) Deccan Scale Centre, Barketpura Nizambabad.	(28) Shivapuramalla Vishwanathan, 1-177, South Street, Vinukonda, Guntur Dist.
(14) Dawood Baig, Shop No. 58, Pattabhi Market, Masulipatan, Krishna Dist.	(29) Union Agency, Vubuyandamavari Street, Kothapet, Guntur.
(15) Jamsheed Iron & Steel Company, Siddiamber Bazar, Hyderabad.	(30) Varamjanaya Varaprasad Rao, Kothapet, Tenali, Guntur Dist.
	(31) Venkateswar Scale Adjusting Scale (K. Linhuna Gupta), Karimnagar.

ASSAM (2)

In the March 1961 issue of *Metric Measures* a list of manufacturers, dealers and repairers licensed by the Government of Assam was published. The following is a list of manufacturers, dealers and repairers of weights and measures since licensed under the Assam Weights and Measures (Enforcement) (Amendment) Act, 1960.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles manufactured
(1)	Impex (Calcutta) Private Ltd., Industrial Estate, Bamuni Maidan, Gauhati.	Weights.
Dealers of Weights & Measures, Weighing and Measuring Instruments		
(1)	Aluminium Industries (Assam) (P) Ltd., Makum Road, Tinsukia.	(4) Avery Company of India (P), Lakhtokia Road, Gauhati.
(2)	Assam Steel & Wire Products, Udyonagar, Tinsukia P. O. Dist. Lakhimpur.	(5) Banshilal Jugal Kishore, Jorhat, Assam.
(3)	Askaran Panchiram Ramlall, Gara Ali, Jorhat, Dist. Sibsagar.	(6) Bhawaram Jodhraj & Co., Dibrugarh, P.O. Dibrugarh.
		(7) Chandi Stores, Bokakhat, Dist. Sibsagar.

Dealers (Contd.)

Dealers of Weights & Measures, Weighing & Measuring Instruments	
(8) Dass & Co., Dhubri, District Goalpara.	(19) Jaskaran Sohanlall (Private) Ltd., Jorhat, Dist. Sibsagar.
(9) Director, Trade & Industry Private Ltd., Tezpur P. O. Dist. Darrang.	(20) Maya Ram Bhagawan Dass, Siding Bazar, Tinsukia, Dist. Lakhimpur.
(10) S. Dutta Phookan, Tazpur, Dist. Darrang.	(21) Radha Shyam Agarwalla-Assam, Iron Stores, Haibargaon, P.O. Nowgong.
(11) Gajanand Chachan, G. S. Road, Shillong, (U. K. Jaintia Hills).	(22) Krishadhan Roy, Fancy Bazar, Gauhati, P.O. Gauhati.
(12) Gangadhar Hari Prasad, Jhodhar Ali, Ward No. III, Chawk Bazar, Golaghat, Assam.	(23) Krishanlal Mohabir Prasad, P.O. Tarabari Hat, Dist. Kamrup.
(13) Garodia Engineering Works, Factory Show-room, Jodhar Ali, Ward No. III, Golaghat.	(24) Sita Ram Kishanlal, P. O. Barpeta Road, Dist. Kamrup.
(14) Girharilal Agarwalla, Haibargaon, P. O. Nowgong.	(25) Sobhagmal Ghorowat, A. T. Road, Nowgong.
(15) Gobardhandas Kojriwal, Marwari Road, Dibrugarh.	(26) Secretary Dhing Pioneer Multipurpose, Co-operative Ltd., P.O. Dhing, Nowgong.
(16) Hanumandas Satya Narayan, P. O. Bongai-jaon, Dist. Goalpara.	(27) Shodir Chandra Das & Sons (India) Private Ltd., Fancy Bazar, Gauhati.
(17) Hiralal Bhowrilal, A. T. Road, Jorhat.	
(18) Hojai Marketing Co-operative Society Ltd., P. O. Hojai, Nowgong.	

Repairers of Weights and Measures, Weighing & Measuring Instruments

(1) Aluminium Industries (Assam) Private Ltd., Tinsukia.	(5) R. B. Industries, Fancy Bazar, Gauhati.
(2) Avery Company of India (P) Ltd., Lakhtokia Road, Gauhati.	(6) J. C. Gogoi, C/o, B.O.C. (I.T.), Ltd., Digboi.
(3) Bindeswar Koch, C/o B.O.C. (I.T.) Ltd., Digboi.	(7) Md. Maniruddin, C/o B.O.C. (I.T.) Ltd., Digboi.
(4) Chamanlal David, C/o Caltex (India) Ltd., Pandu.	(8) K. C. Trunk and Bucket Factory, Fancy Bazar, Gauhati.
	(9) Wazid Ali, C/o Depot Superintendent, B.O.C. (I.T.) Ltd. Badanpur-Ghat.

GUJARAT (2)

In the March 1961 issue of *Metric Measures*, a list of manufacturers, dealers, and repairers was published. This is a second instalment of manufacturers, dealers and repairers licensed under the Bombay Weights and Measures (Enforcement) Act, 1958.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles manufactured
(1)	Ambica Moulding & Engineering Co., Inside Sarangpur Bridge, Ahmedabad.	Weights.
(2)	Asha Metal Industries, Prajapati Wadi, Vijalpore, Navsari (W. Rly.)	Liquid Litre Measures.
(3)	Bavaji Laxmidas, Ram Krishna, Vanda, Saurashtra	Beam Scales Class B.
(4)	Bharat Iron and Brass Works, Chacharia Mota Mohalla, Mormor Wali Sheri, Patan (N. G.).	Weights.
(5)	Famy Measures, 2554, Radiant Building, Kharuwala, Khas Bazar, Ahmedabad.	Conical Capacity Measures.
(6)	Ganesh Foundry Works, Near Ranmukteshwar Mahadev, Pratapnagar, Baroda.	Weights.

Manufacturers (Contd.)

Sl. No.	Name and Address of Manufacturer	Details of Articles manufactured
(7)	Gohil's Industries, Near Sukhnath Chawk, Junagadh	Weights.
(8)	R. P. Harsora, Nadi Kantha, Chital, Saurashtra	Beam Scales Class C.
(9)	Harilal Bhurabhai Shah, Mandvi Chawk, Rajkot	Bullion Weights.
(10)	K. L. Kandhari Industries, Kubernagar Bungalow, P.O. Sardar Nagar, Ahmedabad.	Weights.
(11)	Luhar Bhagwan Haka, Sanghedia Bazar, Savarkundla	Beam Scales Class C & D.
(12)	Luhar Nanji Mulji, Nadi Kantha, Chital, District Amreli	Beam Scales Class B & C.
(13)	Luhar Vallabh Govind Pandya Sheri, Savarkundla	Counter machine.
(14)	V. K. Makvana & Co., Kalupura, Baroda	Beam scales—Class B, C, & D & Counter balances.
(15)	Shri Manjibhai Premjibhai, Sutar, Vanda, Via. Savarkundla	Beam scales Class B.
(16)	Mistry Maganlal, Madhubhai, Mahidharpura, Nagar Sheri, Surat.	Beam Scales Class B & C.
(17)	Nanji Purshottam Luhar, Nadi Kantha, Chital, Dist. Amreli, (Saurashtra).	Beam Scales Class B & C.
(18)	Narshidas Purshottam & Sons, Opp. Kabutar Khana, Chital (Saurashtra).	Beam Scales Class C.
(19)	Swastic Engineering Works, Station Road, Anand	Weights.

I

Dealers licensed for Weights, Measures, Weighing and Measuring Instruments

- (1) Abbasbhai Alimahmed Latiwala, Lati Bazar, Dholka District, Ahmedabad.
- (2) Abdeali Abdulhusen Baldiwala, Limda Chowk, Surat.
- (3) Abdeali Kikabhai & Sons, Bazar, Amod, Dist. Broach.
- (4) Abdulbhai Mithabhai, Opp. Post Office, Dabhoi, Dist. Baroda.
- (5) Akberali F. Kalolwala, Nava Bazar, Godhra, District Panchmahals.
- (6) Ambalal Garbaddas, Station Road, Rajpipla.
- (7) Ambica Industries, Pipla Sheri Tragiwada, Patan (N.C.).
- (8) Amibhai Ganibhai, Bazar, Harij, Dist. Mehsana.
- (9) Amichand Manekchand & Co. Gadhdha—Via—Nigamla.
- (10) Amreli Jila Udyogic Sahkari Sangh Ltd., Amreli.
- (11) Anilkumar Trambaklal Mehta, Dhebarbhai Road, Rajkot.
- (12) Ashabbhai Mathurbhai Patel, Bazar Harij, Dist. Mehsana.
- (13) Baroda General Stores, Opp. Tower Raopura, Baroda.
- (14) Babulal Shankarlal Modi, Ranuj, Dist. Mehsana.

II

Dealers licensed for Weights, Measures and Weighing Instruments

- (1) Abdul Taib Abdul Hussain, Kapad Bazar, Amreli.
- (2) Amin and Company, Kansarawad, Rangraj, Ambli Combay.
- (3) S. R. Amin and Company, Jawahar Street, Vaso, Dist. Kaira.
- (4) Bhatia Lilidhar Champshi, Near Power Station, Amreli.
- (5) Bulsar Paint & Hardware Mart, Azad Road, Bulsar.
- (6) Cambay Wire Nail Products, Ayatamata's Pole, Cambay, Dist. Kaira.
- (7) Chandulal Harkishandas & Company, Old Bus Stand, Modasa, Dist. Sabarkantha.
- (8) Chimanlal Chunilal Gandhi, Vavsetakhat Bazar, Modasa, Dist. Sabarkantha.
- (9) Chimanlal Motilal Penchal, Near New Tower Makni's Gate, Sankheda, Dist. Baroda.
- (10) Chimanlal & Co., Main Road, Surendranagar.
- (11) Chokshi Construction Company, Dev Nivas Juna Bazar, Himatnagar, Dist. Sabarkantha.
- (12) Dayaram Govindji Lakhandwala, Bazar, Chikhli, District Surat.
- (13) Dalichand Raichand, Doshi, Bazar Area, Savarkundla.
- (14) Dilip and Company, Kedarshwar Road, Porbandar.
- (15) Gandhi Scale Manufacturing Company, Sheth Street, Savarkundla.
- (16) Ganesh Foundry Works, Pratapnagar, Baroda.

LICENSED MANUFACTURERS, DEALERS & REPAIRERS OF WEIGHTS & MEASURES (15)

- (17) Gajjar Govindlal & Ramanlal Brothers, Dana Bazar, Dholka, Dist. Ahmedabad.
- (18) Gangaram Kanjibhai and Company, Chowkshi Bazar, Mehsana.
- (19) Gohil's Industries, Near Sukhnath Chowk, Junagadh.
- (20) Gordhandas Chimanlal and Company, Station Road, Modasa, District Sabarkantha.
- (21) Haidarali Sulemanji Iron Merchant, Bazar Area, Vanthali.
- (22) Haribhai Govindhai Mistry, Lokhandwala Bazar, Vyara, Dist. Surat.
- (23) Haji Abdul Rahim Mohamad Umar, Lokhandwala, Near Municipal Office, Kadi, Dist. Mehsana.
- (24) Haji Nathabhai Rajabhai's Company, C/o Shri Suleman Haji Nathabhai Vohra, Kathlal, Dist. Kaira.
- (25) Harishankar Ambalal Gajjar, Gajjar Bazar, Mahudha, Dist. Kaira.
- (26) Indian Metallica Industries, C/o Shri Bhupat-rai Shantilal Shah, 1124/2, Talia's Street, Sarangpura, Ahmedabad.
- (27) Ishvarlal Parbhudas Patel, Bazar, Visnagar, Dist. Mehsana.
- (28) Jambusar Taluka Luhar Karigareni, Sahakari Mandli Limited, Kot Barna, Jambusar Dist. Broach.
- (29) Jayantilal and Brothers, C/o Parbhudas B. Contractors, Raghunath Pura, Swaminarayan Wadi, Surat.
- (30) Jethabhai Pachabhai, Kansara Bazar, Nadiad.
- (31) Jyoti Mechanical Industries, Behind Income Tax Office, Navsari, Dist. Surat.
- (32) Kanaiya Hardware Stores, Bayad, Dist. Sabarkantha.
- (33) Kantilal Mohanlal Patel & Company, Vijay Talkies, Dehad, Dist. Panchmahala.
- (34) Kantilal Punamchand and Company, Dhansura, Dist. Sabarkantha.
- (35) Kantilal Somnath Vohra, Desai Wade, Kadi, Dist. Mehsana.
- (36) Khushiram Tarachand, Private Limited, Gangana, Luhar Chowk, Anjar.
- (37) A.M. Lekhandwala, Bandhan Square, Jamnagar.
- (38) V.K. Makwana and Contractor Company, Nava Bazar, Baroda.
- (39) Luhar Jamnadas Ladhbbhai, Natwar Road, Upleta.
- (40) Mohan General Stores, Shop D-22, Gandhidham.
- (41) Mohsinbhai Gulamali Vohra, Vohrawad, Balasinder, District Kaira.
- (42) Mithanbhai Chandbhai, Station Road, Dabhoi, Dist. Baroda.
- (43) S.S. Parmar Scale Works, Dabhan Bhagol, Dev Bhavan, Nadiad.
- (44) M.J. Parmar and Sons, Kansara Bazar, Bhuj.
- (45) Narayan Moulding Works, Dargah Road, Nanak Hapa Chawl, Navsari, Dist. Surat.
- (46) Narendrakumar Natverlal, Bazar, Talod, Dist. Sabarkantha.
- (47) Nemchand G. Shah, Nemji Building, Kanpith, Surat.
- (48) Parbhudas Premjibhai, Engineer, Near Swaminarayan Temple, Cambay.
- (49) Popatlal Govindji & Sons, Hathibhai Street, Savarkundla.
- (50) Ramji Jivraj Kansara, Kansara Bazar, Anjar.
- (51) Ramnik Lal Kantilal & Bros., Near Tower Chowk, Botad (Para).
- (52) Ratanlal Chhaganlal Shah, Bazar, Jhaled, Dist. Panch mahals.
- (53) Ratilal Sundarji, Main Bazar, Bardoli, Dist. Surat.
- (54) Safe Sale Works, Baradpura, Palanpur, District Sabarkantha.
- (55) Saify Hardware and Paint Store, Mahatma Gandhi Road, Dehad, District Panchmahals.
- (56) G. Sardarmal & Brothers, T.C.X. No. 85, Gandhidham.
- (57) Shah Gandarlal Bhagvandas, Flower Market, Kodinar.
- (58) Sureshkumar M. Raj pura, Near Post Office, Savarkundla.
- (59) Swastik Engineering Works, Station Road, Anand.
- (60) K.C. Thakkar & Co., Station Road, Nadiad.
- (61) Umar Bhai Jivabhai Bhirawala & Sons, Bazar Talad, Dist. Sabarkantha.
- (62) Vanraj Engineering Corporation, Station Road, Patnam, District Mehsana.
- (63) Vasantilal Purshottamdas Shah, Tower Bazar, Dhanduka, District Ahmedabad.
- (64) Vinodkumar Natvarlal Shah, Station Road, Naswadi, Dist. Baroda.
- (65) Vishandas Ahuja Sindhi, Simla Gate, Palanpur, District Banashkantha.
- (66) Vora Mohammadali Pirbhai Lokhandwala, Mulla Medi Road, Jamnagar.
- (67) Vora Fakroodin Gulamhussain, Bazar Area, Vishavadar.
- (68) Vora Fidahusen Ismailji and Brothers, Cloth Market, Una.

III. Dealers Licensed for Weights

- (1) Shantilal Maganlal, Shroff Bazar, Rajkot.
- (2) Shah Engineering Works, Canal Road, Rajkot.

IV. Dealers Licensed for Weighing Instruments

- (1) Luhar Shamji Valji, Gandhichowk, Savarkundla.
- (2) Luhar Govind Mulji Nadi Kantha, Savarkundla.
- (3) Luhar Bhagvan Naka, Sanghadia Bazar, Savarkundla.

V. Dealers licensed for Weights & Measures

- (1) Shah Engineering Co., Agency Deptt., Garedia, Kuva Road, Rajkot.
- (2) Sulemanji Ibrahimji, C/o Bazar, Vanthali.

Repairers licensed for Weights, Measures, Weighing and Measuring Instruments.

(1) Akbarali Abdulali Vadgamwala, Near Vohra Musafirkhana, New Deesa, Dist. Banaskantha.	(13) Luhar Hiralal Bhimji, Ashapura Road, Joshi Falia, Bhuj.
(2) Amin and Company, Jawahar Street, Vaso, District Kaira.	(14) Luhar Kanji Jethabhai, Burdhan Chowk, Jamnagar.
(3) Amthalal Mangalji Prajapati, Kheda Falia, Vejalpur, District Panchmahals.	(15) Luhar Rajvi Madhavji, Luhar Sar, Jamkhambharia.
(4) Bapulal Ishwarlal Patel, Mahatma Gandhi Road, Kalol, District Mehsana.	(16) Masa Kala Okhai Bazar, Mandvi.
(5) Chunilal Shivilal Soni, Limdi Fali, Dhandhuka.	(17) M.J. Parmar and Sons, Kansara Bazar, Bhuj.
(6) Gandhi Scale Manufacturing Company, Sheth Street, Savarkundla.	(18) Natubhai Kashibhai Patel, Golden Street, Sojatra, District Kaira.
(7) Gohil's Industries, Near Sikhnath Chowk, Junagadh.	(19) Natvarlal Chimanlal Panchal, Lal Bazar, Sanaand, District Ahmedabad.
(8) Harishankar Ambalal Gajjar, Gajjar Bazar, Mahudha, District Kaira.	(20) Parmar Nandlal Govindji, Digvijay Plot, Street No. 13, Jamnagar.
(9) Jambusar Lahar Karigaroni, Sahakari Mandli Limited, Ket Barna, Jambusar, District Broach.	(21) P. V. Parmar & Brothers, Plot No. 32, Gandhidham.
(10) Jayantilal & Brothers, C/o Shri Parbhudas B. Contractor, Reghunathpura, Swaminarayana Wadi, Surat.	(22) S.S. Parmar Scale Works, Dabhan Bhagol, Dev Bhavan, Nadiad.
(11) Kantilal Mohanlal Patel & Company, Opp. Vijay Talkies, Dohad, District Panchmahals.	(23) Popatlal Govindji and Sons, Hathibhai Street, Savarkundla.
(12) Luhar Govind Mulji, Savarkundla.	(24) Shanta Vijay Tin Factory, Pandya Street, Savarkundla.
	(25) Tulsidas Sundarji Mistry, Behind New Gandhi Chowk, Petlad, District Kaira.

KERALA (6)

In the November 1959, March and November, 1960 and January 1961, issues of Metric Measures lists of licensed manufacturers, dealers and repairers of weights and measures in Kerala state were published. The following is a list of manufacturers, dealers and repairers subsequently licensed by the Government of Kerala under the Kerala Weights and Measures (Enforcement) Act, 1958.

Manufacturers

Sl. No.	Name and Address of Manufacturers	Details of Articles Manufactured
(1)	Ashok Foundry & Engg. Works, Karamanai P. O., Trivandrum-2.	Cast Iron Weights. (2 kg to 100 g).
(2)	Calicut Tin Works, Thiruvannoor Road, Calicut-3	Liquid and Dry Measures.
(3)	M.P. Philip, P. M. Foundry, Mavelikara	Cast Iron Weights.
(4)	Pioneer Industrials, Nellalam, Kozhikode-3	Brass Weights.
(5)	Saintjos Casting Industries, Palarivattom P. O., Ernakulam	Cast Iron Weights.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	K. S. Abbas & Co., Merchants, Vandiperiyar	Weights, Measures, Weighing and Measuring Instruments.
(2)	M.P. Abdulkhader, Merchant, Market, Alwaye	Weights, Measures and Weighing Instruments.
(3)	K. A. Abraham & Co., Hardware Merchants, Ponkunnam P. O. Kanjirapally.	Weights and Measures.

Dealers (Contd.)

Sl. No.	Name and Address of Dealers	Details of Articles Sold
(4)	A.T. Anthony, Hardware Merchants, High Road, Trichur	Weights, Measures, Weighing and Measuring Instruments.
(5)	C. Assan & Co., Hardware Merchants, Main Road, Tellicherry	Do.
(6)	K. Bava, National Stores, Court Road, Trichur	Weights and Measures.
(7)	E.M. Chakkoru, Proprietor, Peoples Picture Palace, Kunnamkulam.	Weights only.
(8)	T.D. Chakku, Hardware Merchant, Nairangadi, Trichur	Weights, Measures, Weighing and Measuring Instruments.
(9)	M.P. Fakhurudeen Sahib, Maravettickal, Hardware Merchant, Thodupuzha.	Do.
(10)	C.A. Galiakotwal & Co. (P) Ltd., Cloth Bazaar, Ernakulam.	Weights & Measures.
(11)	The General Stores, Hardware Merchants, Chengannur	Do.
(12)	K.M. Joseph, Hardware Merchant, Athirampuzha	Weights, Measures, Weighing and Measuring Instruments.
(13)	P. Kochukunjan, Hardware Merchant, Aingamom, Parassala, Kaliyikavila P.O.	Weights and Measures.
(14)	T.C. Koshy (Thoppil), Merchant, Puramattom	Weights, Measures, Weighing and Measuring Instruments.
(15)	T. Krishna Pillai, Hardware Merchant, Chalai, Trivandrum-1	Do.
(16)	M.A. Mohamed Kannu & Brother, Hardware Merchants, Marakkada Road, Chalai, Trivandrum.	Weights and Measures.
(17)	M.A.M.S.E. Mohamed Kannoo & Co., Mullackal, Alleppey	Weights and Weighing Instruments.
(18)	C.A. Moideen Rowther & Sons, Hardware and Paint Merchants, Kollengode, Palghat District.	Weights, Measures, Weighing Instruments.
(19)	P.K. Oommen, Merchant, Pulamon Junction, Kottarakara	Weights, Measures and Weighing Instruments.
(20)	T.M. Ouseph, Hardware Merchant, Kandassankadavu, Trichur Dist.	Weights and Measures.
(21)	K.P. Padmanabhan, Kumar Stores, Camp Bazaar, Cannanore.	Weights, Measures, Weighing and Measuring Instruments.
(22)	N.T. Paul, Merchant, Ettumanoor	Do.
(23)	P.C. Brothers, Hardware Merchants, Main Road, Tellicherry	Do.
(24)	C.V. Philipose, Hardware Merchant, Near S.C.S. Junction, Thiruvella.	Do.
(25)	P.K. Brothers, Huzur Road, Calicut	Weights and Measures.
(26)	K.K. Raman Nair, Ravindra Stores, Hardware Merchants, Mullackal, Alleppey.	Weights, Measures, and Weighing Instruments.
(27)	K.S. Rama Iyer, Hardware Merchant, Palayam Road, Calicut-1.	Do.
(28)	Sampath Jewellery, Big Bazar, Palghat-1.	Bullion Weights and Weighing Instruments.
(29)	M.P. Sankaran, Merchant, Court Road, Badagara	Weights, Measures, Weighing and Measuring Instruments.
(30)	P. N. Shah and Co., Indian Drugs Merchants, 1st Rly. Gate, Kozhikode-1.	Metric Weights.
(31)	K.C. Sebastian, Hardware Merchant, Palai	Weights, Measures, Weighing and Measuring Instruments.
(32)	Sree Narayana, Engg. Industries (P) Ltd., Kulappully, Shoranur.	Weights and Measures.
(33)	N. B. Syed Mohammed, General Merchant, Parli, Palghat	Weights, Measures and Weighing Instruments.
(34)	The Popular Hardwares, Marakkada Road, Chalai, Trivandrum-1.	Weights, Measures, Weighing and Measuring Instruments.
(35)	A.V. Thomas and Co. (India) Ltd., Main Road, Trivandrum	Weights and Measures.
(36)	K. J. Thomas, Kochampazhathunkal, Erttupetta	Weights, Measures, Weighing and Measuring Instruments.
(37)	Vokart Brothers, Tellicherry	Measures.

Dealers (Contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
List of Dealers whose licences have since been cancelled		
(1)	Multipurpose Cooperative Society No. 3456, Kadakkal, Kottarakara Taluk. (Licence No. D. 30).	Published at Page 34 of the "Metric Measures" Vol. 3, March, 1960, issue.
(2)	Shri K. P. G. Menon, Sole Proprietor, M/s. Construction House, Post Ottappalam, Kerala, (Licence No. D. 145).	Published at page 40 of the "Metric Measures", Vol. 4, January, 1961 issue.

The address of Shri V.V. Ramaswamy Iyer, General Merchant, Yadakkancherry, Palghat District, published on Page 33 of *Metric Measures*, Volume 3, May, 1960 has been changed as follows:—

M/s. V.V. Ramaswamy Iyer Sons, Merchants, Vadakkancherry, Palghat District,

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	M/s. N.A. Lonappan Sons, Hardware Merchants, High Road, Trichur.	Weights, Measures, Weighing and Measuring Instruments.
(2)	M/s. Palliveetil Mammed Koya and Bros., 9/88, Tobacco Street, Calicut.	Weights, Measures and Weighing Instruments.
(3)	M/s. C.J. Palu & Bros., Chirianandath, High Road, Trichur.	Weights, Measures and Weighing Instruments.
(4)	M/s. Southern Scale Service, Haroon Buildings, Francis Road, Calicut.	Weighing Instruments.
(5)	M/s. A.V. Thomas and Co. Ltd., Main Road, Trivandrum.	Weighing Instruments.
(6)	Shri Vadakkethalakkal Kunhuveed Chummar, People's Stores, Kunnamkulam.	Weights, Measures, Weighing and Measuring Instruments.

UTTAR PRADESH (6)

In the July, September, November 1960 and January and March 1961 issues of *Metric Measures* lists of licensed manufacturers, dealers and repairers of weights and measures were published. The following is a list of manufacturers, dealers and repairers subsequently licensed by the Government of Uttar Pradesh under the Uttar Pradesh Weights and Measures (Enforcement) Act, 1959.

(List of dealers licensed will be published in the next issue).

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Agriculture Iron Industries, Nehru Road, Baraut, Meerut ..	Weights and Measures.
(2)	Alloy Founders, Jeoni Mandi, Jamuna Road, Agra ..	Cast Iron, Brass and Bullion Weights.
(3)	O.P. Aggrawal Industries, 209, West End Road, Meerut ..	Weights and Measures.
(4)	U.P. Agricultural Industries, Station Road, Roorkee ..	Cast Iron, Brass and Bullion Weights, Measures, Weighing and Measuring Instruments.
(5)	Abdul Rashid & Co., 124, Begum Bagh, Meerut City ..	Brass and Bullion Weights.
(6)	Amar Industries, Loha Mandi, Katghar, Agra ..	Weights and Measures.

Manufacturers (Contd.)

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(7)	Anil Metal Industries, 1042, Lane Gaushala, Pathwari, Belanganj, Agra.	Cast Iron and Brass Weights.
(8)	Agra Taj Industry, Behind Police Station, Loha Mandi, Agra	Brass Weights, Measures and Weighing Instruments.
(9)	Atul Engineering Works, 1251 Belanganj, Agra ..	Cast Iron and Brass Weights.
(10)	Adarsha Metal Works, 2814, Baghanta Loha Mandi, Agra ..	Brass Weights.
(11)	Agarwal Industrial Corporation 3605-C, Sutturganj, Agra ..	Brass Weights.
(12)	Agarwal Weights and Measures Manufacturing Co. Daulat Market, Agra.	Cast Iron, Bronze and Brass Weights and Measures.
(13)	Ashok Iron Foundry, c/o Bohrey Ram Gopal, Manpara, Agra.	Cast Iron Brass Weights and Measures.
(14)	Associated Industrial Corpn., 1278, Bheron Belanganj, Agra.	Cast Iron, Brass and Bullion Weights and Measures.
(15)	Babu Lal and Sons, 76/517, Cooly Bazar, Kanpur ..	Cast Iron and Brass Weights and Beam Scales.
(16)	Bharat Industries, Debipura, Chandi Mandi Road, Hapar, District Meerut.	Weights and Measures.
(17)	Bajrang Engineering Works, Hanuman Chauraha, Moti Katra, Agra.	Brass Weights.
(18)	Bharat Tin Industries, Seth Gali Agra ..	Cast Iron, Brass and Bullion Weights and Measuring Instruments.
(19)	Bimal Industries, 3652, Sultan Ganj, Agra ..	Cast Iron and Brass Weights.
(20)	Brij Metal Industries, Kangra-ki-Chanki, Agra ..	Cast Iron, Brass and Bullion, Weights.
(21)	Bharat Metal Industries, New Basta, Loha Mandi, Agra ..	Cast Iron and Brass Weights.
(22)	Bharat Iron Foundry, 1514, Baraf Khana, Moti Katra, Agra	Cast Iron and Brass Weights and Measures.
(23)	Bharat Electro-Plating Works, 195, Moti Katra Road, Agra	Cast Iron and Brass Weights and Measures.
(24)	Bajrang Iron Foundry, 1014, Nala Bhairon, Belanganj, Agra.	Cast Iron and Brass Weights.
(25)	Bharat Moulding Centre, 1006, Belanganj, Agra ..	Cast Iron and Brass Weights.
(26)	Bhartiya Ispat Udyog, 77/3, Cooly Bazar, Kanpur ..	Weights and Measures.
(27)	Bharat Metal Works, Hanumangali, Hathras ..	Weights.
(28)	Bharat Brush Traders, Gaushala Lane, Belanganj, Agra ..	Weights and Measures.
(29)	Bright Industrial Corporation, 158-F, Ram Nagar, Colony, Agra.	Cast Iron and Brass Weights.
(30)	Chhajju Lal Babu Lal Jain, Loha Mandi, Agra ..	Cast Iron and Brass Weights.
(31)	Cawnpore Steel Products, 76/2 Halsey Road, Lohai, Kanpur ..	Weights and Measures.
(32)	Doon Industrial Society, Arhat Bazar, Dehra Dun.	Weights
(33)	Durga Prasad Razora, Polishwala, Seo-ka-Bazar, Opp. Taj Hotel, Agra.	Cast Iron & Brass Weights.
(34)	Eagle Metal and Electrical Works, Bansal Building, Chhipotolia Agra.	Cast Iron, Brass and Bullion Weights and Measures.
(35)	S.O. Engineering Works, Mansa Devi Rajmandi Agra ..	Brass Weights.
(36)	Eastern Industries India (Private) Ltd., 7/191 Swarup Nagar, Kanpur.	Cast Iron and Brass Weights.
(37)	Eastern Steel and Iron Foundry, 3953, Ratnapura, Agra ..	Weights.
(38)	Fakhruddin Kkramuddin, 267, Bazara Street, Meerut City ..	Cast Iron and Brass Weights & Measuring Instruments.
(39)	Fayazuddin, Koharpur, Bareilly ..	Cast iron and Brass Weights.
(40)	Ganesh Industries Corporation, Freeganj, Road, Agra ..	Brass Weights.
(41)	Gib India Scientific Works, B. 5/34, Shivala Road, Varanasi-1	Brass Weights, Measures and Weighing Instruments.
(42)	Gopal Prasad & Son, 887, Bara Bhai Gali, Agra ..	Cast Iron and Brass Weights.
(43)	Hanuman Traders, Shivpuri, Varanasi ..	Cast Iron, Brass and Bullion Weights.

Manufacturers (Contd.)

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(44)	Hindustan Casting Corporation, 2002, Chimanlal Road, Freeganj, Agra Gate, Meerut.	Cast Iron and Brass Weights and Measures.
(45)	Hindustan Engineering Industries, Lisari Gate, Meerut ..	Weights and Measures.
(46)	Hindustan Agricultural & Engineering Works, 1075, Baghpat, Gate, Meerut.	Cast Iron and Weights.
(47)	K.R. Industries, Ekkawaligali, Noorigate, Agra	Weights and Measuring Instruments.
(48)	Indian Trade Corporation, 302, Belanganj, Agra	Cast Iron and Brass Weights.
(49)	N.S. Industries, 1681, Belanganj, Agra	Cast Iron and Brass Weights.
(50)	V.N. Industries Opp. Arya Samaj Mandir, Freeganj Road, Agra	Cast Iron and Brass Weights.
(51)	A.K. Industries, Ekkawaligali, Noorigate, Agra	Weights and Measuring Instruments.
(52)	Immam Ali Sons, Tin Merchants, No. 15, Gautam Budh Marg, Lucknow.	Weights and Measures.
(53)	G.O. Iron Foundry, Bhairon Bazar, Belanganj, Agra ..	Cast Iron and Brass Weights.
(54)	G.S. Industries, No. 2994-A, Naya Bans, Loha Mandi, Agra	Cast Iron, Bullion and Brass Weights.
(55)	R.G. Industrial Service, Near Belanganj, Goodshed, Jeoni Mandi, Agra.	Weights.
(56)	Jayshree Industries, 308, Belanganj, Agra	Cast Iron and Brass Weights.
(57)	Janta Industrial Co-operative Society Ltd., 81, North Vijaya Nagar, Agra.	Cast Iron and Brass Weights.
(58)	Jain Iron Works, 5228, City Station Road, Opp. Basant Talkies, Agra.	Cast Iron and Brass Weights.
(59)	Jain Industries, 1166, Phatak Suraj Bhan, Agra	Weights, Measures & Weighing Instruments.
(60)	Jain Metal Industries, 1048, Lane Gaushala, Agra	Cast Iron and Brass Weights.
(61)	Jindal Agricultural Industries, Town and P.O. Agarwal, Mandi	Cast Iron Weights.
(62)	Jain Company, Behron Bazar, Agra	Cast Iron, Brass and Bullion Weights.
(63)	Jain Industries, Opp. Post Office, Nai-ki-Mandi, Agra ..	Cast Iron, Brass and Bullion Weights, Measures and Measuring Instruments.
(64)	Jain Traders, 46/45, Raj Gaddi, Hatia, Kanpur	Brass Weights 1 g to 50 g.
(65)	Kanpur Iron Foundry, 104/307, Ram Bag, Kanpur	Weights.
(66)	Krishna Scale Works, 190/1, Faithpulgari, Kanpur	Weights & Weighing Instruments.
(67)	Laxmi Metal Works, 914, Belanganj, Agra	Cast Iron and Brass Weights.
(68)	Lucky General Industries, Nai-ki-Mandi, Agra	Cast Iron and Brass Weights and Measuring Instruments.
(69)	Metal Krafts, 10-D, Industrial Estate, Naini, Allahabad ..	Cast Iron Weights, Sheets, Metal and Brass Weights.
(70)	Meerut Foundry and Engineering Works, 77, Mahatma Gandhi Road (Lisari Gate), Meerut.	Weights and Measures.
(71)	Modern Agricultural Implements Manufacturing Co., Khera Meerut.	Weights, Measures, Weighing and Measuring Instruments.
(72)	Matadin Bhagwan Das Oil Mills Ltd., Bans Mandi, Kanpur ..	Cast Iron and Brass Weights.
(73)	Mitthan Lal Padam Kumar Jain, Manufacturers and Engineers, Loha Mandi, Agra.	Brass Weights.
(74)	Madhu Sudan Iron Foundry, 1125, Durganand Road, Agra ..	Cast Iron Weights.
(75)	Moha Industrial Corporation, Maingate, Pathwari, Agra ..	Weights and Measuring.
(76)	Mahajan Iron Foundry, Opp. Billochpura, Railway Station, Agra.	Cast Iron and Brass Weights.
(77)	Blipan Iron Foundries, 1755, Alawganj Kaswan, Agra ..	Cast Iron and Brass
(78)	Manjil Moulding Works, Bari Panni Gali, Agra	Weights.
(79)	Mital Brass Industries, 4569, Mohalla Rangraizan, Rajaki Mandi Agra.	Cast Iron and Brass Weights.

Manufacturers (Contd.)

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(80)	Nirmal Engineering Works, No. 1980, Freeganj Road, Agra ..	Cast Iron and Brass Weights.
(81)	Naveen Engineering Co., 915, Belanganj, Agra	Cast Iron and Brass Weights.
(82)	National Industries & Foundry, 488/37, Mirpur Cantt. (Rail Basar) Kanpur.	Weights.
(83)	National Wire Works, 4341, Vijay and Colony, Agra	Cast Iron and Brass Weights.
(84)	Om Engineering Works and Co., Chawalwala Bagh, Sultan-ganj, Agra.	Weights.
(85)	Om Iron Foundry, Belanganj, Agra	Cast Iron and Brass Weights.
(86)	Phool Kumar Sons, Puranaganj, Rampur	Cast Iron, Brass and Bronze Weights.
(87)	Parmason Engineering Industries, Delhi-Meerut Road, Ghaziabad.	Weights and Measures.
(88)	Pioneer Moulding and Engineering Works, 2478, Jeewan Mandi, Agra.	Cast Iron, Brass and Bullion Weights.
(89)	Pioneer Electronic Corporation, 53, Old Vijay Nagar, Agra ..	Brass, Bullion and Cylindrical Weights.
(90)	Rajinder Welding and Mechanical Works, Delhi Road, Meerut City.	Weights, Measures, Weighing and Measuring Instruments.
(91)	Raj Kumar Iron Foundry, Lashkarpur, P.O. Jaganpur, Agra ..	Cast Iron and Brass Weights.
(92)	Radha Engineering Works, C. 29/69, Maldahia, Varanasi ..	Cast Iron, Brass and Bronze Weights.
(93)	Radha Industries, Bheron Bazar, Agra	Weights and Measuring Instruments.
(94)	Ravi Engineering Company, 81/1, Rajpur Road, Dehra Dun ..	Weighing Instruments.
(95)	Raj Kamal Industries, 6382, Khati Para, Loha Mandi, Agra	Cast Iron Weights and Brass Weights.
(96)	Ram Gulam Bachai Lal, Mohalla, Bazar Town Bind Ki, Distt. Fatehpur.	Cast Iron and Measures.
(97)	Rafiuddin Mohinddin and Sons, 98/195, Anwarganj, Kanpur	Brass Weights and Measures.
(98)	Ram Prakash and Co. Nihal Chand Agarwal, 2249, Naigali, Moti Katra, Agra.	Brass Weights.
(99)	Ravi Industrial Corporation, 1104, Lane Gaushala, Pathwara, Agra.	Weights.
(100)	Satya and Tayag Manufacturing Co., 54/1, Nayaganj, Kanpur	Cast Iron and Brass Weights, Measures, Measuring and Weights Instruments.
(101)	Swantantra Bharat Iron Foundry, Narain Bhawan, Moti Lal Nehru Road, Agra.	Cast Iron Weights.
(102)	Sadhna Metal Industries, Loha Mandi, Nayabans, Agra ..	Brass Weights and Measuring Instruments.
(103)	Sharma Brass Engineering Works, 124, Khapara Mohal, Kanpur.	Weights, Measures and Measuring Instruments.
(104)	Sohan Ram Jain, Loha Mandi, Agra	Brass Weights.
(105)	Sarvodaya Industrial Corporation, Kanpur, 89/193 and 194, Bans Mandi, Kanpur.	Cast Iron, Brass, Bronze and Metal and Metal Sheet Weights, Measures, Weighing and Measuring Instruments.
(106)	Standard Chemical Co. (Private) Ltd., 113/8, Swarup Nagar, Kanpur.	Cast Iron Weights.
(107)	Society Iron Industries, Hiraganj, Kanpur	Weights, Measures, Weighing and Measuring Instruments.
(108)	Star Engineering Works, Seo-ka-Bazar, Agra	Weights and Measures.

Manufacturers (Contd.)

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(109)	Tota Ram Mithan Lal Jain, Manufacturer, Loha Mandi, Agra	Weights.
(110)	Tarolia Moulding Works, Lane Gaushala Belanganj, Agra	Cast Iron and Brass Weights.
(111)	United Metal Industries, 17, Civil Lines, Bulandshar Lal Talab, Bulandshahr.	Weights and Measures.
(112)	Universal Industries, 4/5, Hasanpura Shahganj, Agra	Cast Iron, Brass and Bullion Weights.
(113)	United Iron and Metal Works, C/124, 25, Govind Nagar, Kanpur.	Weights and Measures.
(114)	Vijay Trading Company, 1410, Jeoni Mandi, Agra	
(115)	Vishnu Iron Foundry, 4533/1, Chiman Lal Road, Freeganj, Agra	Cast Iron and Brass Weights.

Repairers of Weights and Measures, Weighing and Measuring Instruments

(1) Aurn Iron Stores, Rakabganj, Lucknow.	(20) New Bharat Traders, Sahidganj, Bazar, Saharanpur.
(2) Bharat Iron Foundry, 1514, Baraf Khana, Moti Katra, Agra.	(21) Nukal Sacu Sri Ram, Kagzi Bazar, Meerut City.
(3) Bihari Lal Jairamdass, Halsey Road, Lohai, Kanpur.	(22) Panchayati Dharam Kanta (Regd.), Sarafa Bazar, Meerut City.
(4) Dharam Kanta Sarafa Committee, Chowk Bazar, Moradabad.	(23) Paramason Engineering Industries, Delhi-Meerut Road, Ghaziabad.
(5) Gujadhari Lal Baijnath, 76/157, Halsey Road, Lohai, Kanpur.	(24) Rajkumar Iron Foundry, Lashkarpur, P.O. Jaganpur, Agra.
(6) Ganesh Iron Foundry, Freeganj Road, Agra.	(25) Ram Gulani, Bachai Lal, Mohalla Bazar, Town Bindki, District Fatehpur.
(7) Ganesh Foundry, 118/229, Kanshalpuri, Kanpur.	(26) Randhir Singh Kherbchand, Iron Foundry, Master-ki-Bagichi, Agra.
(8) Gupta and Company, 55/108 Chaumuhala Generalganj, Kanpur.	(27) Ravi Engineering Company, 81/1, Rajpur Road, Dehra Dun.
(9) Hanuman Traders, Shivpuri, Varanasi.	(28) Shivalal Das Mool Chand, Hardware Merchant, 311, Belanganj, Agra.
(10) R.G. Industrial Service, 2442, Jeoni Mandi, Agra.	(29) Sand T. Manufacturing Co., 54/1, Nayaganj, Kanpur.
(11) Immam Ali & Sons, Tin Merchants No. 15, Gautam Budh Marg, Lucknow.	(30) Sarvodaya Industrial Corporation, 89/193-194, Banswandi, Kanpur.
(12) Jagdish Prasad and Phool Singh, Industries, Tajganj Road, Agra.	(31) Steel Fab. Company, 21, Dalampara, Meerut City.
(13) Jay Shree Industries, 308, Belanganj, Agra	(32) Sua Rice Engineering Works, Yamuna Bridge, Agra.
(14) Kishan Swarup Kanshal Kishore, 52, Derkar, Collectorganj, Kanpur.	(33) Sita Ram Shri Chand Lal. Tata Dealers, Lohani Marg, Saharanpur.
(15) K.R. Kohli & Sons, C.K. 13/8, Gyanwapi, Varanasi-I.	(34) Singhal Iron Foundry, Farrah, District Mathura.
(16) Krishna Iron Foundry, Gauri Kunj, Freeganj, Agra.	(35) B.L. Sinha & Sons, Jhutha Ram-Ka-Phatak, Kinari Bazar, Agra.
(17) Krishna Engineering Works, Shivpur, Varanasi	(36) U.P. Agricultural Industries, Station Road, Roorkee.
(18) Mata Din Bhagwan Das Oil Mills Ltd., Bans Mandi, Kanpur.	
(19) Meerut Foundry and Engineering Works, 17, Mahatma Gandhi Road, Meerut.	(37) United Industrial Concern, 98, Durga Bari, Meerut Cantt.

Serial No.	Commodity	Metric Unit
(1) Gold		10 grams (g)
(2) Grocery and Confectionery	Biscuits, sweetmeats, cardamoms.	
Textiles & Textile Fibres	Cotton yarn, damaged and seconds cloth, raw silk, rayon, silk yarn, raw wool, wool manufacturers (when sold by weight).	
Paints & Chemicals	Paint (if sold by weight), indigo, liquid chlorine.	1 kilogram (kg)
Hides, Skins & Leather	Raw hides, leather (hides and skins).	
Metals	Silver, aluminium sheets, strips and circles, copper and brass wires and utensils.	
Miscellaneous	Tea, meat, camphor tablets, mica.	
(3) Grains and Pulses	Rice, wheat, jowar, arhar, moong, masur, gram.	
Spices	Black pepper, mustard, chillies, dhania, dalcini, turmeric, betelnuts.	
Plantation Products	Rubber, cashewnuts, cashew kernels, tobacco (raw and manufactured).	
Forest Products	Lac and lac products, gums, myrobalans, galnuts, soapnuts.	
Textiles & Textile Fibres	Raw jute, raw hemp, coir yarn.	
Oils, Oilseeds & Oilcakes	Vegetable oils, oilseeds, oil cakes.	1 quintal (q) (100 kilograms)
Non-Ferrous Metals	Aluminium: ingots, bars, blocks, slabs, billets. Lead: ingots, sheets and strips. Copper: Ingots, blooms, slabs, cakes, tiles, bricks, billets, blisterbars and wirebars, rods, sections and pipes, plates, sheets and strips, circles. Brass: ingots, rods, sections, pipes, sheets, strips, circles. Zinc: ingots, sheets, strips. Tin: blocks.	
Chemicals	Caustic soda, bleaching powder, glycerine, soaps, paper salt.	
Others	Sugar, gur, ice, fish, sugarcane, vegetables, tamarind.	
(4) Minerals	Iron ore, manganese ore, bauxite, coal.	one metric tonne (t) (1,000 kilograms)
Iron & Steel	Pig iron, iron & steel manufactures, semis (billets for rerolling etc.)	
(5)	Cloth (mill, handloom, silk, rayon and woollen cloth).	1 metre (m)
(6)	Jute carpets, coir mats and matings, sheet glass.	one square metre (m ²)
(7)	Timber.	one cubic metre (m ³)
(8)	Paints (when sold by measure), spirits.	one litre (l)

Weights

- (1) In place of the present units of seer, pound, rattal, viss etc, use the kilogram.
- (2) In place of the tola, use the gram or 10 grams.
- (3) In place of maund or corresponding unit, use the quintal *i.e.* 100 kg.

Capacity Measures

In place of seer or gallon or any other measure use the litre.

Length Measures

- (1) Use the metre in place of yard or foot and the centimetre in place of inch.

Square Measures

- (1) Use the square metre in place of square yard or square foot, and square centimetre in place of square inch.

Cubic Measures

- (1) Use the cubic metre in place of cubic yard or cubic foot and cubic centimetre in place of cubic inch.

Packaging

It is advantageous if sizes of packages correspond to series of commercial weights and measures prescribed. These are: 50 kg, 20 kg, 10 kg, 5 kg, 2 kg, 1 kg, 500 g, 200 g, 100 g, 50 g, 20 g, 10 g, 5 g, 2 g, 1 g, and so on.



TYPICAL PRICING UNITS FOR RETAIL TRADE

Serial No.	Commodity	Metric Unit for Use
(1)	Foodgrains, cereals, pulses, spices, ghee, bread, vegetables, meat, fish, sweetmeats, tea, coffee, sugar, salt.	1 kg
(2)	Oil for cooking	1 kg or 1 litre depending upon prevalent practice.
(3)	Fruits	1 kg or number depending upon prevalent practice.
(4)	Milk	1 litre
(5)	Cloth and related materials	1 metre
(6)	Prepackaged materials	Preferably sizes corresponding to series of commercial weights and measures.

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ABBREVIATIONS FOR METRIC UNITS

(1) DECIMAL MULTIPLES AND SUBMULTIPLES

Prefix	Value in Terms of Unit	Abbreviation
kilo	1,000	k
centi	0.01 (10 ⁻²)	c
milli	0.001 (10 ⁻³)	m
micro	0.000 001 (10 ⁻⁶)	μ

(2) WEIGHTS

Denomination	Value	Abbreviation
tonne	1,000 kg	t
quintal	100 kg	q
kilogram	1 kg	kg
gram	1 g	g
milligram	1 mg	mg
carat	200 mg	c

(3) CAPACITY

kilolitre	1 000 l	kl
litre	1 l	l
millilitre	1 ml	ml

(4) VOLUME

cubic metre	m ³	m ³ or cu m*
cubic centimetre	cm ³	cm ³ or cu m*
cubic millimetre	mm ³	mm ³ or cu mm*

(5) LENGTH

kilometre	1 000 m	km
metre	1 m	m
centimetre	1 cm	cm
millimetre	1 mm	mm
micron	1/1 000 mm or 10 ⁻³ mm	μm

(6) AREA

square kilometre	1 000 000 m ²	km ² or sq km*
square metre	1 m ²	m ² or sq m*
square centimetre	1 cm ²	cm ² or sq cm*
square millimetre	1 mm ²	mm ² or sq mm*

(7) LAND MEASURE

are	100 m ²	a
hectare	100 a ²	ha
centiare	m ²	ca

*Both these abbreviations are current, but the first set should preferably be used. The former abbreviation is used more commonly internationally than the latter.

Rules for Abbreviations:

- (1) Do not make any change, such as addition of 's' to indicate plurality e.g. write 1 kg, 10 kg, 20 g, 5 g, 10 t, 20 ml, 27 l, 165 km, 2 mm, 100 cm³, 66 km²;
- (2) Do not capitalize the abbreviations. For example, do not write 1 Kg, 2 Kg, 20 MM, 50 MM; the right way is to write 1 kg, 2 kg, 20 mm, 50 mm, etc.
- (3) Do not use any other abbreviations except those given above.

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metric measures

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Metrology in India

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Government of India Mint,
Bombay

METROLOGY is often mistakenly taken to be a branch of production engineering. Actually it is mainly based on the principles of applied physics, mathematics and engineering. In its wider scope it covers almost everything concerned with the life of mankind since none of our daily transactions, work and various functions are complete without the application of measuring. It is perhaps this thought that made Theodor Mommsen, the German historian, say :—

‘It is only the art of measuring which helps man to rule the world.’

Bertrand Russell, the famous philosopher avers :

‘Measuring is a masterpiece of simplification without falsification.’

Lord Kelvin feels :

‘If you are able to measure by a number what you talk and express, you then know something; but if you cannot measure what you are able to express by a number, your conception is very poor and unsatisfactory.’

What is Metrology?

The ‘art of measuring’ has been developed in its varied applications and branches of learning into the ‘science of metrology’. Thus ‘scientific metrology’ deals with the evolution and development of the fundamental or derived standards.

‘Engineering metrology’ mainly deals with the precise measurement of articles and components of the engineering industry in their various stages of unfinished and finished condition. It covers the measurement of dimensions, angular measurement, surface finish, profile forms etc. with the requisite degree of accuracy according to the nature of the end product. Articles such as gauges, screw threads, micrometers, comparators, interferometers and a numerous variety of measuring instruments come under the compass of the subject.

‘Legal metrology’ deals with the metrology of public transactions in commerce, industry and agriculture *i.e.* measuring articles which are purchased or sold in commercial transactions through the medium of weights, measures or weighing and measuring instruments which are subject by law to verification, stamping and periodical inspection by a competent state authority like the Department of Weights and Measures.

Besides the above, there are other subdivisions of metrology such as physical metrology of natural phenomena, biological metrology, metrology of hygiene and collective security, metrology of sailing, metrology of flying, of astronomy, of chemistry,

metrology of man and perhaps, in keeping with the times, metrology of radiations and metrology of space travel.

In this article only the subjects of scientific metrology, engineering metrology and legal metrology are briefly considered.

Scientific metrology forms the basic link between the other two as it concerns the evolution and acceptance of fundamental standards.

Standards of Measurement

As India has now adopted the metric system, there is no need to refer to other systems in this article. The International Prototype Kilogram made of platino-iridium alloy and the International Prototype Metre also made of platino-iridium alloy in the well-known Tresca Section, lodged in the Pavillon de Breteuil, Bureau International des Poids et Mesures (BIPM), Sevres, France, are the respective fundamental standards of weight and length measure. (Recently the definition of the metre has been changed to which reference is made later).

Each country which is a member of the 'Metric Convention' has received a prototype copy of these standards and these are the highest standards in use in those countries. The intention of the original promoters of the fundamental standards was to connect the standards to a 'natural quantity'. For example, they decided to fix the length of the metre as equal to 1/40 millionth part of the earth's meridian passing through the observatory of Paris, a portion of which was actually measured to the highest degree of accuracy obtainable in the 1790's.

It was, however, found later that there was still some error and the unit of length was fixed as the distance between two marks

on the International Prototype Standard at 0°C and under normal atmospheric pressure.

In October 1960, even this definition has been changed and the metre has been defined and accepted by the representatives of 32 Governments at the Eleventh Conference of Weights & Measures as the distance equal to 1 650 763.73 wavelengths of the orange red light of krypton 86 in *vacuo*. The wavelength of this light is 0.605 892 microns.*

The unit of the kilogram was based on the mass of one cubic decimetre of distilled water at 4°C. Subsequently it was found that there was an error of 3 parts in 100,000 due to the fact that one kilogram of distilled water has a volume of 1.000 028 cubic decimetres. Although for practical purposes 1 cubic centimetre of pure, air-free water at its temperature of maximum density and at normal atmospheric pressure weighs 1 gram, it is not scientifically correct to say that one cm³ of pure, air-free water weighs one gram or one dm³ weighs one kilogram.

The accuracy of International Standards is of the order of 10⁻⁷ to 10⁻⁸ of their unit values.

In the Standards of Weights and Measures Act, 1956, the following primary and secondary units have been defined :

Length	..	..	Metre
Mass	..	..	Kilogram
Area	..	..	Square Metre
Volume	..	..	Cubic Metre

*An apparatus recently installed in the BIPM, Sevres, which has been manufactured and supplied by M/s. Société Générale Instrument d'Physique, Geneva, and is capable of measuring the graduations to a precision of some millionths of a millimetre, is based on the principle of interferometry and is fitted with photoelectric microscopes and electronic controls.

Capacity	..	..	Litre
Time	..	..	Second
Electric Current	..	..	Ampere
Luminous Intensity	..	..	Candela
Scale of Temperature	..	..	°C

Recently the Eleventh General Conference of Weights and Measures has approved a number of secondary units*.

Engineering Metrology

Even an engineer who is familiar with drawing scales or workshop measuring scales, requires some practice to get the correct feel of instruments like micrometers or calipers used for measuring diameters or widths of objects to an accuracy of 25 microns *i.e.* 0.025 mm (one thousandth of an inch). In most of the precision engineering works, tool rooms and inspection laboratories of today it is not uncommon to aim at an accuracy of 5 microns *i.e.* 0.005 mm (± 0.0002) or better. The inspection and reference gauges used in such precision laboratories have to be still more precise in accuracy. An idea of the degree of accuracy is given by the DIN formula *e.g.* tolerance on reference end standard = $\pm (0.1 + 0.002 L) \mu$ where $\mu = 0.001$ mm, and

L = Length of the standard in mm.

Thus the tolerance on a metre bar is ± 0.0021 mm (2.1 microns). The actual precautions one has to take for achieving this precision will be appreciated from the fact that a steel bar one metre long undergoes a change in length of 1.2 microns for each tenth of a degree Centigrade temperature change.

The basic knowledge for students to be trained in engineering metrology must be in the main in the following subjects :

- (1) Mathematics: engineering level.
- (2) Physics (applied), specially relating to heat, optics, electricity and sound: B.Sc. level.

*Metric Measures, September 1961, p. 22

- (3) Mechanics.
- (4) Heat treatment of steel.
- (5) Properties of materials.
- (6) Standardization.
- (7) Workshop technology including fits and tolerances.
- (8) Extensive knowledge and practical use of measuring instruments, comparators, slip gauges, dial gauges, surface measuring instruments, interferometers, profile measuring machines, universal measuring machines, internal and external cylindrical measuring machines, gear measuring machines, etc.
- (9) Electronics and its industrial application in measuring machines.
- (10) Air conditioning: temperature control, vibration.
- (11) Engineering drawing.
- (12) Manufacture and design of gauges and measuring instruments.
- (13) Testing of straightness, flatness, squareness and alignment.

Legal Metrology

In its application legal metrology requires full knowledge of the practical use and application of all types of standards of weights, capacity measures, linear measures and machines, apparatus and appliances. It also covers the measurement of area, volume, distance, and in some countries electricity and gas supply. The commercial standards employed for these purposes are required by law to be previously verified and stamped, before they are used for commercial transactions. They also have to undergo periodical inspection. Any apparatus, appliance and machine *viz.* scales, balances, weighing machines (automatic or otherwise), platform machines, counter machines, steelyards, batch weighing machines, cloth and leather measuring machines, petrol pumps, meters used for measuring petrol, lubricants and hydrocarbons, meters for measuring gas and electricity, proving vessels, tapes, heavy weights for testing tare of

wagons, tank wagons, oil tankers and so on, can be used for commercial transactions only after their designs have been approved, and models verified and stamped prior to production and then after production, each item has to be verified, tested and stamped by the Inspectors of Weights and Measures, in accordance with the provisions of the Weights and Measures Laws of the country. Legal metrology also covers the legal aspects of the misuse of weights etc., infringements of laws and other related matters.

In order to be able to inspect, verify and approve weights, measures and weighing and measuring instruments, and also to make useful suggestions for the modification of designs to conform to the provisions of the Weights and Measures Rules, the engineering personnel connected with the Weights and Measures Administration must have a sound knowledge of legal and practical metrology. A graded course of study followed by a diploma or degree is a prerequisite prescribed in most countries for its personnel. The standard of the grade depends upon the nature of work allotted in the cadre of employment. Courses of study ranging from 1½ to 2 years are given in some institutions, supplemented or followed by a course of practical training in the Department of Weights and Measures. In the UK, only candidates who have passed the Board of Trade examination are selected. In France there is a College of Metrology for imparting knowledge and to award diplomas and degrees. The subjects covered in France for training (1) Technical Assistants, (2) Inspectors, (3) Engineers (to take up responsible posts of Controlling Officers) are briefly described in Appendix 1.

International Organization of Legal Metrology

An organisation called the International Organization of Legal Metrology, repre-

senting over 30 countries in the world, is now functioning in France, and is laying down unified principles and practices of legal metrology for use all over the world. Many member countries have volunteered to undertake studies and report on technical aspects of various types of instruments and appliances. The long-felt need for such an Organization has now been fulfilled.*

Conclusion

To sum up, an endeavour has been made in this article to stress the importance of metrology in our Government's task of introduction of metric weights and measures. Several thousand technical persons who have been entrusted with the task of verification, inspection and testing of numerous standards, apparatus and machines have to be trained in the subject and educated to have the right approach to the subject. Periodical refresher courses are necessary as soon as facilities are provided, for those already in service. Arrangements should also be made to train new entrants in specialized courses on metrology. Later on it should be made a condition that only holders of diploma or degree in metrology would be taken into service. Engineering graduates should be given post-graduate training and promising young men should be provided research facilities at the various laboratories suited to this type of work.

Although the immediate task of Departments of Weights and Measures is to verify and stamp the country's requirement of new weights, measures, weighing and measuring instruments, they are bound to face many problems in the near future in the verification of various types of measuring instruments, machines, proving vessels etc. As a result, the States would soon feel the need for a central laboratory to examine,

*Metric Measures, Vol. 1, May 1958, pp 5-9.

inspect, verify, approve and stamp prototype designs of new types of machines on a country-wide basis and also to check accurately many measuring instruments or working standards for measurements of great reach (rail, road). The need for several centrally controlled laboratories within easy reach of the States is emphasised by the fact that they would help in the advancement of this science and in solving many technical and scientific problems of approval, verification and inspection of prototypes of new machines and instruments.

APPENDIX 1

Syllabus for Courses of Study for (1) Technical Assistants, (2) Inspectors (3) Engineers employed in the Weights and Measures Department in France.

TECHNICAL ASSISTANTS

Admission : Matriculates, with science or technical subjects, have to appear for an entrance examination and selections are made on the basis of the results of this examination.

Period : Six months at College.
One year at the Bureau of Verification.

Syllabus : (1) General principles of measurement, units of measurement, terminology, errors, numerical calculations.
(2) Length measures and measuring apparatus.
(3) Measures of surface, planimeters.
(4) Measures of volume, solids, liquids and gas.
(5) Measures of masses, weights, weighing instruments.
(6) Measurement of electrical energy.
(7) Technology of metals and alloys used in measuring instruments and standards.
(8) Industrial drawing.

- (9) Administrative law and penal code.
(10) Rules and Regulations regarding the use and inspection of instruments and measures.

INSPECTORS

Admission : Chosen from Science (Mathematics and Physics) graduates or diploma engineers on the results of an entrance examination.

Duration : 12 months at the College.
6 months at the Bureau of Verification.

Syllabus : (1) Mathematics: (Calculus-differential and integral), Probabilities.
(2) Physics: Fluid mechanics, thermodynamics, electricity, electrotechnology, electronics.
(3) Standardization: Terminology.
(4) General information on measures, historical background, units of measurements, errors in measurement.
(5) Length measures and measuring apparatus.
(6) Measurement of angles.
(7) Measurement of surfaces, planimeter and mechanics of planimeter.
(8) Measurement of volume.
Solids: Capacity measures and measuring apparatus.
Liquids: Measures of capacity and apparatus, discontinuous meters etc. recipient measures, proving vessels, cisterns and reservoirs.
Gas : Meters.
(9) Measurement of Mass: Weights, weighing instruments, non-self-indicating, self-indicating and semi-self-indicating, batch weighing machines, totalizing machines, density meters, alcoholometers.
(10) Measurement of time: Chronometry
(11) Measurement of pressure and delivery of gas: Manometers and other gaseous measuring instruments.

- (12) Measurement of electrical energy: Electrical meters.
- (13) Temperature measurements and heat.
- (14) Optical measuring.
- (15) Strength of materials and applied mechanics.
- (16) Technology of materials and alloys of construction, types of wood and other material used in construction.
- (17) Industrial drawing.
- (18) Administrative Law and Penal Code.
- (19) Rules and Regulations relating to weights and measures.

ENGINEER'S DEGREE COURSE (Newly introduced in 1960).

Admission : Chosen from diploma and degree holders from polytechnics on the result of an entrance examination.

Duration : 2 years course at the College.

Syllabus : (1) Higher mathematics including tensor, vector calculus, calculus of probability, statistical control, statics, dynamics and hydrostatics.

- (2) Fluid mechanics, thermodynamics, optics, photometry, acoustics, electrical technology, electronics, modern physics and nuclear physics.
- (3) Principles of standardization, terminology etc.
- (4) General principles of measures, standards of units of measure, quality of measuring apparatus, preparation and verification of measures, errors, tolerance etc.
- (5) Various types of measuring machines, instruments etc. covered by items (5 to 14) of the Inspector's course.
- (6) Precision measurement.
- (7) Strength of materials and applied mechanics.
- (8) Technology of materials and alloys of construction, their analysis and specifications and physical characteristics.
- (9) Industrial design and drawing.
- (10) Administrative Law and Penal Code.
- (11) Rules and Regulations relating to weights and measures.

International Paper Sizes

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'BRITISH paper sizes, like Topsy, just grewed'. This very apt observation of the British Federation of Master Printers in one of its pamphlets for production aids to the printing industry explains the growth in that country of the multiplicity of paper sizes without any common basis. The Indian industry, largely fashioned after its counterpart in the UK, has inherited this multiplicity. To one who is uninitiated in the intricacy of the paper industry and trade, it constitutes a source of much confusion. Many sizes differ only slightly from one another and the nomenclature used to denote them adds to the confusion, as in post, small post, large post, demy, small demy, large demy and so on.

The economic implications of this state of affairs are far-reaching. The cost of manufacture and stocking at multiple points by dealers and consumers grows with the growth of variety. The printing industry has to invest a larger amount of capital in stocks of different sizes of paper. Manufacturers of printing machinery have to align themselves with the paper sizes. Ancillary industries dealing with paper products and stationery equipment are

also similarly affected. The result is an avoidable national wastage on the one hand and an increased burden on the consumer in the form of enhanced prices on the other.

There can be no doubt that a reduction in the number of paper sizes will benefit all concerned, but any attempt to rationalize the existing sizes is met with an inherent difficulty. The sizes, having developed without any correlation with one another, do not offer any logical basis on which reduction can be effected. To choose one in preference to any of the other near sizes is just arbitrary. This difficulty led the Paper Committee of the International Organization for Standardization (ISO) to turn to a series of paper sizes which had been in use in some of the European countries. It was found that these sizes, by virtue of the coherent system on which they were based, possessed some remarkable properties to ensure substantial economies to both paper manufacturing and printing industries and, of course, to consumers in general. These sizes have since been adopted by a very large number of the national standardizing bodies of the world and is

now referred to as the international series of paper sizes.

Basis of International Paper Sizes

The basis of the international series of paper sizes, or A-sizes, is a rectangle having an area of one square metre, the sides of which are in the proportion of $1:\sqrt{2}$. The effect of this arrangement is that if the area of the sheet is doubled or halved, the shorter

the smaller the sheet. Figure 2 shows some subdivisions from A1.

Where larger dimensions are required, the letter A is preceded by a figure. Thus 2A0 means twice the size of A0; and 4A0 means four times the size of A0. Table 1 gives the designations and sizes of the A series. The dimensions are of the trimmed or finished sizes. Stock sizes from which they are obtained are given later.

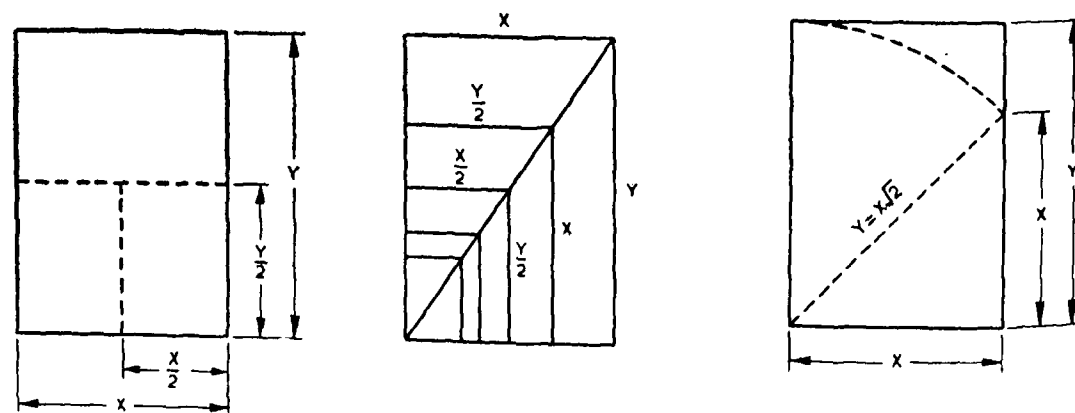


Fig. 1—Basis of International Paper Sizes

side and the longer side of the new sheet are still in the proportion $1:\sqrt{2}$ as shown in Fig. 1.

Thus it is possible to derive successive sizes of the series merely by repeated halving. This also provides advantages in the preparation of copy, as any size in the series can be obtained from one copy by enlargement or reduction.

The designation of the series consists of capital A followed by a figure. The basic size has the designation A0; half A0 is A1; half A1 is A2 and so on. The higher the figure which follows the letter, the greater is the number of subdivisions and, therefore,

TABLE 1—A-SERIES OF INTERNATIONAL PAPER SIZES

Designation	Size in mm	Exact Size in in.
4A0	1 682 × 2 378	66.22 × 93.62
2A0	1 189 × 1 682	46.81 × 66.22
A0	841 × 1 189	33.11 × 46.81
A1	594 × 841	23.39 × 33.11
A2	420 × 594	16.54 × 23.39
A3	297 × 420	11.69 × 16.54
A4	210 × 297	8.27 × 11.69
A5	148 × 210	5.83 × 8.27
A6	105 × 148	4.13 × 5.83
A7	74 × 105	2.91 × 4.13
A8	52 × 74	2.05 × 2.91
A9	37 × 52	1.46 × 2.05
A10	26 × 37	1.02 × 1.46

INTERNATIONAL PAPER SIZES

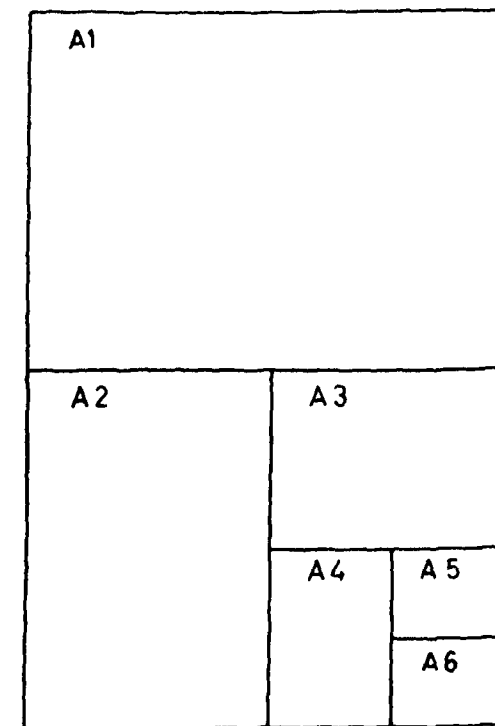


Fig 2-A—Series of Paper Sizes

B and C Sizes

In addition to the A sizes, three other series of international paper sizes were originally devised, namely B, C and D. The D series is obsolete. The B sizes are obtained from the A series as the geometrical intermediates of consecutive A sizes. They are intended primarily for posters, wall charts and similar items where the difference in sizes of the A series represented too large a jump. It is also used for envelopes where it is necessary for an envelope in the C series to be inserted in another envelope.

The C sizes are geometrical intermediates between consecutive A and B sizes. They are primarily meant for envelopes or folders suitable for enclosing the A series of sta-

tionery. The relationship between A, B and C sizes is shown in Fig. 3. A will be seen to fit in C and C in B. Table 2 below gives the dimensions of some of the B and C sizes.

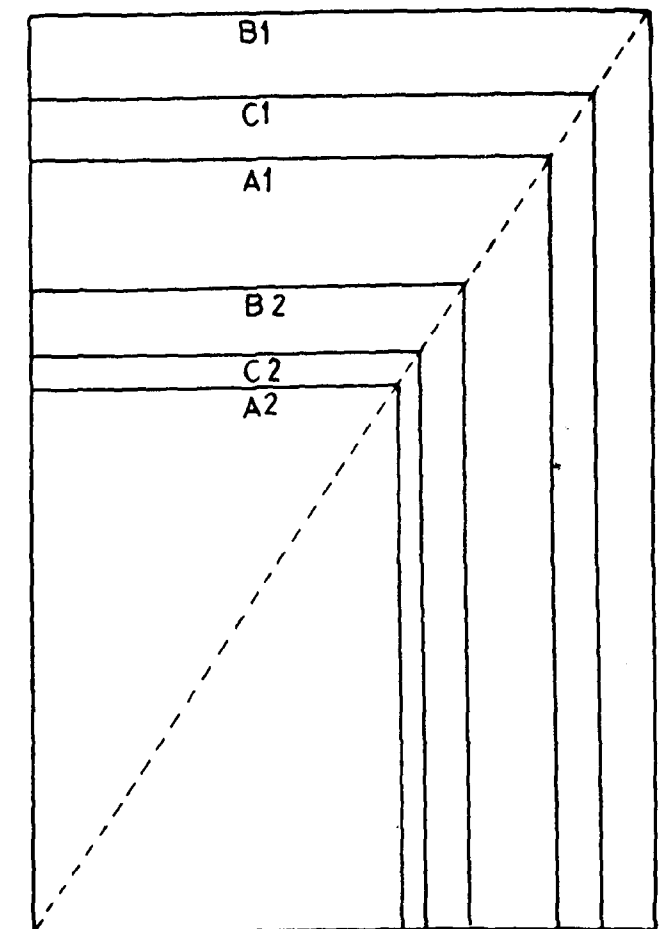


Fig 3—Relation Between A, B and C Sizes

Table 2 below gives the dimensions of some of the B and C sizes

TABLE 2—B AND C SERIES OF INTERNATIONAL PAPER SIZES

Designation	Size in mm	Exact Size in in.
B1 ..	707 × 1 000	27.83 × 39.37
B2 ..	500 × 707	19.68 × 27.83
B3 ..	353 × 500	13.90 × 19.68
C1 ..	648 × 917	25.51 × 36.10
C2 ..	458 × 648	18.03 × 25.51
C3 ..	324 × 458	12.76 × 18.03

The Indian Standards Institution has adopted the international paper sizes in IS: 1064—1957 Indian Standard Specification for Paper Sizes. The A series is recommended as the principal series for all general printing work. In particular, size A4 has been recommended for business letters and periodicals, and books may correspond to any convenient size of the A series preferably in the range A4 to A6. It is realized, however, that the change-over to the A series for printing papers involves considerable deviations from existing practices. The B and C sizes which are nearer to crown and foolscap papers were, therefore, standardized as additional special sizes. As stated before, B and C series are not meant for paper sizes and should be used only rarely to facilitate the transition to the A series.

Stock Sizes

The sizes described above are all trimmed sizes. Raw stock sizes in which paper is manufactured and stocked must necessarily allow for a margin for trimming. No international recommendation is yet available for raw stock sizes but the discussion at the subcommittee level of the ISO Paper Committee has advanced sufficiently to give an indication of the trend of thought now prevailing at the international level. Taking note of it, the Paper Sectional Committee of ISI prepared a draft specification for raw

stock sizes which has just been finalized after eliciting the comments of the industry, trade and other consuming interests.

The proposed raw stock sizes are given in Table 3. They represent a compromise between the wide range of deckle widths of existing paper mills in the country and the minimum trimming margin required by the printing industry for various types of work. The ordinary raw stock sizes are appropriate to cover a large amount of general work but for bleeding work and where extra trims are necessary the special size may have to be ordered.

TABLE 3—UNTRIMMED (RAW STOCK) PAPER SIZES

Untrimmed Size Designation	Standard Size cm	Special Size cm
RA0 ..	86 × 122	88 × 124*
RA1 ..	61 × 86	62 × 88*
RB1 ..	75 × 105	—
RC1 ..	67 × 94	68 × 96*

*For bled work or where extra trim is required.

Change-over to New Sizes

Fig 4 shows the correspondence of the demy, crown and foolscap paper sizes, which are the most popular sizes in demand now, and the A, B and C series of paper sizes.

It is evident that they are fairly close to enable the paper making and printing industries to adopt the nearest international size. It should be borne in mind, however, that if all the three A, B and C sizes are brought into use, the advantage of variety reduction will be largely lost. For this reason, B and particularly C sizes are not recommended to be used unless there are weighty economic considerations against the immediate adoption of the A sizes. The Conference of the State Controllers of Printing and Stationery which has been reported earlier in *Metric*

*Measures** came to the conclusion that for all items of work for which the A sizes can be used, they should be adopted straightaway and for other work the B series may be adopted as a transitional measure for working towards the A sizes in a gradual manner.

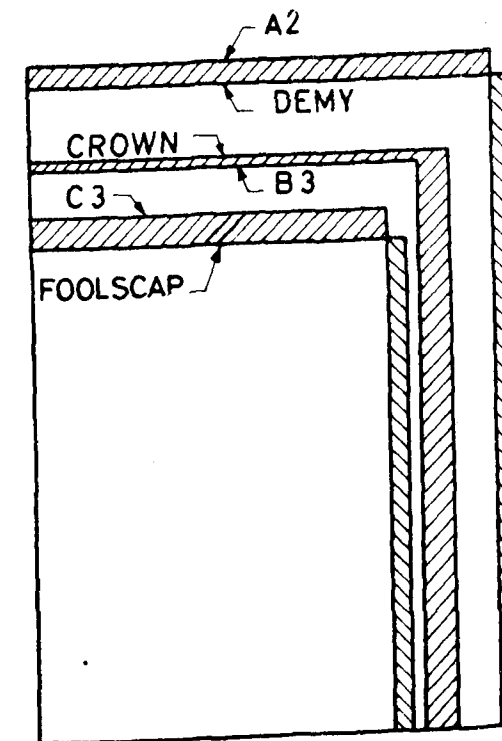


Fig 4—Correspondence Between Some Existing and International Sizes.

**Metric Measures*, March 1961, pp. 20-22.

There would seem to be no serious difficulty in implementing the recommendations of the Conference of the State Controllers of Printing and Stationery by the printing industry in general. There is nothing inherently mandatory in the form of a publication which means that it should be possible to set it in A size as well as in its present size. For forms, the adoption of the A series of paper sizes is much easier. The problem, however, arises in regard to the economics of printing in A sizes in existing printing machines. This question has been examined in detail by the Office of the Chief Controller of Printing and Stationery, New Delhi and it has been shown that a large number of existing printing machines will be able to accommodate A sizes of paper. For the rest, the B sizes will involve little problem.

The international paper sizes have been adopted after much thought both at the national and the international levels. Its adoption will put an end to the recurring wastage of existing multitude of paper sizes. It is to be hoped that the various industries and trade connected with paper making and printing will willingly co-operate with each other and will solve the few problems that may arise in the transition period and clear the way towards the adoption of the international paper sizes in India in the very near future.

Metric System in Architectural, Building and Structural Drawings

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THE Standards of Weights and Measures Act, 1956, lays down a period of 10 years for the complete adoption of the metric system. We are now passing through the transition period. During this period the architect and the building engineer will come across many problems regarding preparation of drawings in metric units and sizes of metric drawing accessories. This article brings together information needed by the architect and the structural engineer for the preparation of architectural, building and structural drawings.

The Indian Standards Institution (ISI) have published IS: 962—1960 'Code of Practice for Architectural and Building Drawings'. This standard lays down detailed procedure for the preparation of architectural drawings in the metric system.

A comprehensive code for the preparation of structural drawings in the metric system is under preparation by the ISI.

Sizes of Drawing Sheets (From IS: 962—1960)

Designation	Trimmed Size	Untrimmed Size
	mm	Minimum mm
A0	841 × 1189	880 × 1230
A1	594 × 841	625 × 880
A2	420 × 594	450 × 625
A3	297 × 420	330 × 450
A4	210 × 297	240 × 330
A5	148 × 210	165 × 240

Note.—The trimmed sizes of drawing sheets are based on the following principles (see IS: 1064—1957) :

(a) The surface area of the basic size A0 is one square metre.

(b) The width and length bear a ratio of 1 : $\sqrt{2}$. In consequence at each doubling or halving lengthwise of any paper size in the series, the aspect ratio of 1 : $\sqrt{2}$ is maintained.

Sizes of Drawing Boards (From IS: 1444—1959)

Designation	Dimensions
	mm
B0	1250 × 900 × 20
B1	900 × 650 × 20
B2	650 × 500 × 20
B3	500 × 350 × 20

Note.—(a) For drawings exceeding these sizes, special drawing boards may be used, but the width of drawing boards should not exceed 1 000 mm.

(b) There are four sizes of engineer's pattern tee squares, designated as T0, T1, T2 and T3 (made according to IS : 1360—1959) for use with drawing boards, designated as B0, B1, B2 and B3 respectively. The B0 of board size should not be confused with B0 paper size.

METRIC SYSTEM IN ARCHITECTURAL, BUILDING AND STRUCTURAL DRAWINGS

Sizes of Printing Frames for Reproduction

Designation (1)	Size (2)
	mm
F0	1250 × 900
F1	900 × 650
F2	650 × 500
F3	500 × 350

Metric Scales for Architectural Purposes (From IS: 1491—1959)

There are 6 scales for architectural purposes, designated as A, B, C, D, E and F and marked with 12 different scales of reduction as given below:

A	{ Full size 1 cm = 2 cm	1/1 1/2
B	{ 1 cm = 2.5 cm 1 cm = 5 cm	1/2.5 1/5
C	{ 1 cm = 10 cm 1 cm = 20 cm	1/10 1/20
D	{ 1 cm = 0.5 m 1 cm = 1 m	1/50 1/100
E	{ 1 cm = 2 m 1 cm = 5 m	1/200 1/500
F	{ 1 cm = 10 m 1 cm = 20 m	1/1 000 1/2 000

The scales used for various purposes will be as follows:

(a) Large Scale Surveys and Layouts
1/2 000, 1/1 000, 1/500

(b) Preliminary Sketch Drawings
1/500, 1/200, 1/100

(c) Working Drawings, Plans, Elevation and Sections
1/200, 1/100, 1/50

(d) Large Scale Drawings—General Details
1/20, 1/10

(e) Enlarged Detail
1/10, 1/5, 1/2.5, 1/2, 1/1

Metric Scales for Use with Drafting Machines (From IS: 1482—1960)

According to IS: 1482—1960, the metric scales for use with drafting machines are to be made in two lengths : 30 cm and 50 cm and incorporate four scales of reduction, namely, 1/1, 1/2.5, 1/5 and 1/20.

Metric Steel Scales for Engineers (From IS: 1481—1959)

According to IS: 1481—1961, the scales are of the following denominations :

10 cm
15 cm (non-preferred)
20 cm
30 cm
50 cm
100 cm

The scales are graduated in cm and mm. The first 5 cm are divided into 0.5 mm divisions.

Numbering of Building Floors, Rooms and Components (From IS: 962—1960)

Floors (1)	Rooms (2)	Windows (3)	Doors (4)	Columns (5)	Beams (6)
Floor 001	R001/1 etc	W001/1 etc	D001/1 etc	C001/1 etc	B001/1 etc
Floor 01	R01/1 etc	W01/1 etc	D01/1 etc	C01/1 etc	B01/1 etc
Floor 1	R1/1 etc	W1/1 etc	D1/1 etc	C1/1 etc	B1/1 etc
Floor 2	R2/1 etc	W2/1 etc	D2/1 etc	C2/1 etc	B2/1 etc

Note:

- Floor 001 refers to second floor below the floor at the ground level (that is, Floor 1) such as sub-basement.
- Floor 01 refers to the floor just below the floor at the ground level, such as basement.
- Floor 1 refers to the floor immediately above ground. This is commonly referred to as ground floor.

Gals on the Line

(The following article, written by Mr. C. A. Howard-Luck, Inspector in-Charge, Nyanza Province, Kenya, is reproduced from *The Monthly Review* (The Journal of the Institute of Weights and Measures Administration, U.K.) June 1961, pages 133-134.

It is hoped that it would be of interest to many in India as it describes the possible effect of variation of gravity on spring balances. The need for accurate readjustment of spring balances when they are to be used in the tropics, is stressed in the article.

It may be mentioned that some Continental countries do not legally permit the use of spring balances in commercial transactions. ---Editor

The Kisumu office of the Kenya Weights and Measures Department is situated only $6\frac{1}{2}$ miles from the Equator and is the nearest Weights and Measures office in the Commonwealth to the "Line". It is therefore in an excellent position for a study of the effect of the equatorial bulge in the earth's shape on the value of g .

The study was made mathematically at first. Using Helmert's formula for correcting the value of g for latitude ($g=980.616-2.5928 \cos 2\lambda+0.0069 \cos^2 2\lambda$), it was calculated that the force of gravity at the Kisumu office (position: $34^\circ 45'E$; $0^\circ 06'S$) should be 978.030 cm/sec^2 . This, however, only gave a value for sea-level and the working level in the office is 3,860 feet above sea-level. A correction for altitude was then applied to the result, by subtracting from it $0.0003086 h$, h being the altitude of

1 177 metres. The theoretical value of g at the Kisumu office was finally calculated to be 977.667 cm .

It was realised, however, that the local geomorphological conditions would cause a considerable variation or anomaly in the actual force of gravity when compared with the theoretical value. As has already been described in Mr. Venable's letter (68 MR 61), Kisumu is surrounded on three sides by large land masses, the nearest being the Nandi Escarpment which towers 2,000 feet above the plain at a distance of 6 miles from the office. These neighbouring land masses are certain to affect the true value of g . Fortunately a recent gravimetric survey had been carried out by a team of geophysicists in the Kisumu area and its results were made available to the Weights and Measures Office there.

It is desirable at this point to give a brief description of a gravimetric survey. The object of this survey is to measure small local variations, known as anomalies, in gravitational force, which are caused by geological formations, such as salt domes, faults and anticlines. The geometrical shapes and the differences in density of these formations control the size of these anomalies, but as the geological formations are very small when compared with the earth's volume, the anomalies are correspondingly small. The unit used in gravimetry is the

GAL (derived from Galileo), which is defined as the strength of a gravitational field that will act upon a mass of 1 gram with a force of 1 dyne. Anomalies are measured in milligals. Pendulums and gravimeters are employed in making a survey. Pendulums, together with crystal clocks, are used at base stations to determine absolute values for g . Gravimeters, which are a sensitive type of spring balance, are then used at various points around the base station to determine changes in g directly from measured changes in their spring extensions. Gravimeters can measure changes of 0.1 milligal in the vertical component of gravity, $\frac{\delta z}{\delta v}$ (if v is the gravity potential

then $\frac{\delta v}{\delta z}$ is the gravity component in the z or vertical direction). Accurate level data are essential since a 1 foot difference in altitude corresponds to approximately 0.2 mgal in the vertical component of gravity.

Readings taken with a Worden gravimeter in the Kisumu area by the geophysicists mentioned previously gave results ranging from 977.607 gals to 977.610 gals. These results were plotted on a 1/10,000 map and,

allowing for differences in altitude, it was calculated that gravity at the work-bench level in the Kisumu Weights and Measures office equalled 977.608 gals.

This experimental result of 977.608 gals was compared with Clark's result for the National Physical Laboratory, Teddington of 981.181 5 gals (1940 Proc. Roy. Soc. A, 175, 113), and it was calculated that a spring balance accurately calibrated at the N.P.L. would show an error of 0.364 percent on a test carried out at Kisumu. When it is considered that the verification tolerance on a 200 lb. spring balance is 0.125 percent and that on a 20 lb. spring balance is 0.098 percent the need for accurate re-adjustment of spring balances intended for use in the tropics is clearly evident.

I wish to acknowledge the advice and assistance given in the preparation of this paper by the Nyanza Provincial offices of both the Survey Department and the Mines and Geology Department, Kenya; also the information supplied by Mr. J. Bryant, M.I.W.M.A., Superintendent of Weights and Measures, Kenya, and by Mr. J. L. Penn, M.I.W.M.A., of the Federal Assize Department, Nyasaland.

CONVERSION TABLES FOR TOLA AND ITS FRACTIONS

Conversion Tables for Tola and its Fractions

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(An article on the above subject by the author was published in the March 1961 issue of *Metric Measures*. The article contained an abridged table for conversion of fractions of tola to grams and milligrams. Since then a number of enquiries have been received for publication of the full table. Shri Luther has been kind enough to prepare a table in which the values proceed in steps of one chawal upto one tola and then in steps of one tola upto 20 tolas. The metric values have been rounded

off to the nearest milligram. This table is published in the following pages.

It is hoped that the table would be useful to bullion merchants, vaidyas and others concerned with fine weighments.

The fractions of the tola converted here are:

8 chawal = 1 rati
8 rati = 1 masha
12 masha = 1 tola

—Editor)

TABLE 1

Chawals, Ratis, Mashas, Tolas to Milligrams and Grams

Factor used: 1 tola = 11.6638 grams

Masha	Rati	Chawal	Gram	Milligram	Masha	Rati	Chawal	Gram	Milligram	Masha	Rati	Chawal	Gram	Milligram
..	1	..	15		2	3	..	289		4	4	..	547	
..	2	..	30		2	4	..	304		4	5	..	562	
..	3	..	46		2	5	..	319		4	6	..	577	
..	4	..	61		2	6	..	334		4	7	..	592	
..	5	..	76		2	7	..	349		5	—	..	607	
..	6	..	91							5	1	..	623	
..	7	..	106		3	—	..	364		5	2	..	638	
1	—	..	121		3	1	..	380		5	3	..	653	
1	1	..	137		3	2	..	395		5	4	..	668	
1	2	..	152		3	3	..	410		5	5	..	683	
1	3	..	167		3	4	..	425		5	6	..	699	
1	4	..	182		3	5	..	440		5	7	..	714	
1	5	..	197		3	6	..	456						
1	6	..	213		3	7	..	471		6	—	..	729	
1	7	..	228							6	1	..	744	
2	—	..	243		4	—	..	486		6	2	..	759	
2	1	..	258		4	1	..	501		6	3	..	775	
2	2	..	273		4	2	..	516		6	4	..	790	
					4	3	..	532						

TABLE 1—contd.

Masha	Rati	Chawal	Gram	Milligram	Masha	Rati	Chawal	Gram	Milligram	Masha	Rati	Chawal	Gram	Milligram
	6	5	..	805	1	6	—	..	701	2	5	3	..	597
	6	6	..	820	1	6	1	..	716	2	5	4	..	612
	6	7	..	835	1	6	2	..	731	2	5	5	..	627
					1	6	3	..	747	2	5	6	..	643
	7	—	..	850	1	6	4	..	762	2	5	7	..	658
	7	1	..	866	1	6	5	..	777					
	7	2	..	881	1	6	6	..	792	2	6	—	..	673
	7	3	..	896	1	6	7	..	807	2	6	1	..	688
	7	4	..	911						2	6	2	..	703
	7	5	..	926	1	7	—	..	822	2	6	3	..	719
	7	6	..	942	1	7	1	..	838	2	6	4	..	734
	7	7	..	957	1	7	2	..	853	2	6	5	..	749
					1	7	3	..	868	2	6	6	..	764
1	—	—	..	972	1	7	4	..	883	2	6	7	..	779
1	—	1	..	987	1	7	5	..	898					
1	—	2	..	2	1	7	6	..	914	2	7	—	..	794
1	—	3	..	18	1	7	7	..	929	2	7	1	..	810
1	—	4	..	33						2	7	2	..	825
1	—	5	..	48	2	—	—	..	944	2	7	3	..	840
1	—	6	..	63	2	—	1	..	959	2	7	4	..	855
1	—	7	..	78	2	—	2	..	974	2	7	5	..	870
					2	—	3	..	990	2	7	6	..	886
1	1	—	..	93	2	—	4	..	5	2	7	7	..	901
1	1	1	..	109	2	—	5	..	20	3	—	—	..	916
1	1	2	..	124	2	—	6	..	35					
1	1	3	..	139	2	—	7	..	50	3	—	1	..	931
1	1	4	..	154	2					3	—	2	..	946
1	1	5	..	169	2	1	—	..	65	3	—	3	..	962
1	1	6	..	185	2	1	1	..	81	3	—	4	..	977
1	1	7	..	200	2	1	2	..	96	3	—	5	..	992
					2	1	3	..	111	3	—	6	..	7
1	2	—	..	215	2	1	4	..	126	3	—	7	..	22
1	2	1	..	230	2	1	5	..	141					
1	2	2	..	245	2	1	6	..	157	3	1	—	..	37
1	2	3	..	261	2	1	7	..	172	3	1	1	..	53
1	2	4	..	276	2	1				3	1	2	..	68
1	2	5	..	291	2	2	—	..	187	3	1	3	..	83
1	2	6	..	306	2	2	1	..	202	3	1	4	..	98
1	2	7	..	321	2	2	2	..	217	3	1	5	..	113
					2	2	3	..	233	3	1	6	..	129
1	3	—	..	336	2	2	4	..	248	3	1	7	..	144
1	3	1	..	352	2	2	5	..	263					
1	3	2	..	367	2	2	6	..	278	3	2	—	..	159
1	3	3	..	382	2	2	7	..	293	3	2	1	..	174
1	3	4	..	397						3	2	2	..	189
1	3	5	..	412	2	3	—	..	308	3	2	3	..	205
1	3	6	..	428	2	3	1	..	324	3	2	4	..	220
1	3	7	..	443	2	3	2	..	339	3	2	5	..	235
					2	3	3	..	354	3	2	6	..	250
1	4	—	..	458	2	3	4	..	369	3	2	7	..	265
1	4	1	..	473	2	3	5	..	384					
1	4	2	..	488	2	3	6	..	400	3	3	—	..	280
1	4	3	..	504	2	3	7	..	415	3	3	1	..	296
1	4	4	..	519						3	3	2	..	311
1	4	5	..	534	2	4	—	..	430	3	3	3	..	326
1	4	6	..	549	2	4	1	..	445	3	3	4	..	341
1	4	7	..	564	2	4	2	..	460	3	3	5	..	356
					2	4	3	..	476	3	3	6	..	372
1	5	—	..	579	2	4	4	..	491	3	3	7	..	387
1	5	1	..	595	2	4	5	..	506	3	4	—	..	402
1	5	2	..	610	2	4	6	..	521					
1	5	3	..	625	2	4	7	..	536	3	4	1	..	417
1	5	4	..	640						3	4	2	..	432
1	5	5	..	655	2	5	—	..	551	3	4	3	..	448
1	5	6	..	671	2	5	1	..	567	3	4	4	..	463
1	5	7	..	686	2	5	2	..	582					

TABLE 1—contd.

Masha	Rati	Chawal	Gram	Milligram	Masha	Rati	Chawal	Gram	Milligram	Masha	Rati	Chawal	Gram	Milligram
3	4	5 .. 3		478	4	3	6 .. 4		344	5	3	— .. 5		224
3	4	6 .. 3		493	4	3	7 .. 4		359	5	3	1 .. 5		240
3	4	7 .. 3		508						5	3	2 .. 5		255
3	5	— .. 3		523	4	4	— .. 4		374	5	3	3 .. 5		270
3	5	1 .. 3		539	4	4	1 .. 4		389	5	3	4 .. 5		285
3	5	2 .. 3		554	4	4	2 .. 4		404	5	3	5 .. 5		300
3	5	3 .. 3		569	4	4	3 .. 4		419	5	3	6 .. 5		316
3	5	4 .. 3		584	4	4	4 .. 4		435	5	3	7 .. 5		331
3	5	5 .. 3		599	4	4	5 .. 4		450					
3	5	6 .. 3		615	4	4	6 .. 4		465	5	4	— .. 5		346
3	5	7 .. 3		630	4	4	7 .. 4		480	5	4	1 .. 5		361
										5	4	2 .. 5		366
3	6	— .. 3		645	4	5	— .. 4		495	5	4	3 .. 5		391
3	6	1 .. 3		660	4	5	1 .. 4		511	5	4	4 .. 5		407
3	6	2 .. 3		675	4	5	2 .. 4		526	5	4	5 .. 5		422
3	6	3 .. 3		691	4	5	3 .. 4		541	5	4	6 .. 5		437
3	6	4 .. 3		706	4	5	4 .. 4		556	5	4	7 .. 5		452
3	6	5 .. 3		721	4	5	5 .. 4		571					
3	6	6 .. 3		736	4	5	6 .. 4		587	5	5	— .. 5		467
3	6	7 .. 3		751	4	5	7 .. 4		602	5	5	1 .. 5		483
										5	5	2 .. 5		498
3	7	— .. 3		766	4	6	— .. 4		617	5	5	3 .. 5		513
3	7	1 .. 3		782	4	6	1 .. 4		632	5	5	4 .. 5		528
3	7	2 .. 3		797	4	6	2 .. 4		647	5	5	5 .. 5		543
3	7	3 .. 3		812	4	6	3 .. 4		662	5	5	6 .. 5		559
3	7	4 .. 3		827	4	6	4 .. 4		678	5	5	7 .. 5		574
3	7	5 .. 3		842	4	6	5 .. 4		693					
3	7	6 .. 3		858	4	6	6 .. 4		708	5	6	— .. 5		589
3	7	7 .. 3		873	4	6	7 .. 4		723	5	6	1 .. 5		604
										5	6	2 .. 5		619
4	—	— .. 3		888	4	7	— .. 4		738	5	6	3 .. 5		634
4	—	1 .. 3		903	4	7	1 .. 4		754	5	6	4 .. 5		650
4	—	2 .. 3		918	4	7	2 .. 4		769	5	6	5 .. 5		665
4	—	3 .. 3		933	4	7	3 .. 4		784	5	6	6 .. 5		680
4	—	4 .. 3		949	4	7	4 .. 4		799	5	6	7 .. 5		695
4	—	5 .. 3		964	4	7	5 .. 4		814					
4	—	6 .. 3		979	4	7	6 .. 4		830	5	7	— .. 5		710
4	—	7 .. 3		994	4	7	7 .. 4		845	5	7	1 .. 5		726
										5	7	2 .. 5		741
4	—	— .. 4		9	5	—	— .. 4		860	5	7	3 .. 5		756
4	1	1 .. 4		25	5	—	1 .. 4		875	5	7	4 .. 5		771
4	1	2 .. 4		40	5	—	2 .. 4		890	5	7	5 .. 5		786
4	1	3 .. 4		55	5	—	3 .. 4		905	5	7	6 .. 5		802
4	1	4 .. 4		70	5	—	4 .. 4		921	5	7	7 .. 5		817
4	1	5 .. 4		85	5	—	5 .. 4		936					
4	1	6 .. 4		101	5	—	6 .. 4		951	6	—	— .. 5		832
4	1	7 .. 4		116	5	—	7 .. 4		966	6	—	1 .. 5		847
										6	—	2 .. 5		862
4	2	— .. 4		131	5	1	— .. 4		981	6	—	3 .. 5		877
4	2	1 .. 4		146	5	1	1 .. 4		997	6	—	4 .. 5		893
4	2	2 .. 4		161	5	1	2 .. 4		12	6	—	5 .. 5		908
4	2	3 .. 4		176	5	1	3 .. 4		27	6	—	6 .. 5		923
4	2	4 .. 4		192	5	1	4 .. 4		42	6	—	7 .. 5		938
4	2	5 .. 4		207	5	1	5 .. 4		57					
4	2	6 .. 4		222	5	1	6 .. 4		73	6	1	— .. 5		953
4	2	7 .. 4		237	5	1	7 .. 4		88	6	1	1 .. 5		969
										6	1	2 .. 5		984
4	3	— .. 4		252	5	2	— .. 5		103	6	1	3 .. 5		999
4	3	1 .. 4		268	5	2	1 .. 5		118	6	1	4 .. 6		14
4	3	2 .. 4		283	5	2	2 .. 5		133	6	1	5 .. 6		29
4	3	3 .. 4		298	5	2	3 .. 5		148	6	1	6 .. 6		45
4	3	4 .. 4		313	5	2	4 .. 5		164	6	1	7 .. 6		60
4	3	5 .. 4		328	5	2	5 .. 5		179					
									194	6	2	— .. 6		75
									209	6	2	1 .. 6		90

TABLE 1—contd.

Masha	Rati	Chawal	Gram	Milligram	Masha	Rati	Chawal	Gram	Milligram	Masha	Rati	Chawal	Gram	Milligram
6	2	2 .. 6		105	7	1	3 .. 6		977	8	—	4 .. 7		837
6	2	3 .. 6		120	7	1	4 .. 6		986	8	—	5 .. 7		852
6	2	4 .. 6		136	7	1	5 .. 7		1	8	—	6 .. 7		867
6	2	5 .. 6		151	7	1	6 .. 7		17	8	—	7 .. 7		882
6	2	6 .. 6		166	7	1	7 .. 7		32					
6	2	7 .. 6		181						8	—	— .. 7		897
					7	2	— .. 7		47	8	1	1 .. 7		913
6	3	— .. 6		196	7	2	1 .. 7		62	8	1	2 .. 7		928
6	3	1 .. 6		212	7	2	2 .. 7		77	8	1	3 .. 7		943
6	3	2 .. 6		227	7	2	3 .. 7		92	8	1	4 .. 7		958
6	3	3 .. 6		242	7	2	4 .. 7		108	8	1	5 .. 7		973
6	3	4 .. 6		257	7	2	5 .. 7		123	8	1	6 .. 7		988
6	3	5 .. 6		272	7	2	6 .. 7		138	8	1	7 .. 8		4
6	3	6 .. 6		288	7	2	7 .. 7		153					
6	3	7 .. 6		303						8	2	— .. 8		19
					7	3	— .. 7		168	8	2	1 .. 8		34
6	4	— .. 6		318	7	3	1 .. 7		184	8	2	2 .. 8		49
6	4	1 .. 6		333	7	3	2 .. 7		199	8	2	3 .. 8		64
6	4	2 .. 6		348	7	3	3 .. 7		214	8	2	4 .. 8		80
6	4	3 .. 6		363	7	3	4 .. 7		229	8	2	5 .. 8		95
6	4	4 .. 6		379	7	3	5 .. 7		244	8	2	6 .. 8		110
6	4	5 .. 6		394	7	3	6 .. 7		260	8	2	7 .. 8		125
6	4	6 .. 6		409	7	3	7 .. 7		275					
6	4	7 .. 6		424						8	3	— .. 8		140
					7	4	— .. 7		290	8	3	1 .. 8		156
6	5	— .. 6		439	7	4	1 .. 7		305	8	3	2 .. 8		171
6	5	1 .. 6		455	7	4	2 .. 7		320	8	3	3 .. 8		186
6	5	2 .. 6		470	7	4	3 .. 7		335	8	3	4 .. 8		201
6	5	3 .. 6		485	7	4	4 .. 7		351	8	3	5 .. 8		216
6	5	4 .. 6		500	7	4	5 .. 7		366	8	3	6 .. 8		231
6	5	5 .. 6		515	7	4	6 .. 7		381	8	3	7 .. 8		247
6	5	6 .. 6		531	7	4	7 .. 7		396					
6	5	7 .. 6		546						8	4	— .. 8		262
					7	5	— .. 7		411	8	4	1 .. 8		277
6	6	— .. 6		561	7	5	1 .. 7		427	8	4	2 .. 8		292
6	6	1 .. 6		576	7	5	2 .. 7		442	8	4	3 .. 8		307
6	6	2 .. 6		591	7	5	3 .. 7		457	8	4	4 .. 8		323
6	6	3 .. 6		606	7	5	4 .. 7		472	8	4	5 .. 8		338
6	6	4 .. 6		622	7	5	5 .. 7		487	8	4	6 .. 8		353
6	6	5 .. 6		637	7	5	6 .. 7		502	8	4	7 .. 8		368
6	6	6 .. 6		652	7	5	7 .. 7		518					
6	6	7 .. 6		667						8	5	— .. 8		383
					7	6	— .. 7		533	8	5	1 .. 8		399
6	7	— .. 6		682	7	6	1 .. 7		548	8	5	2 .. 8		414
6	7	1 .. 6		698	7	6	2 .. 7		563	8	5	3 .. 8		429
6	7	2 .. 6		713	7	6	3 .. 7		578	8	5	4 .. 8		444
6	7	3 .. 6		728	7	6	4 .. 7		594	8	5	5 .. 8		459
6	7	4 .. 6		743	7	6	5 .. 7		609	8	5	6 .. 8		474
6	7	5 .. 6		758	7	6	6 .. 7		624	8	5	7 .. 8		490
6	7	6 .. 6		774	7	6	7 .. 7		639					
6	7	7 .. 6		789						8	6	— .. 8		505
					7	7	— .. 7		654	8	6	1 .. 8		520
7	—	— .. 6		804	7	7	1 .. 7		670	8	6	2 .. 8		535
7	—	1 .. 6		819	7	7	2 .. 7		685	8	6	3 .. 8		550
7	—	2 .. 6		834	7	7	3 .. 7		700	8	6	4 .. 8		566
7	—	3 .. 6		849	7	7	4 .. 7		715	8	6	5 .. 8		581
7	—	4 .. 6		865	7	7	5 .. 7		730	8	6	6 .. 8		596
7	—	5 .. 6		880	7	7	6 .. 7		745	8	6	7 .. 8		611
7	—	6 .. 6		895	7	7	7 .. 7		761					
7	—	7 .. 6		910						8	7	— .. 8		626
					8	—	— .. 7		776	8	7	1 .. 8		642
7	1	— .. 6		925	8	—	1 .. 7		791	8	7	2 .. 8		657
7	1	1 .. 6		941	8	—	2 .. 7		806	8	7	3 .. 8		672
7	1	2 .. 6		956	8	—	3 .. 7		821	8	7	4 .. 8		687

TABLE 1—contd.

Masha	Rati	Chawal	Gram	Milligram	Masha	Rati	Chawal	Gram	Milligram	Masha	Rati	Chawal	Gram	Milligram
8	7	5 .. 8	702		9	6	6 .. 9	568		10	6	— .. 10	449	
8	7	6 .. 8	717		9	6	7 .. 9	583		10	6	1 .. 10	464	
8	7	7 .. 8	733							10	6	2 .. 10	479	
9	—	— .. 8	748		9	7	— .. 9	598		10	6	3 .. 10	494	
9	—	1 .. 8	763		9	7	1 .. 9	614		10	6	4 .. 10	510	
9	—	2 .. 8	778		9	7	2 .. 9	629		10	6	5 .. 10	525	
9	—	3 .. 8	793		9	7	3 .. 9	644		10	6	6 .. 10	540	
9	—	4 .. 8	809		9	7	4 .. 9	659		10	6	7 .. 10	555	
9	—	5 .. 8	824		9	7	5 .. 9	674						
9	—	6 .. 8	839		9	7	6 .. 9	689		10	7	— .. 10	570	
9	—	7 .. 8	854		9	7	7 .. 9	705		10	7	1 .. 10	586	
										10	7	2 .. 10	601	
9	1	— .. 8	869		10	—	— .. 9	720		10	7	3 .. 10	616	
9	1	1 .. 8	885		10	—	1 .. 9	735		10	7	4 .. 10	631	
9	1	2 .. 8	900		10	—	2 .. 9	750		10	7	5 .. 10	646	
9	1	3 .. 8	915		10	—	3 .. 9	765		10	7	6 .. 10	661	
9	1	4 .. 8	930		10	—	4 .. 9	781		10	7	7 .. 10	677	
9	1	5 .. 8	945		10	—	5 .. 9	796						
9	1	6 .. 8	960		10	—	6 .. 9	811		11	—	— .. 10	692	
9	1	7 .. 8	976		10	—	7 .. 9	826		11	—	1 .. 10	707	
										11	—	2 .. 10	722	
9	2	— .. 8	991		10	1	— .. 9	841		11	—	3 .. 10	737	
9	2	1 .. 9	6		10	1	1 .. 9	857		11	—	4 .. 10	753	
9	2	2 .. 9	21		10	1	2 .. 9	872		11	—	5 .. 10	768	
9	2	3 .. 9	36		10	1	3 .. 9	887		11	—	6 .. 10	783	
9	2	4 .. 9	52		10	1	4 .. 9	902		11	—	7 .. 10	798	
9	2	5 .. 9	67		10	1	5 .. 9	917						
9	2	6 .. 9	82		10	1	6 .. 9	932		11	1	— .. 10	813	
9	2	7 .. 9	97		10	1	7 .. 9	948		11	1	1 .. 10	829	
										11	1	2 .. 10	844	
9	3	— .. 9	112		10	2	— .. 9	963		11	1	3 .. 10	859	
9	3	1 .. 9	128		10	2	1 .. 9	978		11	1	4 .. 10	874	
9	3	2 .. 9	143		10	2	2 .. 9	993		11	1	5 .. 10	889	
9	3	3 .. 9	158		10	2	3 .. 10	8		11	1	6 .. 10	904	
9	3	4 .. 9	173		10	2	4 .. 10	24		11	1	7 .. 10	920	
9	3	5 .. 9	188		10	2	5 .. 10	39						
9	3	6 .. 9	203		10	2	6 .. 10	54		11	2	— .. 10	935	
9	3	7 .. 9	219		10	2	7 .. 10	69		11	2	1 .. 10	950	
										11	2	2 .. 10	965	
9	4	— .. 9	234		10	3	— .. 10	84		11	2	3 .. 10	980	
9	4	1 .. 9	249		10	3	1 .. 10	100		11	2	4 .. 10	996	
9	4	2 .. 9	264		10	3	2 .. 10	115		11	2	5 .. 11	11	
9	4	3 .. 9	279		10	3	3 .. 10	130		11	2	6 .. 11	26	
9	4	4 .. 9	295		10	3	4 .. 10	145		11	2	7 .. 11	41	
9	4	5 .. 9	310		10	3	5 .. 10	160						
9	4	6 .. 9	325		10	3	6 .. 10	175		11	3	— .. 11	56	
9	4	7 .. 9	340		10	3	7 .. 10	191		11	3	1 .. 11	71	
										11	3	2 .. 11	87	
9	5	— .. 9	355		10	4	— .. 10	206		11	3	3 .. 11	102	
9	5	1 .. 9	371		10	4	1 .. 10	221		11	3	4 .. 11	117	
9	5	2 .. 9	386		10	4	2 .. 10	236		11	3	5 .. 11	132	
9	5	3 .. 9	401		10	4	3 .. 10	251		11	3	6 .. 11	147	
9	5	4 .. 9	416		10	4	4 .. 10	267		11	3	7 .. 11	163	
9	5	5 .. 9	431		10	4	5 .. 10	282						
9	5	6 .. 9	446		10	4	6 .. 10	297		11	4	— .. 11	178	
9	5	7 .. 9	462		10	4	7 .. 10	312		11	4	1 .. 11	193	
										11	4	2 .. 11	208	
9	6	— .. 9	477		10	5	— .. 10	327		11	4	3 .. 11	223	
9	6	1 .. 9	492		10	5	1 .. 10	343		11	4	4 .. 11	239	
9	6	2 .. 9	507		10	5	2 .. 10	358		11	4	5 .. 11	254	
9	6	3 .. 9	522		10	5	3 .. 10	373		11	4	6 .. 11	269	
9	6	4 .. 9	538		10	5	4 .. 10	388		11	4	7 .. 11	284	
9	6	5 .. 9	553		10	5	5 .. 10	403						
					10	5	6 .. 10	418		11	5	— .. 11	299	
					10	5	7 .. 10	434		11	5	1 .. 11	314	

TABLE 1—contd.

Masha	Rati	Chawal	Gram	Milligram	Masha	Rati	Chawal	Gram	Milligram	Masha	Rati	Chawal	Gram	Milligram
11	5	2 .. 11	330		11	6	— .. 11	421		11	7	— .. 11	542	
11	5	3 .. 11	345		11	6	1 .. 11	436		11	7	1 .. 11	557	
11	5	4 .. 11	360		11	6	2 .. 11	451		11	7	2 .. 11	573	
11	5	5 .. 11	375		11	6	3 .. 11	466		11	7	3 .. 11	588	
11	5	6 .. 11	390		11	6	4 .. 11	482		11	7	4 .. 11	603	
11	5	7 .. 11	406		11	6	5 .. 11	497		11	7	5 .. 11	618	
					11	6	6 .. 11	512		11	7	6 .. 11	633	
					11	6	7 .. 11	527		11	7	7 .. 11	649	

Tolas to Grams and Milligrams

Tolas	Gram	Milligram
1 ..	11	664
2 ..	23	328
3 ..	34	991
4 ..	46	665
5 ..	58	319
6 ..	69	983
7 ..	81	647
8 ..	93	310
9 ..	104	974
10 ..	116	638
11 ..	128	302
12 ..	139	966
13 ..	151	629
14 ..	163	293
15 ..	174	957
16 ..	186	621
17 ..	198	285
18 ..	209	948
19 ..	221	612
20 ..	233	276

News & Views

Recent Notifications

(1) Ports & Shipping

No. S. O. 1738 dated 24th July 1961.

In exercise of the powers conferred by section 14 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby makes the following amendment in the notification of the Government of India in the Ministry of Commerce and Industry No. 1899, dated the 1st August, 1960 (relating to the permission of the continuance of the use of any weight or measure which immediately before the 1st August, 1960 was in use in respect of ports and shipping industry), namely :—

In the said notification, for the words “for a period of one year”, the words “for

a period of eighteen months” shall be substituted.

(2) Capacity Measures in Further Areas

No. S.O. 2142, dated 30th August, 1961.

In exercise of the powers conferred by sub-section (3) of section 1 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby appoints the 1st day of October, 1961, as the date on which the provisions of the said Act, in so far as they relate to units of capacity, shall come into force in the areas specified in column 2 of the Table below in the State or Union Territory specified in the corresponding entry in column 1 thereof : except in those classes of undertakings or those classes of goods in respect of which, the said provisions have already come into force.

TABLE

STATE OR UNION TERRITORY	AREAS IN WHICH METRIC UNITS OF CAPACITY ARE INTRODUCED
(1)	(2)
Andhra Pradesh	East Godavari, West Godavari, Khammam, Mahboob Nagar, and Nalgonda.
Assam	Goalpara District, Kamrup District (except Gauhati municipal area), Darrang District, Sibsagar District, Lakhimpur District, Cachar District, and all District and sub-divisional headquarter towns.
Gujarat	Municipal Towns governed by the Borough Municipal Acts.
Kerala	Quilon, Ernakulam and Kozhikode districts.
Madras	Districts of Salem, Thanjavur, Tiruchirapalli, and Ramanathapuram.

NEWS & VIEWS

(1)	(2)																																				
Maharashtra	Municipal areas of Thana, Panvel, Ratnagiri, Nasik, Jalgaon, Dhulia, Satara, Sangli, Ahmednagar, Osmanabad, Bhir, Parbhani, Nanded, Buldhana, Chanda and Bhandara.																																				
Mysore	Belgaum District, Bijapur District, North Canara District, Shimoga District, Hassan District, Mangalore (South Canara) District, Chikmagalur District, Coorg District.																																				
Orissa	(a) The Municipal area of Jajpur, Kendrapara, Puri, Balasore, Baripada, Bargarh, Deogarh, Keonjhar, Dhenkanal, Bolangir, Sonepur, Sundergarh, Parlakhemidi, Jeypur, Bhawanipatna of the State of Orissa and (b) the notified area council of Bhubaneswar, Nayagarh, Khurda, Bhadrak, Rairangpur, Angul, Talcher, Titlagarh, Kantabanji, Rourkella, Rajgangpur, Biramitrapur, Chatrapur, Bhanjagar, Koraput, Rayagada, Nawarangpur of the State of Orissa and the following Gram Panchayat areas of the State. (c) <table border="0" style="display: inline-table; vertical-align: top;"> <tr> <th>Grampanchayat areas</th><th>District</th></tr> <tr> <td>Nizgard Athgarh</td><td>Cuttack</td></tr> <tr> <td>Nizgard Nilgiri</td><td>Balasore</td></tr> <tr> <td>Kuchinda</td><td>Sambalpur</td></tr> <tr> <td>Rampur</td><td>Sambalpur</td></tr> <tr> <td>Kamakhyangar</td><td>Dhenkanal</td></tr> <tr> <td>Kaintaragarh</td><td>Dhenkanal</td></tr> <tr> <td>Nizgarh Hindol</td><td>Dhenkanal</td></tr> <tr> <td>Champua</td><td>Keonjhar</td></tr> <tr> <td>Anandpur</td><td>Keonjhar</td></tr> <tr> <td>Phulbani</td><td>Boud-Phulbani</td></tr> <tr> <td>Balligada</td><td>Boud-Phulbani</td></tr> <tr> <td>Boudh</td><td>Boud-Phulbani</td></tr> <tr> <td>Patnagarh</td><td>Bolangir</td></tr> <tr> <td>Bonaigarh</td><td>Sundargarh</td></tr> <tr> <td>Nawapara</td><td>Kalahandi</td></tr> <tr> <td>Dharmagarh</td><td>Kalahandi</td></tr> <tr> <td>Kaptipada</td><td>Mayurbhanj</td></tr> </table>	Grampanchayat areas	District	Nizgard Athgarh	Cuttack	Nizgard Nilgiri	Balasore	Kuchinda	Sambalpur	Rampur	Sambalpur	Kamakhyangar	Dhenkanal	Kaintaragarh	Dhenkanal	Nizgarh Hindol	Dhenkanal	Champua	Keonjhar	Anandpur	Keonjhar	Phulbani	Boud-Phulbani	Balligada	Boud-Phulbani	Boudh	Boud-Phulbani	Patnagarh	Bolangir	Bonaigarh	Sundargarh	Nawapara	Kalahandi	Dharmagarh	Kalahandi	Kaptipada	Mayurbhanj
Grampanchayat areas	District																																				
Nizgard Athgarh	Cuttack																																				
Nizgard Nilgiri	Balasore																																				
Kuchinda	Sambalpur																																				
Rampur	Sambalpur																																				
Kamakhyangar	Dhenkanal																																				
Kaintaragarh	Dhenkanal																																				
Nizgarh Hindol	Dhenkanal																																				
Champua	Keonjhar																																				
Anandpur	Keonjhar																																				
Phulbani	Boud-Phulbani																																				
Balligada	Boud-Phulbani																																				
Boudh	Boud-Phulbani																																				
Patnagarh	Bolangir																																				
Bonaigarh	Sundargarh																																				
Nawapara	Kalahandi																																				
Dharmagarh	Kalahandi																																				
Kaptipada	Mayurbhanj																																				
Rajasthan	Alwar, Tonk, Sawai-Madhopur, Sikar, Nagaur, Bhilwara, Pali, Sri Ganganagar, Barmer, Jha'awar, Bundi and Bharatpur.																																				

Union Territories

Himachal Pradesh	Municipal area of Solan Town (Mahashu District), Municipal area of Chamba Town (Chamba District), Municipal area of Bilaspur Town (Bilappur District).
Manipur	Imphal East and West Tahsils. Thoubal Sub-division and Bishenpur Sub-Division.

No. S.O. 2143, dated 30th August, 1961.

In exercise of the powers conferred by section 14 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby permits, in respect of the areas referred to in the Notification of the Government of India, in the Ministry of Commerce and Industry S.O. No. 2142, dated the 30th August, 1961, the continuance of the use for a period of one year from the 1st day of October, 1961 of any unit of capacity which immediately before that date was in use in respect of the said areas.

(3) Use of Weights for All Transactions

No. S.O. 2144, dated 31st August, 1961.

In exercise of the powers conferred by sub-section (3) of section 1 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby appoints the 1st day of October, 1961 as the date on which the provisions of the said Act, in so far as they relate to units of mass, shall come into force in the whole of India except the State of Jammu and Kashmir and except in those classes of undertakings or those classes of goods in respect of which the said provisions have already come into force.

No. S.O. 2145, dated 31st August, 1961.

In exercise of the powers conferred by section 14 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby permits the continuance of the use for a period of 6 months from the

1st day of October, 1961 of any unit of weight which immediately before that date were in use in respect of the areas referred to in the Notification of the Government of India in the Ministry of Commerce and Industry S.O. 2144, dated the 31st August, 1961.

(4) Amendment of S. O. 984

No. S.O. 2146, dated 31st August, 1961.

In exercise of the powers conferred by sub-section (3) of section 1 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby makes the following amendment in the Notification of the Government of India in the Ministry of Commerce and Industry S.O. No. 984, dated the 28th April, 1961.

In the Table to the said notification, in the entries in the second column against 'Madhya Pradesh' in the first column, for the word 'Bhopal', the word 'Schore' shall be substituted.

(5) Prices of Worsted Hosiery Yarn

No. 7(2)/61-Control., dated 8th August, 1961.

In exercise of the powers conferred on me by Clause 4(1) of the Woollen Textiles (Production & Distribution) Control Order, 1960, and in supersession of Textile Commissioner's Notification No. T. C. (424)/60, dated 14th November, 1960, I hereby fix the maximum ex-factory prices of worsted hosiery yarn as specified in the Schedule below :

SCHEDULE: H Y						
Maximum Ex-Factory Prices of Woollen Hosiery Yarn						
Count of yarn	Grade of Wool Top					
	48s/50s	56s	58s	60s	64s	70s
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Rs. per kg	Rs. per kg	Rs. per kg	Rs. per kg	Rs. per kg	Rs. per kg
2/12s	14.53	16.86	17.22	17.83	18.45	—
2/16s	15.01	17.35	—	—	—	—
2/22s	15.78	18.12	18.45	19.07	19.69	20.50

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
2/40s	—	—	—	21.83	22.44	23.06	23.88
2/48s	—	—	—	22.73	23.35	23.96	24.78
12s	—	14.13	16.36	16.71	17.33	17.97	—
16s	—	14.59	16.82	—	—	—	—
22s	—	15.23	17.46	17.79	18.41	19.05	19.86
40s	—	—	—	20.94	21.56	22.20	23.02
48s	—	—	—	21.76	22.38	23.02	23.83

(i) (a) In the case of Worsted Hosiery Yarn of any count specified in column 1 of the Schedule above, the maximum ex-factory price shall be the price that is specified against the count for the different grades of wool tops in columns 2, 3, 4, 5, 6 and 7 of that Schedule.

(b) In the case of Worsted Hosiery Yarn of any count not specified in the Schedule the maximum ex-factory price shall be arrived at in the manner specified in Note (ii) below :

(ii) The maximum ex-factory price referred to in Note (i) (b) above shall be arrived at :

(a) In the case of Worsted Hosiery Yarn of any count below 2/22s (double) or 22s (single) by deducting from the price specified for the next higher count spun from the appropriate grade of wool top at 7 nP per count (per kg.)

(b) In the case of Worsted Hosiery Yarn of counts above 2/22s (double) or 22s (single) by adding to the prices specified for the next lower count spun from the appropriate grade of wool top at 13 nP per count (per kg.)

(c) In the case of more than 2 fold yarn the prices will be the same as for doubled yarn indicated in the appropriate column of the Schedule above.

Sd/- (W. R. NATU)
Textile Commissioner.

(6) Prices of Woollen Hosiery Articles

No. 7(2)/61-Control, dated 8th August, 1961.

In exercise of the powers conferred on me by Clause 4 of the Woollen Textiles (Production and Distribution) Control Order, 1960 and in supersession of the Textile Commissioner's Notification No. Pol. II/2 (105)/61, dated January 11, 1961, I hereby fix the maximum ex-factory price of woollen hosiery articles as specified in the Schedule below :—

SCHEDULE H.A.

Maximum Ex-Factory Prices of Woollen Hosiery Articles

S.No.	Name of the article	Specification of counts	Ex-factory prices per kilogram Rs. nP
(1)	Jersies	3/11 or 2/12	48/50 tops 27.01
(2)	Pullovers	2/22	70 tops 52.91
		2/22	60 tops 50.71
		2/22	48/50 tops 41.89
(3)	Cardigans (Ladies and Gents)	2/22	70 tops 56.22
		2/22	60 tops 54.01
		2/22	48/50 tops 45.19
(4)	Slipovers	2/22	70 tops 50.71
		2/22	60 tops 48.50
		2/22	48/50 tops 39.68
(5)	Socks and Stockings (Civil)	2/22	70 tops 49.60
		2/22	60 tops 46.30
(6)	Socks, Stockings & Hosetops (military)	3/11 or 2/12	48/50 tops 27.78
(7)	Mufflers	2/22	70 tops 40.34
		2/22	60 tops 38.14
(8)	Gloves	2/22	70 tops 55.12
		2/22	60 tops 52.91
(9)	Caps	2/22	70 tops 44.09
		2/22	60 tops 41.89
		2/22	70 tops 38.58
(10)	Vests	2/22	60 tops 36.38

1. The price of the articles mentioned above in the Schedule manufactured out of 2/32s count (including extra for using finer gauges) shall be 12½% more than the corresponding price prescribed for the article manufactured out of yarn of 2/22s counts.

2. The maximum ex-factory price, maximum retail price and maximum excise duty shall be stamped by every producer in letters and figures not less than 6 millimetres in height, provided that the markings shall be made on a piece of paper securely stuck on the hosiery articles.

3. The maximum retail price of the hosiery article shall be the maximum ex-factory price of the article plus 25%.

4. For every increase or decrease in the price of the woollen yarn by Rs. 1.00, the prices of the hosiery articles mentioned in the Schedule shall be revised correspondingly by Rs. 1.25.

5. In the case of hosiery articles of sizes ranging between 36 centimetres and 71 centimetres, the following additional allowances are permissible :—

Size of the hosiery article	Additional Allowances
36 centimetres to 56 centimetres.	Rs. 6.60 per kilogram in addition to the price prescribed in the Schedule above.
61 centimetres, 66 centimetres & 71 centimetres	Rs. 4.40 per kilogram in addition to the price prescribed in the Schedule above.

NEWS & VIEWS

6. Additional allowances for figurative and knitted designs are permissible as under :—

Size of the figurative or knitted design	Additional Allowances
Not exceeding 25 square centimetres	Nil.
Above 25 square centimetres and not exceeding 100 square centimetres.	Rs. 4.40 per kilogram of weight of the article.
For every additional 75 square centimetres	Rs. 2.20 per kilogram of the weight of the article.

7. The ex-factory price of the hosiery articles prescribed above is for the nett weight of yarn contained therein exclusive of the weight of button, zips and other embellishments.

8. Nothing in this notification applies to jerkins, reversibles, fully fashioned garments and swimweavers.

Sd/- (W. R. NATU),
Textile Commissioner

(7) Introduction of Length Measures

No. S.O. 2375, dated 27th September, 1961.

In exercise of the powers conferred by sub-section (3) of section 1 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby appoints the 1st day of October, 1961 as the date on which the provisions of the said Act, in so far as they relate to units of length, shall come into force in the whole of India except the State of Jammu and Kashmir and except in those areas in which, or in those classes of undertakings or those classes of goods in respect of which, the said provisions have already come into force.

No. S.O. 2376, dated 27th September, 1961.

In exercise of the powers conferred by section 14 of the Standards of Weights and Measures Act, 1956 (89 of 1956), the Central Government hereby permits, in respect of the areas referred to in the Notification of the Government of India in the Ministry

of Commerce and Industry S.O. No. 2375, dated the 27th September, 1961, the continuance of the use for a period of one year from the 1st day of October, 1961 of any unit of length which immediately before that date was in use in respect of the said areas.

A New Atomic Clock

Scientists at the Harvard University, U.S.A., have built a new kind of 'maser' which promises to be over 100,000 times more accurate than the best atomic clock now running. The heart of the new device is an ingenious 'bouncing box' that stores high-energy level hydrogen atoms long enough for them to emit a detectable radiation of precisely 21 cm wavelength. The maser can be used both as a sensitive amplifier or as a source of 21 cm radiation of unprecedented stability and purity of tone. The nearly perfect 'monotone' it emits promises to be the most accurate time-piece in the world, a new standard for time or for frequency.

The new maser is the first to use free atoms, rather than atoms trapped in molecules or crystals. The radiation that the free hydrogen atoms give off is much purer than that emitted by other masers; interaction among atoms held in a molecule or a crystal tends to blur or spread out the frequencies they emit.

The working of the atomic hydrogen maser is as follows: A stream of hydrogen

atoms is sent through a magnetic field that reflects those hydrogen atoms at the high-energy state into a unique storage box. Since the radiation given off by the hydrogen is very weak, the trick is to keep the atoms in the high-energy state for a long time—until enough have accumulated to give off a detectable chorus of 21 cm radiation. Ordinarily, the hydrogen atoms, bouncing off the sides of the box, would interact with the surface and quickly drop to the lower energy level. The new device has a special 'bouncing box', a quartz bulb coated on the inside with a paraffin that does not very readily interact with the bouncing atoms. It has been observed that one high-energy level hydrogen atom can endure at least 10,000 bumps in this storage box, *i.e.* a life-time of about 1 sec. In this way, a large number of high-energy level hydrogen atoms are stored up. The gas will then spontaneously emit a nearly perfect 'monotone', thus acting as an oscillator or source of 21 cm waves. But by deliberately decreasing the number of atoms present, this spontaneous emission may be checked. Then the device will emit 21 cm radiation only when it is triggered by an incoming signal of the same wavelength, making the 'bouncing box' a powerful amplifier.

As an oscillator, the new device can be used to measure some of the subtle physical

properties of the protons, electrons and neutrons in atoms much more accurately than has been hitherto possible. Scientists at the Harvard University plan to study the interaction between the nucleus and its orbiting electron in deuterium and tritium (heavy isotopes of hydrogen) with this clock.

[*J. Franklin Inst.* 271 (1961), 71 and *JSIR*].

Metric System in FPS Countries

It is understood that the American Army is adopting the metric system of weights and measures as early as possible so as to facilitate unification with the NATO forces.

It is reported that the Meteorological Office in the UK has changed over to the Centigrade thermometer from 1 January 1961.

Weights and Measures and the Common Market

The Committee of experts in legislation on weighment from the countries of the common market met in Paris on 20 and 21 June 1961, with a view to prepare the ground for the International meeting which is to take place in Bruxelles in September 1961.

The object was to arrive at as thorough a uniformity as possible among all countries and in particular countries of the Common Market.

Book Review

THE METRIC SYSTEM IN WEIGHTS & MEASURES (English)—by D. H. Bhayani & J. K. Vyas B.A.: B.Com., published by Bhayani Book Depot, 150, Princess Street, Bombay-2, pp. 40, First Edition: October, 1960, Price: Rs. 2.00.

Conversion tables are necessary for the change-over to the metric system if the general public is to get acquainted with the new units. A number of tables of various types dealing with weights and measures and prices have been brought out by various organisations and individuals. The present book is one more attempt in this direction.

The book is divided into five parts namely, length, weights, area, volume and capacity, and gives a round 50 tables. Each chapter begins with a general idea of the units, their fractions, their conversion tables and the like. Published tables on length include conversion from inches, feet, yards and miles to millimetres, metres and kilometres. Those for weights include conversion of tolas, seers, maunds, pounds, ounces, quarters, cwts and tons to metric units and the reverse, while those for area deal with conversion of sq. inches, sq. feet, sq. yards, sq. miles and acres to the respective metric units. Volume tables include conversion of cubic inches, cubic feet and cubic yards to metric units while the tables for capacity include conversion of cubic feet and gallons to litres.

The book is very well printed and would serve as a handy guide for many transactions.

It, however, appears to be somewhat incomplete without the price conversion tables. Conversion of prices is often a more important aspect in everyday transaction than the conversion of weights and measures. The value of the book would have been enhanced if the tables for the conversion of prices had been included. It would also appear to some purchasers that a price of Rs. 2.00 for a book of 40 pages, may be somewhat high for the common man. However, it is a useful addition to the literature on the metric system now being produced on large scale in the various States in India.

The publishers have also printed this book in Gujarati and are getting ready editions in other Indian languages.

METRIC SYSTEM CONVERSION FACTORS AND TABLES (English)—Published by the Engineering College Students' Co-operative Stores, Anantapur (Andhra Pradesh), First Published: February 1961, pp. 45, Price: Rs. 2.50.

Although conversion tables for the common man have been appearing in large numbers, tables required by students of science, engineering and technology are rarely published. As such this booklet is a useful addition for students.

The tables are given in thirty-six sections and contain the usual tables dealing with conversion of linear measures, square measures, cubic measures and capacities,

weights, and the like. Tables dealing with stresses and pressures, atmospheric and water pressures, speed, rate of discharge, density, viscosity, concentration, moment of work, moment of inertia, moduli of section, thermometer scales, work, power, consumption units, heat flow and other thermal properties, circular measure of angles, weight per unit length, decimal equivalents, wire and sheet metal gauges, and many others are also included in this book. A particularly interesting feature of this booklet is the use of the rationalized MKS system of units in the field of electrical engineering.

Recently the Eleventh General Conference of Weights and Measures adopted a resolution on the 'International System of Units'*. Many countries have started adopting the various units recommended therein and France has legally accepted the secondary units prescribed in that resolution. A conversion table intended for students should, therefore, now include all these internationally accepted units besides those that are commonly used in

*See 'Metric Measures' September 1961, pages 23-24

scientific books. This is particularly necessary because we are adopting the metric system at a stage where we can accept it in its latest form, instead of going through the scientific evolution of the whole range of units of the system. It is to be hoped that this aspect of the metric system would be reflected in the second edition of the book.

As the book has been based mainly on the conversion tables given in some other books, certain defects of conversion factors have arisen. For example, the equivalent of one pound has been taken as 0.453 592 43 kg. The factor as laid down by the Standards of Weights and Measures Act, 1956, is 0.453 592 4 kg. Similarly in table 35, certain values for accurate calculations have been given, where one inch is given as equal to 2.539 995 6 cm, instead 25.4 mm exactly and so the conversion factors for the foot and yard to the metre are not the same as given in the Act. These are, however, minor errors and do not detract from the value of the book at this stage in the adoption of the metric system in India.

Controllers in States & Union Territories

In the January 1961 issue of *Metric Measures* a list of Controllers in the States and Union Territories was published for the guidance of the general public. Since then, many changes have taken place in the list published and an up-to-date list is, therefore, published below.

(1) ANDHRA PRADESH

Shri C. N. Shastry,
Controller of Weights & Measures,
Government of Andhra Pradesh,
Hyderabad-Deccan.

(2) ASSAM

Shri S. R. Barua,
Director of Agriculture and
Ex-Officio Controller of Weights & Measures,
Government of Assam,
Shillong.

(3) BIHAR

Shri V. N. Singh,
Controller of Weights & Measures,
Government of Bihar,
Patna.

CONTROLLERS IN STATES & UNION TERRITORIES

(4) GUJERAT

Dr. C.B. Patel,
Director of Industries,
Government of Gujarat,
New Civil Hospital,
Block No. B-4,
Asarva, Ahmedabad.

(5) JAMMU AND KASHMIR

Shri M.M. Siddiqui,
Financial Commissioner and
Ex-Officio Controller of Weights & Measures
Revenue Secretariat,
Jammu-Srinagar.

(7) KERALA

Shri K.S. Menon,
Controller of Weights & Measures,
Office of the Board of Revenue,
Trivandrum.

(7) MADHYA PRADESH

Shri Ram Singh Bawal,
Controller of Weights & Measures,
Government of Madhya Pradesh,
Bhopal.

(8) MADRAS

Shri S.A. Sundararajan,
Controller of Weights & Measures,
No. 19-A, Woods Road, Mount Road, Madras-2

(9) MAHARASHTRA

Shri V.M. Pednekar,
Deputy Director of Industries (Metric)
and Deputy Controller of Weights & Measures,
Maharashtra State,
Old Customs House Yard,
Fort, Bombay.

(10) MYSORE

Shri Marudeva Gowda,
Controller of Weights & Measures,
Old Residency Buildings,
Bangalore.

(11) ORISSA

Shri R.N. Dwivedi,
Joint Director of Marketing &
Ex-Officio Controller of Weights & Measures,
Government of Orissa,
Bhubaneswar.

(12) PUNJAB

Shri Kanwar Jit Singh,
Controller of Weights & Measures,
Government of Punjab,
Ambala Cantt.

(13) RAJASTHAN

Shri K.N. Mathur,
Superintendent,
Weights and Measures,
Government of Rajasthan,
Jaipur.

(14) UTTAR PRADESH

Shri G.P. Mital,
Controller of Weights & Measures,
Government of Uttar Pradesh,
Lucknow.

(15) WEST BENGAL

Shri J.B. Sen,
Controller of Weights & Measures,
Government of West Bengal,
45, Ganesh Chandra Avenue,
3rd Floor, Calcutta-12.

(16) ANDAMAN AND NICOBAR ISLANDS

Shri Puran Singh,
Secretary to the Chief Commissioner,
Andaman and Nicobar Islands,
Port Blair.

(17) DELHI

Shri H.L. Mehandru,
Controller of Weights & Measures,
Near Bhagirath Palace,
Chandni Chowk,
Delhi.

(18) HIMACHAL PRADESH

Shri N.C. Kaushal,
Superintendent, Weights and Measures,
Industries Department,
Himachal Pradesh,
Simla-4.

(19) LACCADIVE, MINICOY AND AMINIDIVI ISLANDS

Shri P. Kelukutty Menon,
Secretary to Administrator,
Laccadive, Minicoy and Aminidivi Islands,
Kozhikode.

(20) **MANIPUR**
Shri Pratap Singh,
Controller of Weights & Measures,
Manipur Administration,
Imphal.

Government of Pondicherry,
Pondicherry.

(21) **PONDICHERRY**
Shri J. Arlanda,
Controller of Weights & Measures,

(22) **TRIPURA**
Shri P.R. Purohit,
Superintendent, Weights & Measures,
Tripura Administration,
Agartala.

Licensed Manufacturers, Dealers and Repairers of Weights and Measures (16)

Metric Measures has been publishing a series of lists of manufacturers, dealers and repairers of weights and measures, weighing and measuring instruments licensed by the Governments in the various States and Union Territories under their Weights and Measures (Enforcement) Acts in their respective jurisdiction. This is the sixteenth list. The first list appeared in the March 1959 issue.

Progressively steps are being taken for licensing manufacturers, dealers and repairers in all States and further lists of licensees would be published in *Metric Measures* as this work progresses.

The number in brackets against the name of the State or Union Territory indicates the particular instalment number of the State or the Union Territory. The issues of *Metric Measures* in which previous lists appear are also shown suitably.

An analysis of the licensees, including the present list, shows that the total number of licensees in 14 States and 4 Union Territories is 861 manufacturers, 2,957 dealers,

and 634 repairers. The details of published information are as follows:—

Sl. No.	State/Union Territory	Licensees		
		Manu- facturers	Dealers	Re- pairers
1	Andhra Pradesh	40	84	31
2	Assam	11	44	16
3	Bihar	20	69	34
4	Delhi	22	76	19
5	Gujarat	93	492	121
6	Himachal Pradesh	1	7	1
7	Kerala	18	283	34
8	Madhya Pradesh	99	310	4
9	Madras	79	210	37
10	Maharashtra ..	60	163	106
11	Manipur	5	5	2
12	Mysore	75	399	41
13	Orissa	14	17	1
14	Punjab	35	145	26
15	Rajasthan	16	69	18
16	Tripura	1	5	0
17	Uttar Pradesh ..	207	379	88
18	West Bengal ..	65	200	55
		861	2,957	634

GUJERAT (3)

In the March and September 1961 issues of *Metric Measures*, lists of licensed manufacturers, dealers and repairers of weights and measures in Gujarat State were published. The following is a list of manufacturers, dealers and repairers of weights and measures subsequently licensed under the Bombay Weights and Measures (Enforcement) Act, 1958.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Ambica Moulding and Engineering Works, Bhurta Bawa's Nahera, Bhavnagar.	Weights.
(2)	C. & G. Chokshi, Chokshi Niwas, Haveli Street, Rajkot	Sheet Metal Weights.
(3)	Jyoti Mechanical Industries, Behind Income Tax Office, Navasari.	Dipping type liquid capacity Measures.
(4)	Luhar Khimji Ranchhod, Kansara Bazar, Bhuj (Kutch) ..	Flat cylindrical Bullion weights Beam Scales class B
(5)	Narayan Moulding Works, Dargah Road, Naran Khapa Chawl, Navasari.	Weights.
(6)	M.J. Parmar and Sons, Kansara Bazar, Bhuj (Kutch) ..	Flat cylindrical Bullion weights Beam scales class B.
(7)	Star Metal Industries, Dariapur, Jardon Road, Inside Prom Darwaja, Ahmedabad.	Bullion and Commercial Brass weights
(8)	Shanta Vijay Chain Factory, Pandya Street, Savar-Kundla	Beam Scales Class C & D.
(9)	Sutar Devshi Bhimji, Vanda, Via, Savarkundal	Counter mahines Beam Scales Class B & C.
(10)	Vanraj Engineering, Corporation, Station Road, Patan	Weights.

Dealers of Weights, Measures, Weighing and Measuring Instrument

(1) Abdulkarim Pribhai Memon, Near Station, Jadar, Taluka: Idar, District Sabarkantha.	(9) Bharat Iron & Brass Works, Near Haveli Patan, District Mehsana.
(2) Abdullbahi Hasanbhai Sodagar, Bazar, Jambusar, District—Broach.	(10) Bharat Traders, 4/867, Begumpura Main Road, Corner of Chopra Street, Surat.
(3) Abdulaly Haji Hasanly Lokhandwala, and Co., Satharia Bazar, Godhra, District Panchmahals.	(11) Bhujangilal Shivji Shah, Opp: Bus Stand, Bhuj/Kutch.
(4) Admadbhai Haiderbhai Lokhandwala, Limda Chowk, Surat.	(12) Bodalji Taibji Jodiawalas Mulla Medi Road, Sanghadia Bazar, Jamnagar.
(5) Ahmedabad Photographic Cooperative Consumer's Society Ltd., Turist Bureo, S. Rani Manzil, Saraspur, Khadia, Ahmedabad.	(13) Champaklal Bhagvatlal Shah, Near Vegetable Market, Ankleshwar, District Broach.
(6) Akberalli F. Vakharwala, Mullawad, Ankleshwar, District Broach.	(14) Champaklal K. Mehta, Bazar, Chikhli District Surat.
(7) Asiatic Agency, 1593/6, Mohmadi Manjil, Pirsakarganj Masjid, Chudial, Ahmedabad.	(15) Champaklal P. Kansara, Kansara Bazar, Broach.
(8) Bansal Iron Foundry, Sales Corporation Dudheswar Road, Plot No. 82, Ahmedabad.	(16) Chandulal Vithaldas Shah, Station Road, Bechraji, District Mehsana.
	(17) Chhaganlal Ranji, Porbandar Naka Road, Bhanvad.

Dealers (Contd.)

- (18) Chimanlal Popatlal Mistry, Opp. Police Head Quarter, Amreli.
- (19) Chhotalal Manilal & Co., Bayad, District, Sabarkantha.
- (20) Chunilal Kevaldas Panchal, Bazar, Umta District Mehsana.
- (21) Dharamchand Hirachand & Sons., Station Road, Motamiya Mangrol, District Surat.
- (22) Fajlehusain Fidali, Vakharwala, Mullawad, Ankleshwar, District Broach.
- (23) Girdharlal Laxman & Brod., Sardar Road, Morvi.
- (24) Gohilwad Jilla Udyogic Sahakari Sangh Ltd., Opp. Bhaga Talav, Bhavanagar.
- (25) Goverdhan Hardware Stores, Bazar Kalol, District—Panchmahals.
- (26) Gullamali Mohamedali Limdiwala, Bazar, Lunavada, District Panchmahals.
- (27) Harshadray Nathubhai Shah, Station Road, Madhi, Distt, Surat.
- (28) Himathlal Bogilal Shah, 15, Sarvodaya, Society, Surendranagar.
- (29) Indian Iron Industries, C/o 16, Commercial Chambers, Rajkot.
- (30) Ismail Mohamed Jabar, Station Road Dohab, District Panchmahals.
- (31) J.N. Bros., Bazar, Devgadhi-Baria, District Panchmahals.
- (32) Jagdishchandra Babubhai Mistry, Jawahar Road, Cambay, District Kaira.
- (33) Jain Book Depot, Station Road, Talod, District Sabarkantha.
- (34) Jayantilal Manilal Sheth, Bazar Vejalpur, District Panchmahals.
- (35) Jivabhai Gangadas Patel, Bazar ODE District Kaira.
- (36) K.B. Parmar, Opp. Plaza Cinema Below U. Co., Bank, Porbandar.
- (37) Kanchanlal Pursottamdas Mehta, Bazar Kalol, District Panchmahals.
- (38) Kansara Bhagvanji Damodar, Kaji Chakla, Near Haveli, Jamnagar.
- (39) Kantilal & Brothers, Shroff Bazar, Modasa District Sabarkantha.
- (40) Keshavlal Bhogilal Lokhandwala, Kalol, District Panchmahals.
- (41) Keshavlal Devchand Shah, Kansara Bazar, Manek Chowk, Ahmedabad.
- (42) Khimji Govindji Radia, Near Darbargadh, Bhanvad.
- (43) Kurbanhusin Fidlay Vakharwala, Kullawad, Ankleshwar, District Baroach.
- (44) Lalji Bhanii Tinwala, Natvar Chowk, Porbandar.
- (45) Luhar Gordhan Jinabhai, Bazar Road, Wankaner.
- (46) Luhar Hiram Trikamji Gohel, Motva Sheri, Near Jagawala, Chora, Jetpur.
- (47) Luhar Ramji Valji Keshav, Chandhi Chowk, Savarkundla.
- (48) Maganlal Himatlal, Kumbar Gali, Near Kalupur Tower, Kalupur, Ahmemdabad.
- (49) Maneklal Chimanlal Patel, Saraspur Vasan-sheri No : 1315, Ahmedabad.
- (50) Marshal Scale Industries, Manibhai Road, Savarkundla.
- (51) Mohamad Abdulla Dadani, Bazar Chowk, Dhoraji.
- (52) Mohammedali Hajee Yusufali Vasanwala, Netaji Subhas Road, Dohad, District Panchmahals.
- (53) Mohanlal Chunilal, Chauta Bazar, Ankleshwar, District—Broach.
- (54) Mohanlal Vasanji, Natvar Chowk, Porbandar.
- (55) Mulla Fidahusen Kikabhai & Sons, Bazar Road, Chhotaudapur, District Baroda.
- (56) Munavarali Fidaali Vohra—Bazar, Thasra, District, Kaira.
- (57) Narandas Tribhovandas Panchal, Nani-chhipwad, Aklakor Wada, Baroda.
- (58) Narshi Lakhamshi & Co., Lakada Bazar, Anjar/Kutch.
- (59) National Steel Industries, Near Bharpura, Dehad Road, Gohara, District Panchmahals.
- (60) Natubhai Kashibhai Patel, Golden Street, Sejitra, District Karia.
- (61) Dchhavlal Purshettamdas & Co., Kansara Bazar, Cambay, District Kaira.
- (62) Pradip Hardware Mart, Chauta Bazar, Ankleshwar, District Broach.
- (63) Pragji Dhag-vanji Mulji, Daria Sthan Chowk, Bhanvad.
- (64) Ramanlal Jivanlal Shah, Bazar, Halol, District Panchmahals.
- (65) Rajabali Abdulhusan Mulla, Kata Bazar, Dhandhuka, District Ahmedabad.
- (66) Rajendrakumar Shantilal Vyarawalla, Madhi, District Surat.
- (67) Ratilal and Co., Kansara Bazar, Petlad, District Kaira.
- (68) Ratilal Dahyabhai Shah, Near Mota Mandir, Jambhusar, District Broach.
- (69) Ratilal Manilal Shah, Soni Chakla Bazar, Jambhusar.
- (70) Safakathusein Yakubali Bardanwals, Katorpor Darwaja, Broach.

Dealers (Contd.)

- (71) Sakarchand Govindji & Bros., Motamiya Monsrol, District Surat.
- (72) Sohan Co-operative Consumer's Society Ltd., Bureo '5' Rani Munzil Sarangpur Khadir, Ahmedabad.
- (73) Sankarchand Madhavlal & Co., Sankada Bazar, Mehmabad, District Kaira.
- (74) Standard Engineering Works, Opp. Vaghesh-waji Temple, Mahava.
- (75) Sutar Manjibhai Premjibhai, Post Vanda, Via Savarkundla.
- (76) T. Mohsin & Bros., Mota Bazar, Godhara District Panchmahals.
- (77) Thakar Kanji Madhavji, Kaneriwala Bazar, Keshod.
- (78) Thakerbhai Bhikhabhai Shah, Main Bazar, Bar-doli, District Surat.
- (79) Tulsidas Sundarji Mistry, New Gandhi Chowk, Petlad, District Kaira.
- (80) Ujamshi Laheab-hai Lokhandwala, Mahatma Gandhi Road, Bulsar, District Surat.
- (81) Uttamlal and Co., Main Road, Surrendra-nagar.
- (82) Vallabh Govind, Pandya Sheri, Savarkundla.
- (83) Vanmalidas Laxmichand Soni, Shop No. 55, Mithapur.
- (84) Vantaj Engineering Corporation, Station Road, Patan, District Mehsana.
- (85) Vijay Industries, Station Plot, No : 8, Gondal.
- (86) Vohra Salehbbhai Abdulhusen & Sons, Bazar, Killapardi, Dist. Surat.
- (87) Vrajlal Hirchand Rupani, Grain Market, Jamnagar.
- (88) Zinabhai Huskishandas Lokhandwala, Limda Chowk, Surat.

Repairers of Weights, Measures, Weighing and Measuring Instruments.

- (1) Balusingh Harising, Near Sejota, Godhavav Pati, Girnar Road, Junagadh.
- (2) Chimanlal Popatlal Mistry, Opp: Police Head Quarter, Amreli.
- (3) Chunilal Kevaldas Panchal, Umta, District Mehsana.
- (4) Ismail Mohomad Jabar, Station, Road, Dohad, District Panchamahals.
- (5) Jilani Scale Works, Taluka Kheralu, District Mehsana.
- (6) Kansara Ramji Jivram, Kansara Bazar, Anjar/Kutch.
- (7) Laxman Chandubhai Kantawala, Lalu Kaka's Lari, Talod, District Sabarkantha.
- (8) Luhar Jeram Trikamji Gohel, Opp : Matva Sheri, Jagavala Chora Road, Jetpur.
- (9) J.J. Makwana, Opp : Miraji's Medi, Jetpur.
- (10) Mistry Bhagwan Ragha, Nava Para, Ghogha Road, Bhavnagar.
- (11) Narandas Tribhovandas Panchal, Nani-chhipwad, Akalkorwada, Baroda.
- (12) K.B. Parmar, Plaza Cinema, Below U. Co., Bank, Opp : Porbandar.
- (13) Ramji Hirji Mistry, Stall No. N-98, Ghandhi-dham.
- (14) Solanki Brothers Engineering Works, Dhrangadhra.
- (15) Vallabh Govind Pandhya Street, Savarkundla.
- (16) Vanmalidas Laxmichand Soni, Shop No. 55 Mithapur.

MANIPUR (I)

The following is the first instalment of manufacturers, dealers and repairers by licensed by the Manipur Administration.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Aryvart Engineering Works, Khairnagar, Meerut ..	Weights, Measures, Weighing and Measuring Instruments.
(2)	Avery Compnay Private Ltd., Lakhokia Road, Gauhati ..	Weights, Measures, Weighing and Measuring Instruments.

Manufacturers (Contd.)

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(3)	G.O. Iron Foundry, Bhairon Belanganj, Agra	Weights, Measures, Weighing and Measuring Instruments.
(4)	Jaiswal Trading Co. P.O. Dhambad	Weights, Measures, Weighing and Measuring Instruments.
(5)	Naba Kumar Routh, 78, Netaji Subhas Road, Calcutta-7	Weights, Measures, Weighing and Measuring Instruments.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Ganeshlal Bagri & Co. Paona Bazar, Imphal	Weights.
(2)	Gokul Singh Manikchand Singh, Thangal Bazar, Imphal	Weights and Measures.
(3)	Jamunalal Mangilal, Paona Bazar, Imphal	Weights.
(4)	Manipur Apex Marketing Co-operative Society Ltd. Imphal.	Weights and Measures.
(5)	Punjab Hardware Store, Phangal Bazar, Imphal	Weights and Measures.

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles repaired
(1)	Ksh Damodar Singh, Singamei Burma Road, Imphal	Weights, Measures, Weighing and Measuring Instruments.
(2)	Electrical and Auto Works, Thangal Bazar, Imphal	Weights, Measures, Weighing and Measuring Instruments.

PUNJAB (11)

In the July and September 1959, March, May, July September and November 1960 and March, May and July 1961 issues of *Metric Measures* lists of Manufacturers, Dealers and Repairers of Weights and Measures in Punjab State were published. The following is a list of manufacturers, dealers and repairers subsequently licensed by the Government of Punjab under the Punjab Weights and Measures (Enforcement) Act, 1958.

Manufacturers

Sl. No.	Name and Address of Manufacturers	Details of Articles Manufactured
(1)	East and West, 149/9-A, Ludhiana	Measuring Tapes upto 100 ft.
(2)	Harbans Tank Engineering Works, Gurdaspur Road, Pathankot.	Petrol Tanks Cap. upto 100 ft.
(3)	Ramgarhia Motor Mechanical Workshop, Gurdaspur Road, Pathankot.	Petrol Tanks 8000 Litre Cap.

LICENSED MANUFACTURERS, DEALERS & REPAIRERS OF WEIGHTS & MEASURES (16)**Dealers**

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Amin Chand Shadi Ram, G.T. Road, Phagwara	Weights, Measures, Weighing and Measuring Instruments.
(2)	Anant Ram Roshan Lal, Railway Road, Taran Taran	Weights, Measures and Beam Scales.
(3)	Bachint Singh and Sons, Industrial Area, Ludhiana	Weights, Measures, and Beam Scales.
(4)	Bawa Industrial Steel Works Ltd., Sonapat	Cast Iron Weights 100g to 50 kg.
(5)	Ishwar Das Charanji Lal, Anandpur Sahib (Hoshiarpur)	Weights, Measures, Weighing and Measuring Instruments.
(6)	Charanji Lal Dev Raj, Iron Merchants, Raman (Bhatinda)	Weights, Measures, and Beamscales only.
(7)	Khan Chand Arore, Bazar Kathian, Amritsar	Weights, Measures, and Beamscales only.
(8)	K.R. Kohli and Sons, Civil Lines, Ludhiana	Weights, Measures, Beamscales and Platform Machines upto 800kg. Cap.
(9)	Phul Kumar Parkash Chand, Nai Mandi, Nissar	Weights, Measures, Weighing and Measuring Instruments.
(10)	Ram Ji Dass Jai Chand, Majith Mandi	Weights, Measures, and Beamscales.
(11)	Ram Partap, Chandni Chowk, Sirsa	Weights, Measures, Weighing and Measuring Instruments.
(12)	Ram Gyanshawar Dass, Iron Merchants, Bhiwani	Weights, Measures and Beamscales only.
(13)	Sonipat Bharat Printing and Sport Cooperative M.P. Coop. Society, Sonapat.	Weights, Measures, Weighing and Measuring Instruments.
(14)	Satya Narain Aggarwal, Outside Mandi Gate, Narnaul	Weights, Measures, Weighing and Measuring Instruments.
(15)	Susta Mal Mohan Lal, Rly Road, Kotkapura	Weights, Measures and Beamscales.
(16)	Tulsi Ram Pyare Lal Jain, Patalia	Litre Measures 5 to 100 ml.
(17)	Vijay Kumar Sish Pal, Bazar, Kathian, Amritsar	Weights, Measures and Beamscales.

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	Munshi Ram, Naya Bazar, Bhiwani	Weights.

UTTAR PRADESH (7)**I. Dealers Licensed for Weights, Measures, Weighing and Measuring Instruments.**

(1) Abdul Hameed, Bachhan Behari, 11/30 Gwatoli, Kanpur.	(6) Agrawal Weights and Measures Manufacturing Co., Daulat Market, Agra.
(2) Arjan Singh, Hammander Singh, Ambala Road, Saharanpur.	(7) Anand Bartan, Brass Merchants, Stores, Pipal Mandi, Dehra Dun.
(3) R.L. Agrawal & Bros., Laxmi Buildings, The mall, Kanpur.	(8) Anand Hardware & Paint Mart, Raja's Road, Dehra Dun.
(4) Agra Taj Industries, Behind Police Station, Lohamandi, Agra.	(9) Anil Stores, 54/11, Nayaganj, Kanpur.
(5) Agrawal Hardware Stores, 792 Rakabganj, Fazizabad.	(10) Agrawal Tin Manufacturing Co., and Engineering Works, Sultanganj, Agra.
	(11) Agra Tools Stores, Namak-ki-Mandi, Agra.

Dealers (Contd.)

- | | |
|---|---|
| (12) Bajrang Iron Foundry, 1014, Kala Bhairon, Belanganj, Agra. | (40) Hazari Lal Bhagwan Dass, Jain, Loha Mandi, Agra. |
| (13) Braham Prakash Bhuvanesh 201, Handya Mohalla, Muzaffarnagar. | (41) Hori Lal Krishna Chandra, Arya Nagar Sitapur. |
| (14) Brij Metal Industries, Langra-Ki-Chauki, Agra. | (42) Hindustan Casting Corporation 2002, Chiman Lal Road, Freeganj, Agra. |
| (15) Bishambher Lal Ram Grain Merchants & Commission Agents, P.O. Naupara Bahraich. | (43) A.K. Industries Ekkawali Gali, Noorigate, Agra. |
| (16) Babu Ram Tulsi Ram Mohalla Parkinganj, Sultanpur. | (44) V.N.P. Jaiswal, C. 21/3 Maldehia, Varanasi. |
| (17) Balli Ram Bhagwan Das, Pipraich, P.O. pipraich, Gorakhpur. | (45) Jain Hardware Stores, Belanganj, Agra. |
| (18) Smt. Balwanta Devi Sushila Devi Iron & Cement Dealers, Sultanpur (Oudh). | (46) Janta Industrial Co-operative Society Ltd., 81, North Vijay Nagar, Agra. |
| (19) S. Batin Bhoy & Co., 24, Latouche Road, Lucknow. | (47) Jagdish Saran & Co., Bara Bazar, Bareilly. |
| (20) Babu Ram Mathura Prasad, 49/63, Nayaganj, Agra. | (48) Kishan Swaroop Kaushal Kishore, 73/34, Collectorganj, Bawan Dukan Kanpur. |
| (21) Babu Lal Agrwal, Stamp Vendor and General Merchant, Belanganj, Agra. | (49) Fateh Chand & Sons, Iron Merchants, Bara Bazar, Muzaffarnagar. |
| (22) Balak Ram Banarasi Dass, Iron & Hardware Merchants, Sadar Bazar, Meerut Cantt. | (50) Goenka Traders, 35, Sri Ram Road, Lucknow. |
| (23) Bishambar Sahai & Sons, Iron & Hardware Merchants, Sadar Bazar, Meerut Cantt. | (51) Gobardhan Das Brij Nath, P.O. Bridgman-ganj, Gorakhpur. |
| (24) Bhagat Jewellers, Sarafa Bazar, Meerut. | (52) Govind Prasad, Place & P.O. Sridutta Ganj, Gonda Teh. Utranal, Distt. Gonda. |
| (25) Bhartiya Ispat Udyog, 77/3, Cooli Bazar, Kanpur. | (53) Har Sahai Mal Govind Ram, Iron Merchants, Moulviganj, Budaun. |
| (26) Chota Lal Dhan Prakash, 26-C, New Mandi, Muzaffarnagar. | (54) Hzari Lal Ram Chandra, Das Iron Merchants, Bara Bazar, Muzaffarnagar. |
| (27) Chitram Tahel Dass, Iron Merchants, Bara Bazar, Muzaffarnagar. | (55) Jai Prakash Jagmohan Lal, Iron Merchants, Bara Bazar Muzaffarnagar. |
| (28) Chowdhary Badri Das Suraj Bhan, Ghia Mandi, Mathura. | (56) Industrial Traders, Baxipur Chowk, Gorakhpur. |
| (29) Cawanpore Steel Products, 76/2, Halse Kanpur. | (57) Jit Singh Anand & Sons, Pipal Mandi, Dehra Dun. |
| (30) Dina Nath Lohia, Bara Bazar, Bareilly. | (58) Jagdish Prasad Satyapal, Iron Merchants, Bara Bazar, Muzaffarnagar. |
| (31) Dayal & Bros., Kishanganj, Meerut. | (59) Jai Prakash Jagmohan Lal, Iron Merchants, Bara Bazar, Muzaffarnagar. |
| (32) Dhan Prakash Tilak Chand Iron Merchants, Bara Bazar Muzaffarnagar. | (60) Janeshwar Das & Bros., Iron Merchants 57-C, New Mandi, Muzaffarnagar. |
| (33) Chajju Lal Babu Lal Jain, Lohamandi, Agra. | (61) Kishan Swrup Gupta, 393, Mah. Kunj, Kacheri Ghat, Agra. |
| (34) Fakruddin Irkramuddin, 267, Bazaza Street, Meerut City. | (62) Kedar Nath & Sons, Iron Merchants, Bara Bazar, Muzaffarnagar. |
| (35) Dharamkanta Sarafa Committee, Chowk Bazar Moradabad. | (63) Kishan Agencies, 22 Chakrata Road, Dehra Dun. |
| (36) Ganesh Prasad Dhaniram & Co., Iron Merchants, Mandaha P.O. Ragani Distt. Hamirpur. | (64) Kishori Lal Hoshier Singh, Iron Merchants, Bara Bazar, Muzaffarnagar. |
| (37) Kuldip Singh, 66, New Ganeshganj, Lucknow. | (65) Kishori Lal Kailash Chand Iron Merchants, Bara Bazar Muzaffarnagar. |
| (38) Jadish and Satish Bros., 119, Kesarganj, Meerut City. | (66) Kundan Lal Mulakraj, Sohrab Gate, Meerut. |
| (39) Daulatram Sunehri Lal Jain, Belanganj, Agra. | (67) Kanahiya Lal Prag Dass, 7, Nazirabad, Lucknow. |

LICENSED MANUFACTURERS, DEALERS & REPAIRERS OF WEIGHTS & MEASURES (16)

Dealers (Contd.)

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| (68) Krishna Kumar Agrawal, 26, Gautam Budh Marg, Lucknow. | (95) Raja Ram Uggar Sen, Iron Merchants, Bara Bazar, Muzaffarnagar. |
| (69) Kashi Ram Phool Chand, Hardware Merchants Pipal Mandi, Dehradun. | (96) Ram Dass, Iron Hall, Bareilly. |
| (70) Mitthan Lal Padam Kumar Jain, Lohamandi, Agra. | (97) Ramjimal Ram Prashad, Iron Merchants, Old Ganj, Rampur. |
| (71) Jodha Ram Ram Prakash, Hardware Merchants, Lohamandi, Agra. | (98) Rajendra Kumar, Charhai Neem, Bareilly. |
| (72) Khanna Weight Measurement Co., Krishan Maraiya, Humayunpur, Gorakhpur. | (99) Radhey Shyam Shusil Kumar Gupta, Fateh Ganj, Lucknow. |
| (73) Krishna Engineering Works, Shivpur, Varanasi. | (100) Ram Lal Ram Kumar, P.O. & Vil. Nagar, Distt. Gorakhpur. |
| (74) Lalitpur Consumers' Co-operative Society Ltd., 110, Saraipura Lalitpur, Dist. Jhansi. | (101) Naveen Engineering Co., 915, Belanganj, Agra. |
| (75) Laxmi Metal Works, 914, Belanganj, Agra. | (102) Narain Singh Babu Lal, Iron Foundry, Sheo Station, Behind Lohamandi, Agra. |
| (76) Martin & Co., 47/48, New Market, Begum Bridge, Meerut. | (103) Nukal Sain Siri Ram, Kagzi Bazar, Meerut City. |
| (77) Mukundlal Babu Lal, Iron Merchants, Bara Bazar, Muzaffarnagar. | (104) Narain Das Daya Ram, Iron Merchants, Bara Bazar, Muzaffarnagar. |
| (78) Mitter Sen Goel Iron Merchants, 12C, Bhopa Road, New Mandi, Muzaffarnagar. | (105) Premier Fair Price Dealers Private Ltd., 68/2, Gandhi Road, Dehradun. |
| (79) Maharaj Kishan Hansraj, Iron Merchants, 2946, Loha Mandi, Agra. | (106) Padam Chand & Bros., 926, Belanganj, Agra. |
| (80) Moti Lal Vijay Kumar, Iron Merchants, Loha Mandi, Agra. | (107) Pramatta Saran Devandra Kumar, Iron Merchants, Kabari Bazar, Meerut City. |
| (81) Mohan Industrial Corporation, Mina Gate, Pathwari, Agra. | (108) Rakesh Bros., Merchants and Commission Agents, Saran Villa Ramnagar, Ghaziabad. |
| (82) Manga Ram Suresh Chand, Iron Dealers, Bara Bazar, Muzaffarnagar. | (109) Ram Chand Dharam Lal, Iron Merchants, Bara Bazar, Muzaffarnagar. |
| (83) Mithan Lal Padam Kumar Jain, Loha Mandi, Agra. | (110) Ram Asray Lal, Gali Mirdhan, Bareilly. |
| (84) Mohammad Yasin, Hardware Merchants, Kabari Bazar, Meerut City. | (111) Ram Swaroop Gupta & Co., Thompson Ganj, Sitapur. |
| (85) Mool Chand Har Narain Jain, Belanganj, Agra. | (112) Rathi Iron Stores, Urdu Bazar, Gorakhpur. |
| (86) Patan Din Satya Prakash, Moh. Khirki, P.O. Utranla, Distt. Gonda. | (113) Ram Autar Son of Lal Misri Lal, resident of Nawabganj, Bareilly. |
| (87) Matin & Co., Delhi Gate, Meerut. | (114) Ram Chand Om Prakash, Iron & Hardware Merchants, Kabari Bazar, Meerut City. |
| (88) L. Ramadhin Gupta, Iron Merchants, Fatehganj, Lucknow. | (115) Ram Gulam Bachai Lal, Town Bindki Moh. Bazar, Fatehpur. |
| (89) Ram Niwas Pushakar Dutt, Fatehganj, Faizabad. | (116) Rama Iron Stores, 248, Baghpat Gate, Meerut. |
| (90) Ramchandra Sharma, Vill. & P.O. Saidpur, Distt. Bulandshair. | (117) Roop Kishore Bansal, Kotwari, Meerut. |
| (91) Prakash Trunk & Crockery Stores, Subzi Bazar, Hapur, Distt. Meerut. | (118) Ram Gauri Shankar, Iron Merchants, Saheb-ganj, Gorakhpur. |
| (92) Nand Kishore Agrawal, (Prop. Shambeer Milk Stores), Sipri Bazar, Jhansi. | (119) Shankar Nath Kapoor, 20, Lakaramandi, Daliganu, Lucknow. |
| (93) Nihal Chand Ram Kishan and Co., Iron Merchants, Bara Bazar, Muzaffarnagar. | (120) Sajjad Ahmed Khan, Moh. Pulpukhta, Rampur. |
| (94) Ramji Das & Sons, Sarafa Bazar, Muzaffarnagar. | (121) Shankar Bhagwan Stores, Station Road, Galeghar, Gorakhpur. |
| | (122) Shivaldas Mool Chand, Hardware Merchants, 311, Belanganj, Agra. |

Dealers (Concl'd.)

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| (123) M. M. Sharma & Sons, 185, Lisar Gate, Meerut. | (142) Vijai Narain Gupta, Lohewale, Gosainganj, Lucknow. |
| (124) Shittal Dass Hardayal, Iron Merchants, Bara Bazar, Muzaffarnagar. | (143) Virendera Kumar Bros., Chaumukhapul, Moradabad. |
| (125) Sita Ram Shrichand, Lal Tata Dealers, Lohani Marg, Saharanpur. | (144) Vinod Kumar, 285 Muttiganj, Allahabad. |
| (126) Standard Engineering Corpn. Tining Factory Buildings, Lane Ganshala, Pathwari, Agra. | (145) Vibhuti Ram Paras Nath, Cinema Road, Golghar, Gorakhpur. |
| (127) Suraj Prakash Ram Gopal, Iron Merchants, Bara Bazar, Muzaffarnagar. | |
| (128) Shyam Sunder Hari Nanadan, Moh. Sheikhpur, Gorakhpur. | |
| (129) Saraf Trading Company, 54/1 Nayaganj. | |
| (130) Swatantra Iron Industries, Patelganj, Meeru City. | |
| (132) Singhal Brothers, Iron & Merchants, 226/A, Sadar, Meerut. | |
| (132) Sahjogi Brothers, Civil Lines, Bara Banki. | |
| (133) Swathi & Co., Massey Lodge, 124, Begam Bagh, Meerut. | |
| (134) Singhal Iron Foundry, Distt. Mathura. | |
| (135) Sarvodaya Industrial Corp., 89/193-194 Bans Mandi, Kanpur. | |
| (136) Subhash Iron Stores, Iron Merchants, Bara Bazar, Muzaffarnagar. | |
| (137) Tota Ram Nithan Lal Jain, Lohamandi, Agra. | |
| (138) Trilok Chand Gupta, Smithganj, Meerut City. | |
| (139) Upper India Iron & Hardware Stores, Hapur Chandi Road, P.O. Hapur. | |
| (140) U.P. Agricultural Industries, Station Road, Roorkee. | |
| (141) United Iron & Metal Works, C-124/25 Govind Nagar, Kanpur. | |
| | (146) Bharat Brush Traders, Gaushala Lane, Belanganj, Agra. |
| | (147) Tara Chand Monoharlal, Iron Merchants, Ujhani, Budaun. |
| | (148) Shravan Kumar Praveen Kumar, Iron Merchants, Chandausi, Distt. Moradabad. |
| | (149) Shadi Ram Bal Mukund, Moreganj, Saharanpur. |
| | (150) Sandhana Metal Industries, Lohamandi, Naya Bans, Agra. |
| | (151) Solanki Brothers, 4, Chowk Lohathi Bazar, Allahabad. |
| | (152) Mahajan Iron Foundry, Opposite Billochpura, Railway Station, Agra. |
| | (153) S. K. Dutta & Bros., Sonarpura, Varanasi. |
| | (154) Indra Narain Gupta, Iron Dealer, Bawan Dokan, Collectorganj, Kanpur. |
| | (155) Lucknow Millers' Association, Ganeshganj, Lucknow. |
| | (156) Shanker Das Durga Pradas, Ganj Bazar, Sadar, Meerut. |
| | (157) Ram Shanker Tripathi, 73/5, Collectorganj, Gusahi, Kanpur. |

2. WEIGHTS, MEASURES/WEIGHING INSTRUMENTS

(Further list of licensed dealers will be published in the next issue of *Metric Measures*).

CORRECTIONS

- (1) Against item 34 appearing on page 39 of May 1961 issue of *Metric Measures* "R. K. Sheet Metal Works" for the words "Bangalore-1" in last line, please read "Mangalore-1"
- (2) In the list of Manufacturers of Uttar Pradesh, appearing on page 46 in September 1961 issue of *Metric Measures*, the following correction may please be made:

For the existing item (77), please read

Milan Iron Industries, 1755, Alamganj, Karwan, Agra

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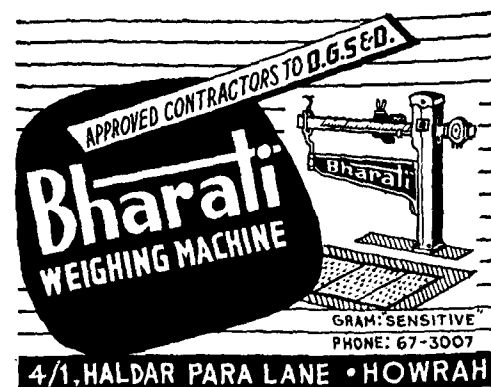
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Serial No.	Commodity	Metric Unit
(1) Gold		10 grams(g)
(2) Grocery and Collectionary	Biscuits, sweetmeats, cardamoms.	
Textiles and Textile Fibres	Cotton yarn, damaged and seconds cloth, raw silk, rayon, silk yarn, raw wool, wool manufactures (when sold by weight).	1 kilogram (kg)
Paints & Chemicals	Paint (if sold by weight), indigo, liquid chlorine.	
Hides, Skins & Leather	Raw hides, leather (hides and skins).	
Metals	Silver, aluminium sheets, strips and circles, copper and brass wires and utensils.	
Miscellaneous	Tea, meat, camphor tablets, mica.	
(3) Grains and Pulses	Rice, wheat, jowar, arhar, moong, masur, gram.	
Spices	Black pepper, mustard, chillies, dhania, dalchini, turmeric, betelnuts.	
Plantation Products	Rubber, cashewnuts, cashew kernels, tobacco (raw and manufactured).	
Forest Products	Lac and lac products, gums, myrobalans, galnuts, soapnuts.	
Textiles & Textile Fibres	Raw jute, raw hemp, coir yarn.	1 quintal (q) (100 kilograms)
Oils, Oilseeds & Oilcakes	Vegetable oils, oilseeds, oil cakes.	
Non-Ferrous Metals	Aluminium: ingots, bars, blocks, slabs, billets. Lead: ingots, sheets and strips. Copper: ingots, blooms, slabs, cakes, tiles, bricks, billets, blisterbars and wirebars, rods, sections and pipes, plates, sheets and strips, circles. Brass: ingots, rods, sections, pipes, sheets, strips, circles. Zinc: ingots, sheets, strips. Tin: blocks.	
Chemicals	Caustic soda, bleaching powder, glycerine, soaps, paper salt.	
Others	Sugar, gur, ice, fish, sugarcane, vegetables, tamarind.	
(4) Minerals	Iron ore, manganese ore, bauxite, coal.	one metric tonne(t) (1,000 kilograms)
Iron & Steel	Pig iron, iron & steel manufactures, semis (billets for rerolling etc.)	1 metre (m)
(5)	Cloth (mill, handloom, silk, rayon and woollen cloth).	one square metre (m ²)
(6)	Jute carpets, coir mats and mattings, sheet glass.	one cubic metre (m ³)
(7)	Timber.	one litre (l)
(8)	Paints (when sold by measure), spirits.	

Weights

- (1) In place of the present units of seer, pound, rattal, viss etc, use the kilogram.
- (2) In place of the tola, use the gram or 10 grams.
- (3) In place of maund or corresponding unit, use the quintal *i.e.* 100 kg.

Capacity Measures

In place of seer or gallon or any other measure use the litre.

Length Measures

- (1) Use the metre in place of yard or foot and the centimetre in place of inch.

Square Measures

- (1) Use the square metre in place of square yard or square foot, and square centimetre in place of square inch.

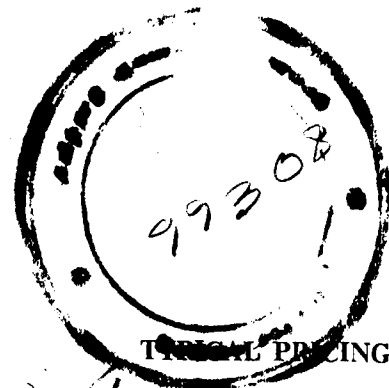
Cubic Measures

- (1) Use the cubic metre in place of cubic yard or cubic foot and cubic centimetre in place of cubic inch.

Packaging

It is advantageous if sizes of packages correspond to series of commercial weights and measures prescribed.

These are: 50 kg, 20 kg, 10 kg, 5 kg, 2 kg, 1 kg, 500 g, 200 g, 100 g, 50 g, 20 g, 5 g, 2 g, 1 g, and so on.



Serial No.	Commodity	Metric Unit for Use
(1)	Foodgrains, cereals, pulses, spices, ghee, bread, vegetables, meat, fish, sweetmeats, tea, coffee, sugar, salt.	1 kg
(2)	Oil for cooking	1 kg or 1 litre depending upon prevalent practice.
(3)	Fruits	1 kg or number depending upon prevalent practice.
(4)	Milk	1 litre
(5)	Cloth and related materials	1 metre
(6)	Prepackaged materials	Preferably sizes corresponding to series of commercial weights and measures.

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