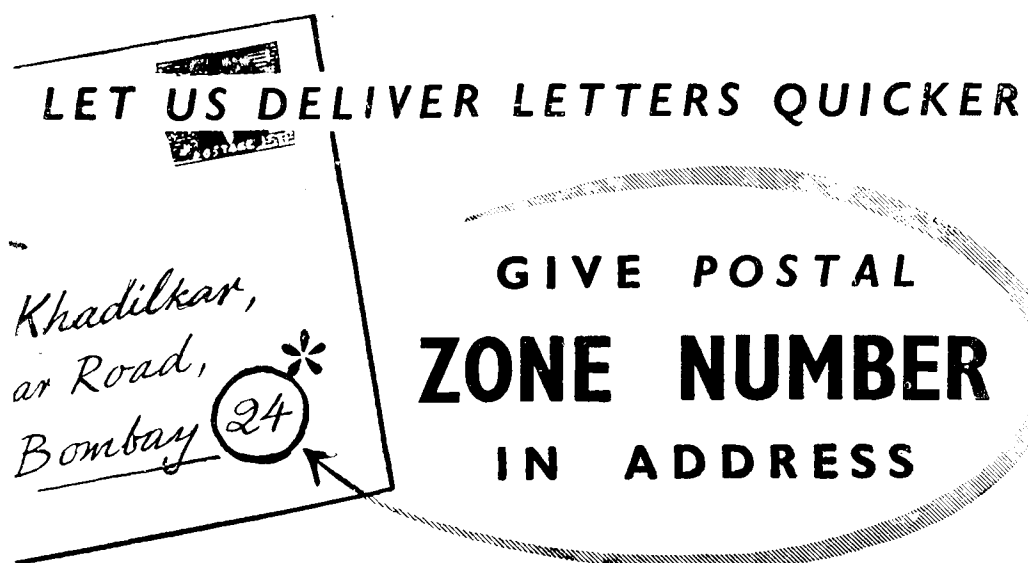




Most large towns have been divided into postal delivery zones.

By decentralising detailed sorting and reducing the distance to be covered by a postman before he starts his beat, the zonal system seeks to speed up the delivery of mail.

Postal articles carrying 'zone number' in the address are sent directly to the delivery post office serving that area.

Absence of this number reduces the speed of sorting and increases the chances of delay. If you live in a town divided into postal zones, tell your correspondents to add the zone number to your address.



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metric measures

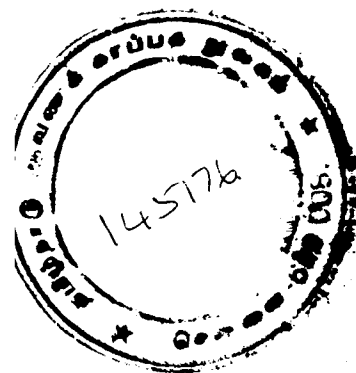
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metric measures

METRIC MEASURES is published every two months.

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Forty Years of Metric Reform in the USSR

G. D. BOURDOUN

Vice-President of the Committee of Standards, Measures and Measuring Instruments
at the Council of Ministers of the USSR, Moscow

I

The Metric Reform

FROM 1 January 1919 the USSR introduced the international metric decimal system of weights and measures.

The metric reform was successfully carried out in the USSR in a historically short period. The introduction of complete uniformity of measures and the conversion of all kinds of measures into the more perfect metric units based upon the decimal system played a positive role in the development of science and engineering in the USSR.

In 40 years since the introduction of the metric system, the State Service of Measures and Measuring Instruments of the USSR has developed considerably. The aim of this service is to provide all branches of the national economy with uniform and correct measures and measuring instruments and control of their proper application.

Historical Background

In the second half of the 19th century, the Russian Academy of Sciences was the first to raise the question of the convocation of an International Commission on Weights

and Measures as a result of which the Metric Convention and the International Prototypes of the metric units have been established. Russia was one of the 17 countries which signed the Metric Convention (Convention du Metre) in 1875. However, before the Great October Socialist Revolution old measures were in use in Russia, the metric system being allowed as an optional system.

The historic transition to the metric system was carried out in accordance with the Decree of the Council of People's Commissars (14 September 1918), which stated that :

- (1) The international metric system of weights and measures with decimal subdivisions and multiples shall be taken as the basis for all measurements;
- (2) The copy of the International Metre bearing No. 28, and the copy of the International Kilogramme, with No. 12, made of platinum-iridium, which had been transferred to Russia by the First International Conference of Weights and Measures held in Paris in 1889 and kept in the Central Chamber of Weights and Measures, shall be taken as the standard for the basic units of the metric system;
- (3) All Soviet organizations and institutions shall beginning with 1 January 1919, introduce the international metric system;
- (4) The use of non-metric measures and weight shall be prohibited beginning from 1 January 1924.

Furthermore, in a number of clauses of this Decree, practical arrangements for introducing the metric system were prescribed.

The Decree provided a period of 5 years for the completion of all the preparatory work with a view to complete transition to the metric system throughout the country. However, 2 years before the given term elapsed it became evident that it would be impossible in reality to fulfil the directives of the Decree. The Council of People's Commissars, by an additional Decree of 29 May 1922, therefore, prolonged this term by 3 years *i.e.* expiring on 1 January 1927.

Preparatory Work

The Central Metric Commission was attached early in its activities to the People's Commissariat of Trade and Industry. Later, by a decision of the Council of People's Commissars, the administration of the Council of Labour and Defence was entrusted with the realization of the programme stated briefly in the Decree of 14 September 1918, and further developed in a detailed plan.

During the first years of its work the Central Metric Commission concentrated its attention on introducing into common practice the usual metric measures such as weights, measures of length and capacity or volume. For this purpose it was necessary to design simple types of instruments and give necessary technical instructions to factories and shops manufacturing and distributing measuring instruments.

In the initial stages of the reform the conversion of old Russian measures and measuring instruments into metric measures and instruments was permitted. This decision accelerated the introduction of the metric system in our country giving the population an opportunity of practical acquaintance with the new system. When the manufacture of metric measures was sufficiently organized

in the USSR, this temporary decision was withdrawn (9 January 1925).

Besides the above arrangements, much work was carried out to propagate knowledge of the metric system by publishing elementary diagrams of instruments, tables showing corresponding Russian and metric measures, engineering rules, etc. In 1923 the Central Chamber of Weights and Measures completed the publication of 'Conversion Tables of Russian and Metric Measures', calculated with metrological accuracy. Many proceedings, pamphlets and articles concerning the metric system were published in the various languages used in the USSR. About 30 publications of the Central Chamber of Weights and Measures deal with problems concerning the introduction of the new system of measures in the country.

The dissemination of metric measures took a short period.

Energetic action by the Central Metric Commission, the Central Chamber of Weights and Measures and Local Verification Chambers resulted in the employment of metric measures amounting to about half the total number of old measures two years prior to the date fixed by the Decree. As the population had become accustomed to the new system, further propagation of the system did not meet any obstacles.

In Engineering and Industry

Besides introducing measuring instruments into common use, work on enforcing the metric system in all fields of engineering and national economy was also carried out.

For this purpose the Central Metric Commission, exercising its legal right to issue obligatory decrees for enforcing the metric system of weights and measures, published rules for the following: measurement of water in litres and gas in cubic metres, introduction of the metric system of measures

in the wine industry for filling bottles; determination of the area of buildings in metric measures; unification of abbreviations employed for designating metric units in printing; adoption of metric measures in industry, trade, transport, etc.

In March 1928 the Council of People's Commissars of the USSR considered a report on the activity of the Central Metric Commission in the Council of Labour and Defence concerning introduction of the metric system of measures and weights. The decision of the Government of the USSR concerning this matter stated that the metric system was becoming current in various fields of national economy, social and cultural life of the Soviet Union and that it greatly saved labour and facilitated the rationalization of the national economy.

In the decision summarizing the activity of the Central Metric Commission for introducing the metric system, the Council of People's Commissars of the USSR:

- (1) Approved the activity of the Commission;
- (2) Entrusted the Commission with the adoption of a three-year working plan, agreed upon by other related Departments, for the final establishment of the metric system in the USSR and the arrangements necessary for implementing this plan;
- (3) Decided to entrust State bodies, enterprises, co-operative and public organizations with the fulfilment of this plan, liquidating the Central Metric Commission with effect from 1 October 1928.

II

Control of Weights & Measures

State Service of Measures and Measuring Instruments

The State Service of Measures and Measuring Instruments deals not only with measures and instruments used in trade,

but also with the various measures and measuring instruments used in all branches of national economy for the control of technological processes and production quality. Accordingly, means of measurements used for electrical and radio measurements, measurements of dimensions in machine building industry, measurement of mass, pressure, force, velocity, liquid and gas flow, temperature and other units of great importance for national economy are under the supervision of the State Service of Measures and Measuring Instruments.

In the USSR the State Service of Measures and Measuring Instruments is under the direction of the Committee of Standards, Measures and Measuring Instruments at the Council of Ministers of the USSR. Metrological institutes spread over the whole territory of the country and charged with the realization of the scientific research work in the field of metrology, State testing laboratories in the field of measuring techniques carrying out the verification of measuring instruments used in the national economy, controlling the quality of manufacturing and repair of measures and measuring instruments and their proper utilization are under the authority of the Committee.

The Committee publishes a monthly journal of science and engineering, (*Izmeritel'naja Tekhnika—Measurement Techniques*), dealing with the problems of pure and applied metrology, organization and techniques of verification, operation of measures and measuring instruments and also instrument making industry.

All-Union Mendeleev Research Institute of Metrology

All Union Mendeleev Research Institute of Metrology (VNIIM), located in Leningrad, is organized on the basis of the Central Chamber of Weights and Measures, created

by the great Russian scientist D.I. Mendeleev in 1893.

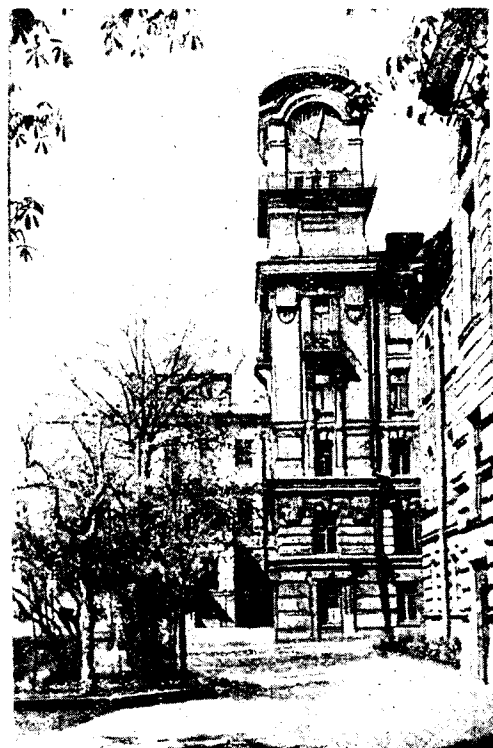


Fig. 1—All Union Mendeleev Research Institute of Metrology, Leningrad.

At present VNIIM is one of the important research institutions of the USSR having at its disposal research and testing laboratories, a designing bureau and experimental factory 'Etalon'.

VNIIM is the custodian of the national standards of the USSR. Research work on preserving and maintaining the standards, observing their conditions and developing new standards and on other metrological subjects is carried out in the various laboratories of the VNIIM. Since the Soviets came into power the Institute has issued about 100 volumes of its proceedings comprising several hundreds of scientific articles in the field of metrology.

All-Union Research Institute of the Committee of Standards, Measures and Measuring Instruments

All-Union Research Institute of the Committee of Standards, Measures and Measuring Instruments (VNIIC) in Moscow, besides undertaking research work in the field of metrology and certification of standard instruments of attached laboratories, also carries out State testing of models of measuring instruments designed and manufactured by the industry. On the basis of the results of the tests, enterprises are given permission for serial (large-scale) production of measuring instruments.

State Institutes of Measures and Measuring Instruments

The State Institutes of Measures and Measuring Instruments in Kharkov, Sverdlovsk and Novosibirsk keep the working standards and verify secondary standards and measuring instruments for the Committee's laboratories and industry. They also carry out scientific research work in some branches of measurement techniques and supervise the working conditions of measures and measuring instruments used in industry and trade.

Before the Great October Socialist Revolution the verification organization of this country consisted of 25 verification chambers, directed by the Central Chamber of Weights and Measures. In 1924 there were in the USSR 34 verification chambers. In 1927 their number increased to 82 and at present there are 130 State control laboratories of measurement techniques with more than 100 permanent departments.

Among the working measures and measuring instruments subject to obligatory verification at intervals fixed by the committee are :

Weights and balances (except analytical and microanalytical balances); bar type measures of length (commercial metres); electric meters; oil meters; meters for alcohol,

water, milk; gas meters; petrol and oil distribution pumps; automatic and semi-automatic devices and dosimeters for kerosene, vodka, beer and milk; medical, veterinary and incubator thermometers; kilometres counters (taximeters); blood pressure gauges; differential pressure type flow meters; metallic hydrometers for alcohol etc.

In addition, secondary standard measures and measuring instruments which serve as the basis for accurately imparting the real value of the units of measurement to working measures and measuring instruments are also subject to obligatory verification.

The majority of working measures and measuring instruments which are used in the national economy (electrical instruments, pressure and vacuum measuring instruments, general purpose measuring instruments, optical-mechanical instruments, radio-technical instruments and others) are subject to verification by the users themselves. In case it is not possible for the users to carry out this verification, the instruments are sent for verification to the Committee's representative agencies.

State verification of measures and measuring instruments is carried out in accordance with the special instructions developed by the Research Institutions of the Committee.

State verification of measures and measuring instruments which are in use is carried out :

- (1) In State testing laboratories of measurement techniques or in their permanent departments;
- (2) At the premises of the enterprises, institutions and organizations which use measures and measuring instruments by sending State inspectors according to the demand of the organizations;
- (3) By sending mobile verification laboratories to different districts;
- (4) By creating temporary centres in rural districts and towns where there are no permanent verification agencies.

The aim of the inspection carried out by verification agencies of the State Service of

Measures and Measuring Instruments is to ensure accuracy, good working conditions and proper use of measures and measuring instruments in the national economy. The inspection covers the following points :

- (1) Control of technical conditions and accuracy of measures and measuring instruments and the use of appropriate methods of measurement;
- (2) Control of appropriate use of measures and measuring instruments in accordance with the prescribed limits of accuracy and ranges of measurements;
- (3) Control of observance of the dates fixed for submitting measures and measuring instruments to State verification and dates fixed for the verification carried out by enterprises themselves;
- (4) Observance of the State decrees of the USSR on measures and measuring instruments, and also rules and instructions of the State Service of Measures and Measuring Instruments.

In case inaccurate, damaged or improperly used measures and measuring instruments are revealed, the Act provides instructions for their correction and these instructions are obligatory.

The scope, order and terms of inspection of measures and measuring instruments are determined by the chiefs of the local verification agencies of the State Service taking into account proper technical conditions of measures and measuring instruments in the region served by this verification agency.

Along with the work carried out by the agencies of the Service of Measures and Measuring Instruments in accordance with State Decree of the USSR all the enterprises, organizations and agencies which have measures and measuring instruments are obliged to carry out the verification in due time, to observe the proper use of measures and measuring instruments, to withdraw from use inaccurate and non-verified measures and measuring instruments and those which need repairs.

Special bodies (measurement laboratories, control verification centres, measuring instruments production shops and others) which are called Production Supervision Agencies carry out in practice the supervision of proper technical conditions and proper use of measures and measuring instruments used by enterprises, organizations and agencies.

The organizational structure of the Production Supervision Agencies depends upon various conditions such as the number of measuring instruments at the disposal of the enterprise, operating conditions, *i.e.* frequency of their use, classes of accuracy according to which the enterprise works, availability of premises which meet the re-

quirements for verification of measures and measuring instruments, skill of the personnel and so on.

All the Production Supervision Agencies work under the control of different institutions of the State Service of Measures and Measuring Instruments.

The above system of organization for State and Departmental supervision of measures and measuring instruments, the implementation of the metric system of measures and the development of scientific research on precise measurements in various fields of science and industry, create the necessary pre-requisites for further technical progress of the national economy of the USSR.



Railway Commercial Departments go Metric from April

The Commercial Departments of the Indian Railways will go over to the metric system of weights and measures with effect from 1 April, 1960.

From that date, passenger fare tables will give fares in terms of kilometres instead of miles, one kilometre being equal to about 0.62 mile.

The passenger fares tax, instead of being based on the distance zones of upto 15, 30 and 500 miles will now be based on distance zones of 25, 49 and 805 kilometres.

The unit of weight for purposes of freight charges, for goods, parcels and other traffic, will be a quintal (100 kilograms), one quintal being equivalent to about two maunds and 27 seers.

The rates for coal will similarly be notified per 'metric tonne' instead of per ton as at present, the 'metric tonne' representing the weight of 1,000 kilograms, equal to approximately 0.98 ton.

The senders of consignments can, however, if they so desire, show the weight of consignments in the forwarding notes in the existing units *i.e.* tons, maunds and seers. The charges will be invoiced by the Railway staff after converting the weights into metric units.

The change-over to the metric system of weights and measures is expected to result in slight variations in fares and freight due to rounding off. The variations, which will be upward or downward, are inescapable and have been kept down to the minimum.

Printed passenger fare tables and freight rate tables, giving rates and fares for different distances in kilometres, are expected to be available for sale early in March 1960.

Distances on the mileage posts along the Railway track are being changed over gradually to kilometres.

Also, markings on wagons are being changed to metric units.

Fixing of Ceiling Prices of Weights in Delhi

H. L. MEHANDRU

Controller of Weights & Measures,
Delhi

THERE will be no two opinions that a fair fixation of ceiling prices of the new metric weights based on mutual agreement between the manufacturers, dealers and the Government administration, is a necessity for the trading public in Delhi as in any other place. This is especially so when there is no legal provision empowering the Administration to fix the prices under the Rajasthan Weights and Measures (Enforcement) Act, 1958 as extended to the Union Territory of Delhi. A fair settlement not only contributes towards dispelling fear and mistrust about the metric reform, but also creates confidence in the public. Such a settlement required a study of errors and lapses of the past with a view to avoid them in future or to prevent a repetition of the bitter memories of 1953 which saw prices of weights and measures soaring high.

Under the circumstances, personal contacts established with the manufacturers in a spirit of co-operation for ironing out differences by proper analysis led to useful results.

Price Fixation Committee

The series of meetings of the two-man Technical Committee comprising of Shri K. Srinivasa Rao, Development Officer (Metric), representing the Ministry of Commerce

and Industry, Government of India and the author acting as Convener, led to very useful results. The formation of this Committee was the result of a meeting of manufacturers called by the Director of Industries and Labour, Delhi, in August 1959 in connection with the working out of the break-up of the cost of commercial metric weights.

The first meeting of the Technical Committee was held on 22 September 1959. Representatives of nine manufacturing concerns of cast iron weights in Delhi and New Delhi were present at the meeting.

The urgent need to work out a suitable price structure was emphasized in the meeting in view of the suspicion lurking in the minds of the trading public. A scrutiny of the various factors of production such as cost of raw materials, cost of labour in various departments, services like coke and electricity, machinery costs, overheads etc. was made to arrive at the total cost. The break-up costs submitted by all the manufacturers were examined separately and the manufacturers were given an opportunity to revise their figures, wherever necessary. This was in their own interest in view of the fact that manufacturers from outside Delhi would also be in a position to push weights into the Delhi

market by complying with certain obligations under the Act and the Rules.

Ceiling Prices Fixed

The break-ups from the manufacturers were analysed on the above basis and it was unanimously agreed that a profit of $6\frac{1}{4}$ percent may be allowed at the manufacturers' end and the same at the dealers' end. The prices of the cast iron weights were then worked out for each piece separately as shown in Annexure A.

One set comprising six cast iron weights from 2 kg to 100 g with one spare 200 g weight was accepted at Rs. 6.50 per set.

The second meeting of the Technical Committee for weights held on 29 September 1959, fixed the prices of metric brass and bullion weights. Annexure B gives the prices fixed for flat cylindrical bullion weights after considering the various factors involved in their production.

The price of a set of stamped brass weights (non-bullion) from 1 kg to 1 g with one spare weight each of 2 g, 20 g and 200 g in each set was worked out by the Committee at Rs. 25.00 at the dealer's end. It may be stated here that the demand for this set of weights is very small. Accordingly, the manufacturers have been allowed a reasonable profit on this set.

The price of a complete set of flat cylindrical bullion weights from 1 kg to 1 g was worked out at Rs. 30.00. The prices were derived as shown in Annexure B.

The price of a set of stamped brass weights normally required by the traders in conjunction with the cast iron weights and consisting of 50 g, 20 g and 10 g, with one spare weight of 20 g in each set, was worked out by the Committee at Rs. 2.00 per set.

The price of a set of stamped bullion milligram weights from 500 mg to 1 mg

(200 mg, 20 mg and 2 mg weights to be two in each set) was worked out at Rs. 6.00 per set at dealers' end.

The fixation of prices of bullion weights (cylindrical with knob) was not taken up as the demand for them is too meagre to warrant active consideration.

Provision for Future Variation

Provision is preventing. An important factor in any agreement is the provision it contains for compensating for any upward or downward trends in the prices of the raw materials in the future. That means the ceiling price is based on the present prices of raw materials and other related factors. In other words, the price may have to be revised to provide for cost increase or decrease arising from such factors as Government legislation, prices of raw materials, freight charges and wage bill, which vary from State to State.

The manufacturers were assured of all help from the authorities for an adequate supply of raw materials to them at reasonable cost.

Condition of Licence

The main provision for sustaining this mutually agreed price structure is that henceforth it will be a condition attached to the licence of a manufacturer or a dealer to abide by the prices. This step was necessary as there was no provision about the fixation of price in the Rajasthan Weights and Measures (Enforcement) Act, 1958. The opportunity that has been afforded to the manufacturers outside Delhi enabling them to push their weights in Delhi through licensed dealers in Delhi is bound to arrest any tendency of the local manufacturers towards 'monopolistic' hold over the local market.

It is hoped that this agreement and arrangement arrived at in a spirit of reasonableness would ensure justice to everyone.

FIXING OF CEILING PRICES OF WEIGHTS IN DELHI

ANNEXURE A

Break-up of Cost of Cast Iron Weights

Denomination/Head of Cost	50 kg	20 kg	10 kg	5 kg	2 kg	1 kg	500 g	200 g	100 g
	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
(1) Cost of Pig Iron & Cast Iron.	12.56	5.00	2.50	1.37	0.68	0.31	0.25	0.16	0.04
(2) Hard Coke	1.50	0.75	0.37	0.31	0.10	0.06	0.06	0.03	0.02
(3) Moulding Charges ..	2.50	1.25	0.62	0.31	0.10	0.06	0.06	0.05	0.02
(4) Fitter's Charges ..	0.50	0.18	0.09	0.09	0.05	0.06	0.06	0.04	0.02
(5) Molasses & Sand ..	1.00	0.50	0.25	0.15	0.09	0.06	0.06	0.05	0.01
(6) Chipping Charges ..	0.25	0.12	0.12	0.12	0.05	0.06	0.05	0.04	0.01
(7) Lead Charges	0.63	0.31	0.25	0.15	0.09	0.06	0.05	0.06	0.02
(8) Stamping Charges ..	0.50	0.50	0.50	0.50	0.50	0.50	0.15	0.15	0.15
(9) Cartage to & From Controller's Office ..	0.75	0.33	0.25	0.10	0.05	0.06	0.07	0.03	0.01
(10) Round Handle ..	1.00	0.50	0.31	0.17	0.00	0.00	0.00	0.00	0.00
(11) Painting Charges ..	0.50	0.25	0.25	0.12	0.06	0.03	0.03	0.03	0.01
(12) Rejection	0.31	0.25	0.09	0.15	0.08	0.04	0.03	0.02	0.01
(13) Manufacturer's Profit..	1.25	0.74	0.45	0.18	0.12	0.09	0.06	0.04	0.01
(14) Dealer's Discount ..	1.75	0.82	0.45	0.28	0.18	0.11	0.07	0.05	0.02
(15) TOTAL PRICE ..	25.00	11.50	6.50	4.00	2.15	1.50	1.00	0.75	0.35

ANNEXURE B

Break-up of Cost of Flat Cylindrical Bullion Weights Bullion Metric Weights (Flat) from 1 kg to 1 g (Weights of 200 g, 20 g & 2 g to be two in each set)

Serial No.	Head of Cost	Rs.
(1)	Cost of Brass 3 sr. 2 ch. (Rs. 3.75 per sr.)	11.75
(2)	Casting Charges	1.50
(3)	Expenditure Towards Coal, Oil, Sand & Molasses, and Crucibles	1.37
(4)	Filing Charges	0.37
(5)	Scraping Charges	1.50
(6)	Lead	0.62
(7)	Testing, Adjustment & Stamping of Denominations, Manufacturer's Name etc.	1.25
(8)	Verification & Stamping Fee	7.00
(9)	Scraping and Rejection in Testing etc. & Expenses for Carriage	0.75
(10)	Overhead Expenses, Depreciation in Machinery & Casting & Rental Value of the Premises	0.50
(11)	Manufacturer's Profit @ $6\frac{1}{4}$ %	1.64
(12)	Dealer's Commission @ $6\frac{1}{4}$ %	1.75
	Total Cost	30.00

Metric Monsoon

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New Delhi

INDIA is the best example of a monsoon country. The advent of the rains every year fairly regularly is a feature of the climate of the country. Naturally many facts about the monsoon are widely known. We may try to list a few of these. The annual rainfall steadily decreases from East to West as one travels across North India. In the Khasi Hills in Assam we have Cherrapunji with an average annual rainfall of over 1000 cm; the rainfall steadily decreases to an average annual rainfall of less than 12.5 cm in the extreme northwest. This is more clearly brought out by the normals of the annual rainfall in each of the political divisions of the Union shown in Table 1.

TABLE 1
NORMAL ANNUAL RAINFALL OF THE MAIN
POLITICAL DIVISIONS OF INDIA
(1951)

Political Division	Annual Rainfall in mm
Assam	2,508.0
West Bengal	1,713.7
Orissa	1,476.5

Bihar	1,276.1
Uttar Pradesh	992.9
Punjab	611.4
Rajasthan	529.1
Madhya Bharat, Bhopal and Vindhya Pradesh	961.9
Madhya Pradesh	1,252.2
Bombay	1,127.8
Hyderabad	905.0
Madras	1,349.8
Mysore	922.0

The steady decrease mentioned above can be clearly seen from the figures shown in Table 1 which also shows the changed pattern of the rainfall variation in the Peninsular India. A more graphic picture of the distribution of the annual rainfall amounts can be obtained from the isohyets drawn on the annual map of India shown in Fig. 1.

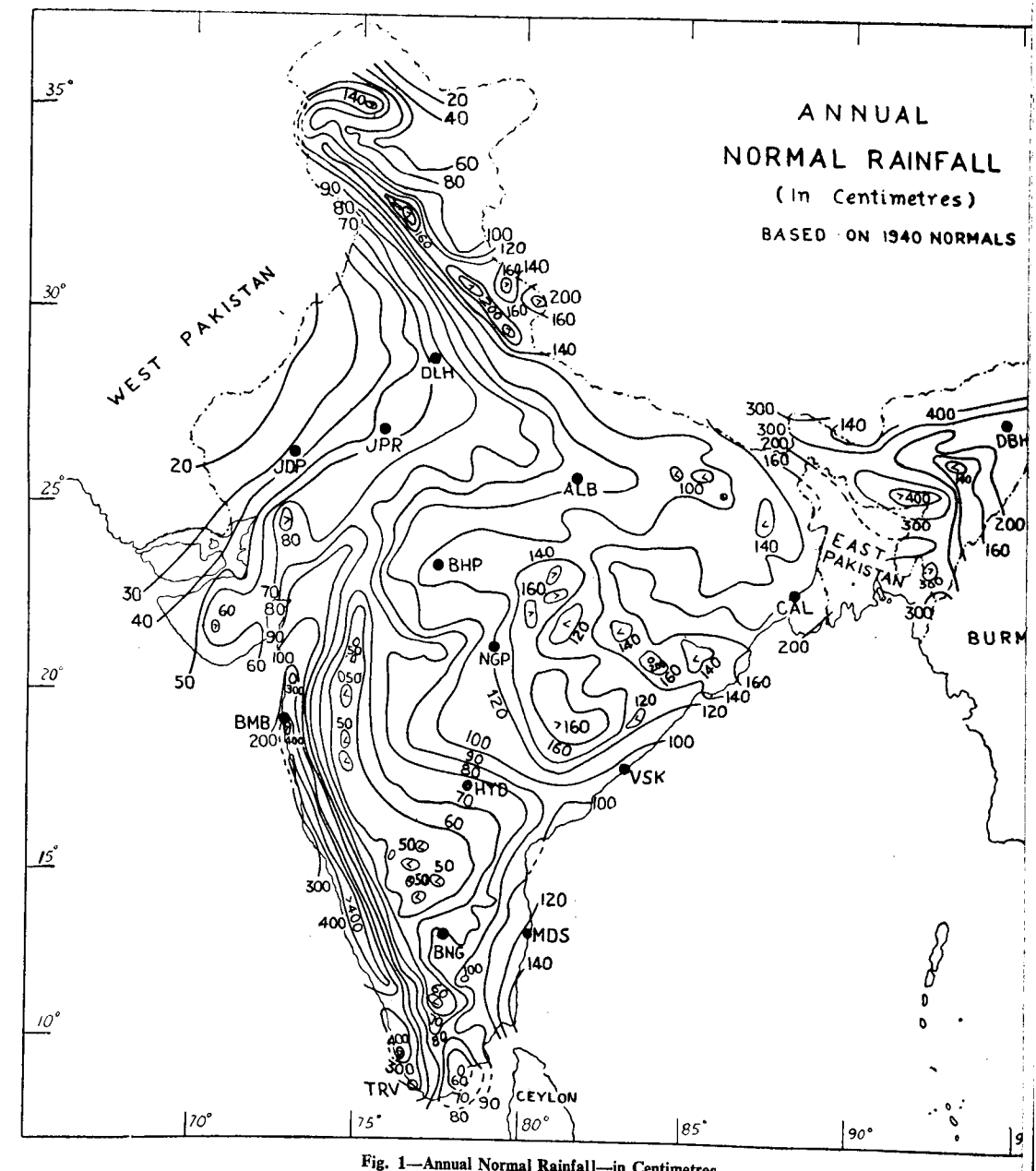


Fig. 1—Annual Normal Rainfall—in Centimetres

It is fairly well known that a line joining the places Visakhapatnam, Bangalore and Mangalore divides the Peninsula very roughly into portions which are markedly different in their seasonal rainfall behaviour. Also that winter rainfall and snowfall over the Himalayas, particularly in Kashmir, and in Northern India, especially in the Punjab plains, is caused by the so-called western disturbances.

Variations in Rainfall

Despite the regularity of the monsoons, one notices considerable variations in the rainfall over the country from year to year. The variations may be temporal, such as the early arrival of the rains, late withdrawal, early withdrawal, prolonged or intermittent interruptions in the rains, etc., or spatial variations in the amounts of annual or seasonal rainfall over different parts of the country during the same year. It is not at all uncommon to find years during which contiguous or nearby divisions have received very different amounts of rainfall with the result that one division has well above and the other markedly below the average amounts of rainfall. Specific examples are not quoted here, because examples of such years are quite numerous. Therefore, keeping these variations in view, one has to stretch one's perspective in terms of the extent of the periods of record of rainfall and take a large number of years to be able to get any idea of the average rainfall. It is only then that the irregularities are smoothened out. However, one must remember that the picture so obtained may vary considerably from the picture obtained in any particular year.

It may be of interest to mention here that according to the latest recommendation of the Climatological Commission of

the World Meteorological Organization (W.M.O.) based on a decision of the International Meteorological Organization (I.M.O.) meeting at Warsaw in 1935, rainfall normals for international use are to be based as far as possible on 30 years' data from 1901 to 1930 (*Recommendation 15(CC1-I) I Session, Washington, 1953*). Data for other periods, either longer or shorter, will be used for working out 'averages'. Of course, option is given to the different member nations to name their years for the national normals. The map in Fig. 1 showing the annual rainfall in India has been drawn on the basis of 1940 normals (or 'averages' according to the W.M.O. definition). Most of the stations, which include meteorological observatories as well as large number of raingauge stations maintained by the State authorities, have rainfall records for period 1891—1940 or even longer.

An examination of the annual rainfall map (Fig.1) will show that in some parts of the country the space variation of rainfall is exceptionally large. The seasonal rainfall also confirms this. As an illustration, let us consider the rainfall at the following pairs of stations.

Bhagmandala and Mercara, two places separated by a straight distance of 24 km have an annual rainfall of 6 219 and 3 237 mm respectively. The rainfall for each of the months June to September, given in Table 2, shows similar differences. Another pair, as an example, is Gaganbavada and Kolhapur, separated by a direct distance of 66 km. The annual rainfall figures are 6 064 and 1 032 mm respectively. The monthly figures can be seen in Table 2. These examples are rather on the extreme side as will be seen from the rainfall map (Fig. 1) in which extensive areas with nearly equal rainfall can also be seen.

TABLE 2
RAINFALL AT NEIGHBOURING PLACES

Places				Distance apart [in km]	Rainfall in mm				
					June	July	August	September	Annual
Bhagmandala	..	..	24	1,348.0	2,204.5	1,269.7	487.9	6 219	
& Mercara	..	..		647.7	1,095.0	662.4	281.4	3 237	
Gaganbavada	..	..	66	1,200.1	2,177.8	1,594.6	745.7	6 064	
& Kolhapur	..	..		160.5	334.0	186.9	105.2	1 032	

If instead of taking seasonal or monthly rainfall we consider shorter periods of, say, a day or so, the space variations are still more striking. The effect is noticeably different from area to area and the part of the season and, of course, depends on the nature of the precipitation *i.e.* showery type or continuous heavy rain or intermittent rain from extensive cloud layers. Generally speaking, we may say that when the main contribution to the rainfall amount is from showery type of precipitation, the variations are more pronounced. The 24 hours' rainfall on 20 July 1959, a date chosen at random, recorded at Amausi (Lucknow) was 91 mm while that in the city was 36 mm. The two raingauges are separated by a distance of approximately 10 km.

In Fig. 2 is shown the 24 hours' rainfall occurring on 3 October 1955 at Bombay and its immediate neighbourhood. Isohyets have been drawn on the map at intervals of 20 mm. The map shows clearly how the short period rainfall is localized even within this restricted area.

In order to illustrate this point further, we have examined 24 hours' rainfall recorded at Safdarjung (aerodrome) and that recorded at the Delhi University raingauge for the period

1952—1954, confining only to the months June to October. The two raingauges are separated by a straight distance of approximately 11 km. Only days on which rainfall amounts equal to or in excess of 0.3 mm occurred at both the places were counted. A scatter diagram was prepared with these pairs of rainfall values. The scatter of the points in the

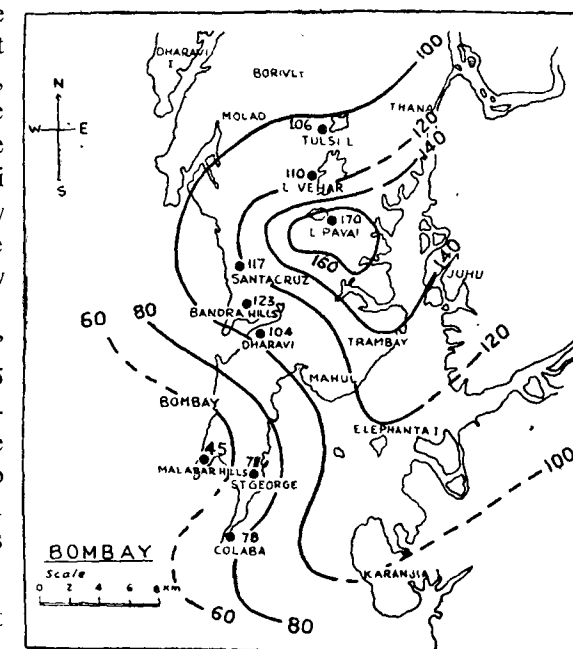


Fig. 2. 24 hrs rainfall (in mm) ending 03.10.1955 and isohyets.

diagram (Fig. 3) clearly shows how different the rainfalls at the two places were during the same 24 hour-period, from which one infers how localized the rainfall can be. A large number of studies with rainfall data from other parts of India show the same thing. The effect becomes more marked as the amount of the rainfall increases.

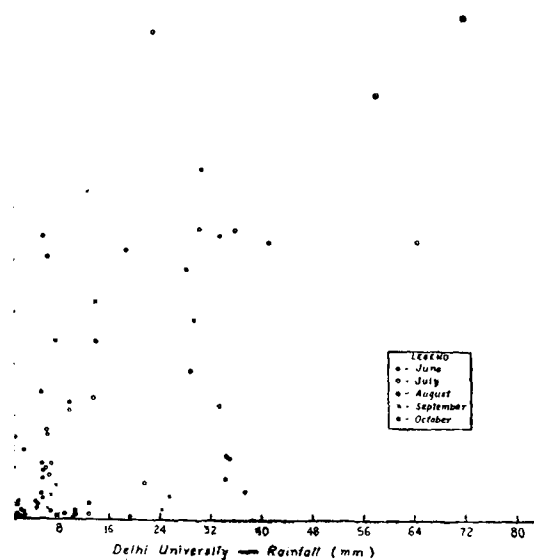


Fig. 3—Scatter Diagram of Rainfall in Delhi University and Safdarjung Airport.

It will not be necessary to labour the point further because in cases of showery type of precipitation the active rain centre

is limited in its lateral dimensions and passes through a life cycle of very roughly half an hour to three hours duration during which the rainfall intensity waxes to its maximum and wanes to its minimum or its cessation. From the above it is easy to see why in such cases the record of a very large number of years has to be considered, so that all random and irregular variations are smoothened out from the averages as far as possible.

Temporal Variations

A reference was made to temporal variations of rainfall in India. If we consider the rainfall at one place over a large number of years we shall find that the annual rainfall recorded varies from year to year. This is noticed even after all variations on account of changes in exposure of the raingauge etc. have either been eliminated or accounted for. This effect is more clearly seen if we consider the rainfall at one station for different months instead of the year as a whole. The rainfall records at Delhi for the period 1844 to 1855 and 1859 to 1957 i.e. 111 years, were examined and the monthly rainfall each year for the principal rainy months i.e. June to October were classified within specified rainfall intervals. Fig. 4 gives the frequency distribution of the monthly rainfall

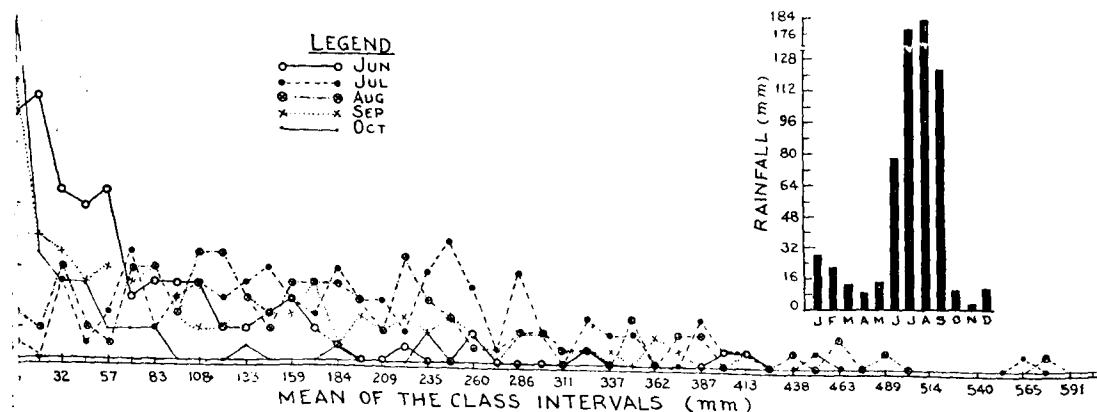


Fig. 4—Frequency Distribution of Rainfall in Delhi for June to October.

for each of these months. In the inset The frequency distribution curves clearly the normal monthly rainfall of Delhi show the wide variations of the monthly rainfall from one year to another.

Fig. 5— DATES OF ONSET OF S.W. MONSOON

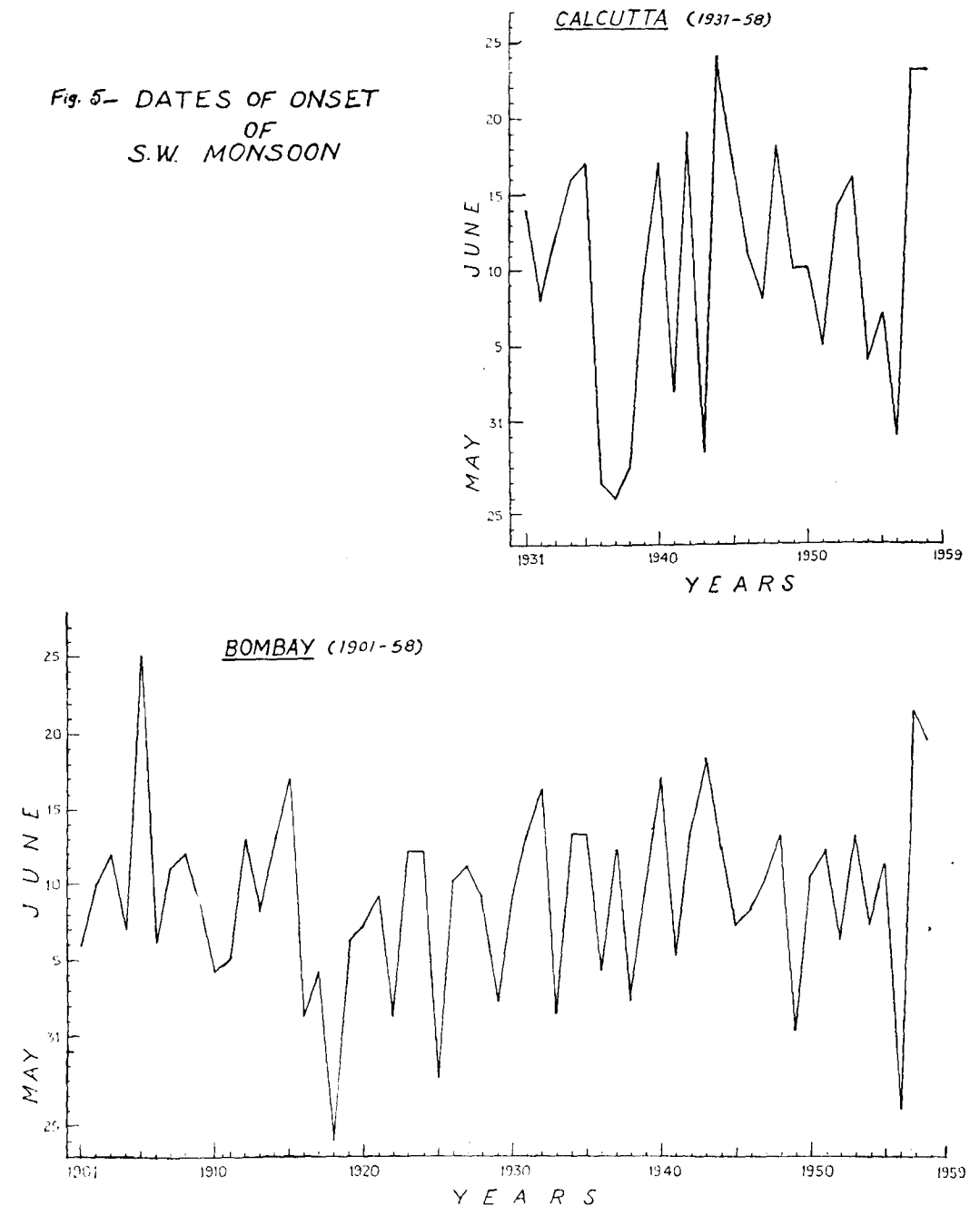


Fig. 5—Dates of Onset of Southwest Monsoon in Calcutta and Bombay.

Onset of Southwest Monsoon—Criteria

Another aspect of the southwest monsoon which attracts a great deal of public attention is the date of onset of the monsoon. The India Meteorological Department has published maps showing the normal dates of onset and withdrawal of the southwest monsoon over India. These maps have been prepared on the basis of five-day normals of accumulated rainfall of stations grouped into areas of about 2 degrees of latitude squares. The middle date of the five-day period showing the characteristic monsoon rise in the rainfall curve is taken as the date of onset of the monsoon. The onset of the monsoon even at the coastal stations of India is not quite sharp on many occasions. The monsoon rain often merges with the pre-monsoon showers. The criterion of a rainy day *i.e.* day with rainfall greater than 2.5 mm in use in the India Meteorological Department is not of any help in deciding on the date because the rainfall amounts caused by pre-monsoon thundershower activity is often much greater than this amount. Also no criteria on the basis of persistence of rainfall of general validity can be worked out. However, once the monsoon has set in over an area the thunderstorm activity decreases considerably and the spatial distribution of the rainfall becomes

wider. At coastal stations there is a change in the nature of cloudiness as well as the state of the sea.

The southwest monsoon sets in over the West Coast with a relatively sharper beginning than over the Bengal area. Therefore, the dates of the onset in respect of Bombay can be worked out with greater confidence. In Fig. 5 the dates of onset of the southwest monsoon from the year 1901 to 1958 at Bombay (an area of radius 150 to 250 km around Bombay) are shown. The dates of onset of southwest monsoon at Calcutta for the year 1931—58 are also shown for comparison in the same figure.

Although precipitation occurs outside the southwest monsoon season in parts of North India and in the extreme southern parts of the Peninsula, the total amount of water involved in this precipitation is of an extremely lower order of magnitude compared with that of the southwest monsoon. Even the duration of the rain, notwithstanding the persistent foggy and cloudy conditions in Northwest and North India, are considerably shorter as will be seen from the following figures of the normal number of rainy days during the periods June—September and November through February at a few places in North India.

TABLE 3

NUMBER OF RAINY DAYS DURING JUNE TO SEPTEMBER AND NOVEMBER TO FEBRUARY AT SOME SELECTED STATIONS

Season	No. of Rainy Days at					
	Ludhiana	Simla	Bareilly	Calcutta	Gauhati	Dibrugarh
Southwest Monsoon						
June—September	23.0	58.5	37.3	61.9	52.4	75.0
Winter						
November—February ..	7.2	14.0	5.1	4.0	5.4	13.8

METRIC MONSOON

Northeast Monsoon

In South India the so-called northeast monsoon gives rainfall during the winter months. An examination of the distribution of the rainfall through the different months clearly shows the different nature of the distribution of precipitation. Fig. 6 gives the monthly rainfall at Kodaikanal and Nagpur (outside the sphere of northeast monsoon) for showing the difference.

If in the above description of the rainfall in India the aspect of the variability of the rainfall appears to have been overstressed, the justification lies in the fact that this aspect is not sufficiently widely recognized. Also because it is precisely these minor and peculiar variations, together with the violent departures, that are to a great extent at the root of the anxieties and despairs in the hearts of hundreds of millions of inhabitants of this subcontinent of ours.

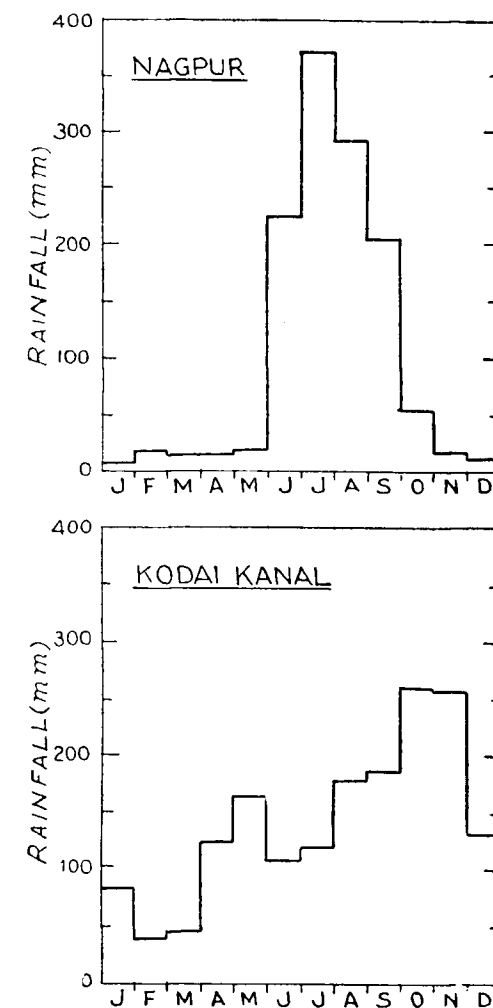


FIG. 6.

Fig. 6—Monthly Rainfall at Kodaikanal and Nagpur.

Abbreviations for Metric Units

IN the July 1958 issue of *Metric Measures* (p 21) an article on the above subject was published. Since then the Government of India have notified the secondary units of weights and measures and the State Governments have published *Weights and Measures (Enforcement) Rules* in which the abbreviations for the legalized primary and secondary units are given.

Units Defined by Central Act

The units defined by the Standards of Weights and Measures Act, 1956, are :

Length	—metre
Mass	—kilogram
Area	—square metre
Volume	—cubic metre
Capacity	—litre
Time	—second
Electric	
Current	—ampere
Luminous	
Intensity	—candela
Temperature	—°C

Secondary Units Centrally Notified

Under Section 12 of the Standards of Weights and Measures Act, 1956 the following secondary units were notified by the Central Government :

(1) Secondary Units in Relation to Metre

Micron	=	10 ⁻⁶ metre
Millimetre	=	10 ⁻³ metre
Centimetre	=	10 ⁻² metre
Kilometre	=	10 ³ metres

(2) Secondary Units in Relation to Kilogram

Milligram	=	10 ⁻⁶ kilogram
Gram	=	10 ⁻³ kilogram
Quintal	=	10 ² kilograms
Tonne	=	10 ³ kilograms

(3) Secondary Units in Relation to Litre

Millilitre	=	10 ⁻³ litre
Kilolitre	=	10 ³ litres

Abbreviations Prescribed by States

The *Weights and Measures (Enforcement) Rules* prepared by the State Governments require that if the denomination or capacity is not given in full, the following abbreviations only should be used for markings on weights, measures and weighing and measuring instruments, as also for indicating the contents of various packages etc. As these abbreviations are based on international practices approved by the International Bureau of Weights and Measures and the International Organization for Standardization, they may be taken as being universally accepted and used for other purposes such as scientific publications, statistical data, teaching in schools, colleges and technical institutions *i.e.* wherever abbreviations have to be used. The principles of abbreviation explained in the July 1958 issue remain unchanged. The approved abbreviations are :

(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

ABBREVIATIONS FOR METRIC UNITS

(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

Denomination	Value	Abbreviation
kilolitre	.. 1 000 l	kl
litre	.. 1 l	l
millilitre	.. 1 ml	ml

(4) Volume

Denomination	Value	Abbreviation
cubic metre	.. m ³	m ³ or cu m*
cubic centi-		
metre	cm	cm ³ or cu cm*
cubic milli-		
metre	.. mm	mm ³ or cu mm*

(5) Length

Denomination	Value	Abbreviation
kilometre	.. 1000 m	km
metre	.. 1 m	m
centimetre	1 cm	cm
millimetre	.. 1 mm	mm
micron	.. 1/1000 mm or 10 ⁻³ mm.	μm

(6) Areas

Denomination	Value	Abbreviation
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*

It will be noticed that units like hectogram, decametre, centilitre, decimetre are not recognized by law in India for general use, because such units and abbreviations are rarely, if at all ever, required for use in transactions. They are mainly useful in schools for teaching the decimal gradations of the metric system.

Rules for Abbreviations

If the following rules are applied the correct use of abbreviations would be ensured :

(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.

The following examples of the titles of some International Recommendations issued by the International Organization for Standardization may serve for guidance :

(i) ISO RECOMMENDATION R-74
IMAGE PRODUCED BY CAMERA
APERTURE AND PROJECTED
IMAGE AREA FOR 8 mm FILMS.

(ii) ISO RECOMMENDATION R-71
PHOTOGRAPHIC SOUND RE-
CORD ON 16 mm PRINTS.

(iii) ISO RECOMMENDATION R-41
COVERS FOR DECK OPENINGS
FOR 220 mm PUMPS.

(3) Do not use any other abbreviations except those given above.

The adoption of the above abbreviations not only in commercial transactions but in all spheres where their use is required would ensure uniformity of understanding all over India and confer on us the fullest benefits of the metric system in this sphere.

*Both these abbreviations are current, but the first set should preferably be used. The former abbreviation is used more commonly internationally than the latter.

Pricing Units for Wholesale and Retail Trade

At a meeting held in Udyog Bhavan, New Delhi on 27 January 1960, the metric pricing units to be used in the wholesale and retail trade were considered. The recommendations made are given in Annexure 1 and Annexure 2. The meeting was presided over by Shri K. V. Venkatachalam, Joint Secretary, Ministry of Commerce & Industry, New Delhi and was attended by representatives of the Directorate of Marketing and Inspection, Nagpur, Directorate of Storage and Inspection, Ministry of Food and Agriculture, New Delhi, Federation of Indian Chambers of Commerce & Industry, New Delhi, Jute Commissioner, Calcutta, Indian Standards Institution, New Delhi.

The proposals made earlier by the Ministry of Commerce and Industry were circulated for views to all trade and industry associations, State Governments, Central Ministries, State Marketing Officers, Controllers of Weights and Measures and others interested in the subject. The comments received were discussed.

Units for Pricing

One of the important questions raised at the meeting was about the feasibility of adopting 50 kilograms as a unit for wholesale pricing. The general opinion was that fractional units are not usually used in trade. Moreover, even if a unit of 50 kg was accepted it could only be for a short while in the

immediate future and again the change to one quintal would have to be made. That would mean double hardship. In view of the long-term interest it was thought undesirable to recommend 50 kg as a unit for pricing. The transitional difficulty of using a unit which was about $2\frac{1}{2}$ times the maund could be overcome by emphasizing that fact. For some time to come the prices should be quoted in both the present unit and the recommended metric unit so as to get accustomed to the significance of the new unit.

In order to avoid confusion between the various 'tons' it was recommended that the term 'metric tonne' may be used for some time.

Containers

As for the contents of jute packages, it was decided that the Jute Commissioner should consult the organizations directly concerned with packing such as Agricultural Marketing Adviser, Food Ministry, Federation of All India Foodgrains Dealers' Association and the like. The metal containers for wholesale and retail trade were already being standardized by the Indian Standards Institution and paper packages would present little difficulty in changing over.

Annexure 1 and Annexure 2 give the summaries of the representative recommendations.

PRICING UNITS FOR WHOLESALE AND RETAIL TRADE

ANNEXURE 1 Metric Pricing Units for Wholesale Transactions

Serial No.	Commodity	Metric Unit
(1) Gold		1 gram (g)
(2) Grocery	Cardamoms, pickles and jams, dry mangoes.	1 kilogram (kg)
Confectionery	Biscuits, sweetmeats.	
Textiles & Textile Fibres	Cotton yarn, damaged and seconds cloth, (fents, rags, chindies etc.), raw silk, rayon, silk yarn, raw wool, wool manufacturers (when sold by weight).	
Paints & Chemicals	Paints (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, senna leaves, mica.	
(3) Grains and Pulses	Rice, wheat, bajri, jowar, arhar, moong, masur, gram.	
Spices	Black pepper, mustard, chillies, cloves, dhanian, dalcini, malethi, turmeric, betelnuts, dry ginger.	
Plantation Products	Coffee, rubber, cashewnuts, cashew kernels, tobacco (raw and manufactured)	
Forest Products	Lac and lac products, gum benjamin and gum arabic, myrobalans, galnuts, soapnuts, avaram bark, konnam bark.	1 quintal (q) (100 kilograms)
Textiles & Textile Fibres	Raw cotton, raw jute, raw hemp, coir yarn.	
Oils, Oilseeds & Oilcakes	Vegetable oils like groundnut, linseed, castor, gingelly, mustard, coconut, etc. oilseeds like groundnut, gingelly, rapeseed, copra etc. groundnut cake, castor cake, sesamum cake, coconut cake.	
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.	

Serial No.	Commodity	Metric Unit
Others	Sugar, gur, ice, fish, sugarcane, vegetables, tamarind etc.	1 quintal (q)
4) Minerals	Iron ore, manganese ore, bauxite, coal.	} one metric tonne (t) (1,000 kilograms)
Iron & Steel	Pig iron and iron & steel manufacturers, semis (billets for re-rolling etc).	
(5)	Cotton cloth (mill and handloom, silk and rayon manufactures, woollen cloth.	1 metre (m)
(6)	Jute carpets, coir mats and matings, sheet glass etc.	one square metre (m ²)
(7)	Timber	one cubic metre (m ³)
(8)	Paints (when sold by measure), spirits.	one litre (l)

ANNEXURE 2

Pricing Units for Retail Trade

For adopting the metric system in retail trade, it is necessary to determine appropriate units in which retail prices may be expressed. The following general principles will be useful :

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.
- (3) In place of maund or corresponding unit, use the quintal i.e. 100 kg.

Capacity Measures

- (1) In place of seer or gallon or other corresponding measure use the litre.

Length Measures

- (1) Use the metre in place of yard or foot and the centimetre in place of inch.

The following units of prices are suggested for commodities which figure prominently in retail trade.

Units for Retail Trade

Serial No.	Commodity	Metric Unit for Use
(1)	Foodgrains, cereals, pulses, spices, ghee, bread, vegetables, meat, fish, sweetmeats, etc.	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)	Tea, coffee, sugar, salt etc.	1 kg
(5)	Milk	1 litre
(6)	Cloth and related materials	1 metre
(7)	Prepackaged materials	Preferably in packages of sizes corresponding to the prescribed commercial weights and measures.

Metric System In ISI Convention

THE 5th Indian Standards Convention was held in Hyderabad recently. One of the Sessions, (T4), held on 1 January 1960, was devoted to the 'Preparation of Standards in Terms of Metric Units'. Six papers dealing with the various aspects of the subject were discussed.

Chairman's Speech

The Chairman, Shri S. L. Kirloskar, in his address said that standards were essential for the proper development of industries. Standardization usually followed established industrial practice but in view of the change-over to the metric system in India, metric standards had to be made available sufficiently well before actual production could start. The Indian Standards Institution (ISI) had, therefore, the important responsibility of making available the required standards in the metric system.

In fulfilment of this responsibility the ISI had already prepared metric standards for weights and measures, weighing instruments, raw materials etc. But this was only the beginning and much more had to be done and done expeditiously to cater to the needs of the change-over.

He expressed the view that the problems connected with the change-over were complex, and it may not be possible to lay down a uniform procedure to be followed by different industries though some of the questions involved may be common. He urged that in the process of change-over we should follow, as far as possible, the recommendations made by the International Organization for Standardization (ISO) as also the

standards already published by a number of metric countries, with due modifications to suit Indian conditions.

He then called upon each author to give a brief review of his paper before throwing it open for discussion.

First Paper

A Code for Conversion of Mechanical Drawings with Working Tolerances for Metric Working: Shri K. L. Puri, Inspectorate of Electronic Equipment, Ministry of Defence (CGDP), Bangalore.

The author said that the code he proposed would reduce metric conversion of mechanical drawings to a routine.

In the discussion that followed it was stressed that although the code might not be useful for precision conversion involving interchangeability, it might be used for coarse work.

Expressing his views as a manufacturer, Shri Kirloskar stated that mathematical conversion of existing inch drawings to metric units would not only be a waste of effort but was also likely to lead to confusion in production units. He added that although the Government have decided to change over to the metric system of weights and measures, in the first place a period of change-over had been provided and secondly, by the nature of things, both the systems were bound to continue side by side for some time. Hence, wherever present production is based on inch designs, no purpose would be served by trying to convert them into metric units. Of course, where development to existing inch design or entirely new designs are being evolved, metric unit should be used.

Second Paper

Availability of Indian Standards in and the Pace Change-over to the Metric System : Lt. Col. R. Vardhanam, Research and Development Organization, Ministry of Defence.

The author, introducing the paper, expressed his dissatisfaction at the slow pace of introduction of the metric system in the country and felt that the pace should be accelerated, if necessary, by force.

During the discussion, the reasons for the apparent slowness of change-over were explained. Once these were overcome, particularly in the procurement of equipment and inspectors, setting up of enforcement organizations and the like, the pace would be accelerated. It was possible that by 1963, the date mentioned by the author for full change-over, the objective might have been achieved. The year 1960 might see the compulsory adoption of metric weights and measures in a number of areas in the country, in many major industries, and government departments. The impact on the general public would be substantial.

The representative of the Posts & Telegraphs Department also explained how the P & T were working towards the adoption of the metric system in 1960.

The consensus of opinion was that the pace of change-over was not at all slow.

Third Paper

The Skein Strength of Cotton Yarn in Metric System : R. L. N. Iyengar, V. V. Gupte, Hari Rao Avkal and V. N. Modale, Technological Laboratory of the Indian Central Cotton Committee, Bombay.

Dr. Iyengar said that a new yarn strength index had been defined in the paper. The value of this index was practically equal to the count strength product used at present. The author recommended the new method for universal adoption.

In the discussion it was brought out that the relationship could not be worked out by mere mathematical conversion because of the many variables that go into the determination.

Fourth Paper

Draft Indian Standard Guide for Specifying Metric Values in Standards : Indian Standards Institution, New Delhi.

It was explained that the guide was a Draft Indian Standard proposed by the ISI Directorate. Delegates were requested to send their comments.

Fifth Paper

Essential Characteristics of Engineering Standards : K. S. Namdev Rao, Hindustan Machine Tools Ltd., Bangalore.

The author stressed the importance of standardization of definitions and designations as variations in these gave rise to difficulties in the procurement of the correct type of material.

Sixth Paper

Procedure to be Followed For a Smooth Change-over : Hermann Schmitz, Oberingenieur.

The author said that in order to make the change-over economical, modifications and alterations of technical documents, tools, machines, etc. should be done rationally. He urged that the problems of change-over should be entrusted to the standards departments of companies.

Civil Engineers' Problems

Shri Nadirshah suggested that the ISI should take the following steps for the benefit of the civil engineers :

- (1) Evolve an efficient and quick procedure for making civil engineers think in metric terms.
- (2) Prepare specimen calculations for designing of engineering structural components such as beams, straps, columns in metric terms.
- (3) Prepare drawings of typical structures in metric units.

Conclusion

In his concluding remarks the Chairman stressed the need for evolving new metric designs. The earliest opportunity should be taken to change old designs to new metric units. He emphasized that it was necessary to build up 'metric psychology' in the country and start thinking in metric terms instead of converting old units into new every time we came across them.

News & Views

Metric System for UK ?

It is understood that the British Association for the Advancement of Science is likely to recommend the adoption of decimal coinage and the metric system of weights and measures.

This will be in a report which is being compiled on the advantages and drawbacks of changing over and which is expected to be published in February or March.

Among those who have experimented with the rival systems are businessmen approached by the Eastern Regional Board for Industry. They reported that an experiment showed that the decimal system made it easier to carry out office calculations. Staff made only half the usual number of mistakes and cut the time needed by 30 percent.

Groups of children were put to work on sums involving money. When handling the decimal method, they made 60 percent fewer errors. It also resulted in the problem being solved in less than half the usual time.

Contents of Packages

The Director of Industries, Delhi, has warned the manufacturers of tinned products and traders dealing in packed commodities to declare the net weight of the contents of each package. Otherwise they would be liable to legal action under the Rajasthan Weights and Measures (Enforcement) Act, as extended to the Territory of Delhi.

It had been found that many of the traders dealing in packed commodities did not declare the net weight of the contents on their

packages. Section 14 of the Act made the sale of packages without declaration an offence.

It may be mentioned that similar legal provisions exist in the Enforcement Acts of other States and will be enforced in a like manner in the near future.

Second Conference of Controllers of Weights & Measures

The Second Conference of Controllers of Weights and Measures of the States and Union Territories in India is scheduled to be held from 7-10 March 1960 at Rajgir, Bihar. The Conference will review the progress in implementing the metric system of weights, the organizational aspects of enforcement, publicity, the arrangement to be made for making available commercial weights, the extension of the metric commercial weights to the whole country and other topics. There will also be a symposium on 'Enforcement of weights and measures, with reference to the law, procedure for enforcement and the special difficulties experienced in the situation of this country'.

It will be recalled that the first Conference of Controllers of Weights and Measures was held in September 1959.

Metric System in Drugs & Fertilizers Industries

The Government of India have recently issued notifications for the drugs and fertilizers industries.

According to the notification for drugs, S.O. 2558, dated 5th November 1959, the metric weights and measures will be introduced

from April 1960 'in respect of factories engaged in the manufacture of drugs, of in so far as they undertake the sale of drugs or purchase of materials'. The period of change-over will be one year according to notification No. S.O. 2559.

Two notifications S.O. 125 and S.O. 126, dated 31 December 1959 deal with the fertilizers industry. According to S.O. 125, from 1 April 1960 the metric units of mass shall come into force in respect of transactions involving sale and purchase of fertilizers. The period of change-over is one year according to S.O. 126.

Change-over to Metric Weights

In Delhi important local trade associations were approached to convene meetings of their members to decide the dates for the change-over to metric weights. The following trade associations have agreed to the change-over on the dates shown against each of them.

(1) All Delhi Sarrafa Association, Delhi.

They have inaugurated from 7 January 1960, but they will use metric weights along with old weights from 1 April 1960, if rates from Bombay and Calcutta are quoted in grams earlier.

(2) Delhi Milk & Sweets Merchants Association, Delhi.
1 March 1960.

(3) Delhi Fruit and Vegetable Merchants' Union, Delhi.
1 April 1960.

(4) Federation of Sadar Bazar Trade Associations, Delhi.
1 April 1960.

(5) Delhi Glass & Paint Merchants' Association, Delhi.
1 April 1960.

(6) Grain Merchants' Association, Delhi.
1 July 1960.

(7) Kirana Committee, Delhi.

1 July 1960.

In Madras, jaggery dealers of Tiruvannamalai and Tirupattur taluks of North Arcot District and the co-operative stores of Vellore town have already begun selling in terms of kilogram weights.

Recently the cashewnut trade of South Arcot district also announced the change-over to metric weights.

Metric system in Cement Industry

The Government of India have decided, in consultation with manufacturers and the State Trading Corporation that metric system of weights should be adopted fully for the sale of cement from 1 July 1960. From that date, cement will be packed in bags of 50 kg. net weight.

The price of cement is at present controlled by the Government of India under the Cement Control Order, 1958 and is for a British ton. The ex-works prices payable by the S.T.C. to the producers and the selling price for a metric tonne of cement will be notified in due course.

Metric system was introduced in the cement industry from 1 October 1958, but in order to give time to the cement producers to prepare themselves for the change-over, it had been decided that both the existing as well as the metric system of weights might be allowed to be used up to a maximum period of two years from that date. This period has also been utilized to familiarize the consumers with metric weights. The weights on cement bags at present are indicated both according to British and metric system.

METRIC PADDHATI VYAVAHAR MARG-DARSHAK (Marathi)—by Shri R. G. Ukekar, publisher Mrs. Lila Ukekar, Kurha (Achalpur), pp 64, October 1959, price Re. 1.00.

This book has been published for the use of students, teachers and the common man in understanding the change-over to decimal coinage and the metric system of weights and measures. It has been written in simple language. The printing has also been done in large type which facilitates quick reading.

There is a definite necessity for the publication of books or booklets in regional languages explaining the metric system in simple language to students and the general public. Unfortunately, very few such books have so far come out. It is hoped that similar books in the regional languages would also be published in large numbers in the near future when the necessity for such literature will be greatly felt.

The book has been divided into 10 chapters. The first 4 chapters deal with the conversion of old and the new coins. The author has given certain formulae which could be used for the conversion of the old into new coins and *vice versa*. He has also set exercises for readers and given the answers at the end of the book. The remaining chapters deal with metric weights and measures. Here also the author has given many exercises in the conversion of metric

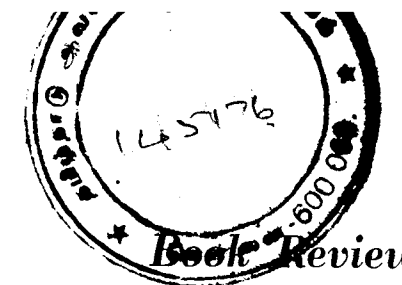
into other units and *vice versa*. At the end of the book pictures of the new weights have been printed. Inclusion of pictures of capacity and length measures also would have been appropriate.

One of the common misconcepts about capacity measures is also reflected in this book. Ordinarily the unit of capacity measure is defined as the volume occupied by a certain weight of pure water, say one kilogram or one seer, under certain conditions. This does not mean that one seer of milk by measure will also weigh one seer. Therefore, the exercises on conversion of capacities to weights, become erroneous unless the specific gravity of the material is also stated.

For the measurement of land areas, the unit of *are*, i.e. 100 m² is usually used. Its higher and lower denominations are the hectare and centiare. The hectare is equal to 100 metre × 100 metre i.e. 10,000 m² and the centiare is equal to 1 metre × 1 metre = 1 m².

The book also includes conversion tables which would be useful to the readers.

Excepting the above points, the book is useful as additional reading for students of higher classes and will prove informative for the teachers. Such efforts deserve to be emulated all over India.



Standards News

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

Brass Sheet and Strip for the Manufacture of Utensils (IS : 422—1959)

The standard covers the requirements for the two different grades of brass sheet and a strip, suitable for the manufacture of household utensils and general brass hollow ware.

Price: Rs. 2.00

Equivalent Metric Units for Scales, Dimensions and Quantities in General Construction Work (IS: 965—1958)

This standard lays down equivalent metric units for the various dimensional values met with in general construction work and at present expressed in the foot-pound (fps) system.

Price: Rs. 5.00

Hot Rolled Mild Steel and Medium Tensile Steel Deformed Bars for Concrete Reinforcement (IS : 139—1959)

The standard covers the requirements and the methods of test for hot rolled mild steel and medium tensile steel deformed bars for concrete reinforcement.

Price: Rs. 2.50

Steel Tubes for Structural Purposes (IS : 1161—1958)

Indian Standards Institution has published a specification for Steel Tubes for Structural Purposes (IS:1161—1958), which covers the requirements for plain carbon steel tubes for structural purposes, not exceeding 150 mm (or 6 in.) nominal bore.

The specification prescribes standard sizes, weights and properties of structural steel tubes and lays down mechanical tests and specific requirements for hot finished welded steel tubes, hot finished seamless steel tubes, electric resistance or induction butt welded steel tubes.

Price: Rs. 3.00

Mild Steel Tubes and Tubulars (IS : 1239—1958)

The standard covers the requirements of welded and seamless, screwed and socketed mild steel tubes and tubulars and of plain end steel tubes of nominal bores ranging from 6 to 150 mm (or $\frac{1}{8}$ to 6 in.). Three grades of thicknesses have been included in this standard.

Price: Rs. 4.00

Cold Rolled Mild Steel Butt Hinges (IS : 1341—1959)

The standard lays down the requirements regarding material dimensions, manufacture and finish of cold rolled mild steel butt hinges.

Price: Rs. 2.00

Steelyards (IS : 1439—1959)

The Indian Standards Institution has published an Indian Standard Specification for Steelyards (IS: 1439—1959). The standard covers the requirements for steelyards. The standard is one of a series of Indian Standards on commercial weighing instruments being prepared 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.

Price : Rs. 1.50

Draft Indian Standard for Steel Wire for Manufacture of Machine Screws [DOC : SMDC 5(72)]

While recommending the continuance of the protection to the machine screw industry, the Tariff Commission had recommended, *inter alia*, that the Indian Standards Institution should give high priority to the formulation of standards for iron or steel rods and wire for the machine screw industry.

The Institution has accordingly drafted a specification for Steel Wire for Manufacture of Machine Screw [Doc: SMDC 5 (72)] which covers the requirements for cold drawn mild steel and free cutting mild steel wire suitable for the manufacture of machine screws supplied in the $\frac{1}{4}$ hard and $1\frac{1}{2}$ hard conditions.

Draft Indian Standard for Hard-drawn Steel Wire Fabric for Concrete Reinforcement [DOC : BDC 2(438)]

Steel wire fabric is being extensively used in the country as reinforcement in reinforced concrete work; and there exists a great potential for its further development and use. With a view to covering the requirements and methods of tests for electrically welded hard-drawn steel wire fabric, the Indian Standards Institution has drafted a specification for hard-drawn steel wire fabric for concrete reinforcement [Doc: BDC 2 (438)] which covers the require-

ments and the methods of test for hard-drawn steel wire fabric for concrete reinforcement, consisting of hard-drawn steel wire with cross wires electrically welded to them.

It is expected that the standard would help consumers to determine and the manufacturer to produce the correct quality of the welded fabric.

Draft Indian Standard Rules for Rounding off Numerical Values [DOC : EDC 1(531)]

The Indian Standards Institution has drafted an Indian Standard Rules for Rounding off Numerical Values [Doc: EDC 1(531)] which prescribes rules for rounding off numerical values for the purposes of reporting results of a test, an analysis, a measurement or a calculation, and thus assisting in drafting 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 the adoption of a uniform procedure in rounding of numerical values. However, the rules given referred only to unit fineness of rounding and in course of years the need was felt to prescribe rules for rounding of numerical values to fineness of rounding other than unity. Moreover, 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.

Licensed Manufacturers, Dealers and Repairers of Weights and Measures (6)

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

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 instalment number of the list for that State or Union Territory. The issues of *Metric Measures* in which previous lists appear are also indicated suitably.

An analysis of the licensees, including the present list, shows that the total number of licensees in 8 States and 2 Union Territories is 161 manufacturers, 604 dealers and 111 repairers. The details of published information are as follows:

Serial No.	State/Union Territory									Licensees		
										Manufacturers	Dealers	Repairers
(1)	Andhra Pradesh	..	..	..	..	..	..	..	..	25	25	16
(2)	Bombay	..	..	..	..	..	..	..	..	23	160	52
(3)	Delhi	..	..	..	..	..	..	..	..	12	54	17
(4)	Kerala	..	..	..	..	..	..	..	..	4	56	0
(5)	Madras	..	..	..	..	..	..	..	..	38	74	14
(6)	Mysore	..	..	..	..	..	..	..	..	9	67	0
(7)	Orissa	..	..	..	..	..	..	..	..	4	5	0
(8)	Punjab	..	..	..	..	..	..	..	..	11	155	3
(9)	Tripura	..	..	..	..	..	..	..	..	0	8	0
(10)	West Bengal	..	..	..	..	..	..	..	..	35	0	9
										161	604	111

LICENSED MANUFACTURERS, DEALERS & REPAIRERS OF WEIGHTS & MEASURES (6)

DELHI (3)

In the July and September 1959 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 and repairers subsequently licensed by the Delhi Administration.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Adarsh Engineering Works, 16/2522, Gali No. 8, Beadon Pura Karol Bagh, New Delhi.	Beam Scales, Class 'D'.
(2)	Northern Scales Co., Khanna Talkies Building, New Delhi	Person Weighing Machines.
(3)	Paul Engineering Works, 38, Motia Khan, Jhandewala Road, New Delhi.	Cast Iron Weights.
(4)	Sh. Mohd Afaq, 1362, Haveli Kalu Khawas, Chitli Kabar, Delhi.	Bullion & Brass Weights.
(5)	Sultan Khan Nasim Khan, X/1491, Chitli Kabar, Mohalla Suiwalan, Gali Kotana, Delhi.	Bullion & Brass Weights.

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	Tirlik Singh Vig & Sons, 63, Ghaffaar Market, Karol Bagh, New Delhi.	Cast Iron and Brass Weights and Beam Scales Class C & D.

KERALA (2)

In the November 1959 issue of *Metric Measures* a list of licensed manufacturers and dealers of weights and measures in Kerala State was published. The following is a list of manufacturers and dealers subsequently licensed by the Government of Kerala.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Brite Engineering Co., Peroorkada, Trivandrum-5 ..	Cast Iron, Brass and Sheet Metal Weights and Capacity Measures.
(2)	Metal Industries, Shoranur	Weights.
(3)	Mighty Scale Co., Kuranchery, Minalur Post, Wadakkancherry.	Platform Machines.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	P.V. Aipoq & Sons, Alwaye	Weighing Instruments.
(2)	C.V. Antony, Proprietor, Varuthunny & Sons, Hardware Merchant, P.O. Road, Trichur.	Weights.
(3)	P. Bhaskara Menon, The Kerala Stores, Market Road, Irinjalakuda.	Weights and Measures.
(4)	Central Scales & Service House No. 202/6, Palai Bazaar, Meenachil Taluk.	Weights, Measures and Weighing Instruments.
(5)	K.B. Chandran Kaliappan Sons, Hardware & Vessel Merchant, Wadakkancherry.	Weights and Measures.
(6)	Chandy Devassy & Sons, High Road, Trichur	Weights and Measures.
(7)	Chittilapilly Chennu & Sons, Merchants, Wadakkanchery ..	Weights and Measures.
(8)	Das Brothers, Hardware Merchants, Muvattupuzha ..	Weights and Measures.
(9)	M. Dasappa Kamath & Sons, Near Town Bus Stand, Talikar Ward, Cannanore.	Weights, Measures, Weighing and Measuring Instruments.
(10)	T.H. Ebrahim Karim & Co., Muvattupuzha	Weights.
(11)	Francis Chandy, High Road, Trichur	Weights, Measures and Weighing Instruments.
(12)	K. Gopala Pillai, Hardware Merchants, Punaloor	Weights and Measures.
(13)	N. Gopala Pillai, Hardware Merchants, Mukkada Bazar, Quilon.	Weights, Measures, Weighing and Measuring Instruments.
(14)	K. Gopalakrishnan, Hardware Merchant, R.S. Road, Ottapalam.	Weights, Measures, Weighing and Instruments.
(15)	Indo Mercantile Industries, 2/27, Irinjalakuda	Weights and Measures.
(16)	P. K. Joseph, Hardware Merchant, High Road, Trichur ..	Weights and Weighing Instruments.
(17)	K.S. & Co. Hardware Merchants, Mukkada, Quilon	Weights and Weighing Instruments.
(18)	T.A. Kochappu, J. I. Varkey and Family, Irinjalakuda ..	Weights and Measures.
(19)	C.K. Kochittyathi & Sons, Hospital Road, Ernakulam ..	Weights and Measures.
(20)	P.C. Kunju Vareed, Iron and Stationery Merchant, Market Road, Chalakudy.	Weights, Measures, Weighing and Measuring Instruments.
(21)	M.L. Lonappan, Hardware Merchant, Trichur	Weights and Measures.
(22)	N.A. Lonappan & Sons, Hardware Merchants, High Road, Trichur.	Weights and Measures.
(23)	M. Maitheen Kunju, Chunkasserri & Co., Karunagapally	Weights, Measures and Weighing Instruments.
(24)	The Money's Corporation (Private) Ltd., Sreekanteswaram, Trivandrum-1.	Weights, Measures, Weighing Instruments and Platform Machines.
(25)	Multipurpose Co-operative Society Ltd., No. 3456, Kadakal, Kottarakara.	Weights and Weighing Instruments.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(26)	V.N. Nambissan, Fair Price Shop, Ottapalam, Palghat ..	Weights and Measures.
(27)	R. Ponnaiah Chettiar & Sons, Hardware Merchants, Punaloor.	Weights, Measures and Weighing Instruments.
(28)	K.V. Poulo & Sons, General Merchants, Angamally	Weights and Measures.
(29)	Quilon Agencies, Musaliar Buildings, Chinnakada, Quilon	Weights, Measures, Weighing and Measuring Instruments.
(30)	K. M. Radhakrishna Chetty & Bros., Palayam Road, Calicut-1	Weights and Weighing Instruments
(31)	C.S. Ramakrishnan Iyer, Hardware Merchant, Perintalmanna	Weights and Measures.
(32)	K.A. Rappai, Hardware Merchant, Post Office Road, Trichur	Weights and Measures.
(33)	Scales and Services Markets Road, Cochin	Weights and Weighing Instruments.
(34)	C.M. Syed, Chakkungal, Hardware Merchant, Muvattupuzha	Weights.
(35)	Tholath Ipe Ittoop, Hardware Merchant, Kunnamkulam ..	Weights, Measures and Weighing Instruments.
(36)	Trichur Hardware Stores, Post Office Road, Trichur ..	Weights and Measures.
(37)	Vadakkithalakkal Kunju, Vareed Chummer, People's Stores Hardware Merchant, Kunnamkulam.	Weights, Measures and Weighing Instruments.
(38)	T.V. Vanchi Aiyar & Bros., Merchant, Market Road, Chalakudy.	Weights, Measures, Weighing and Measuring Instruments.
(39)	P.I.C. Vareed, Kottungal, Chowghat	Weights and Measures.
(40)	T.P. Virupakshi Chettiar, Hardware Merchant, Big Bazar, Palghat.	Weights, Measures, Weighing and Measuring Instruments.

MADRAS (2)

In the November 1959 issue of *Metric Measures* a list of licensed manufacturers and dealers and repairers in Madras State was 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)	British and Eastern Engineering Co., 16, General Patters Road, Madras-2.	Weights and Measures.
(2)	Industrial Machine Tools Co., 25, P.P.V. Nandavan Street, Virudhunagar.	Weights and Measures.
(3)	J.B. Industries, 31, Palam Station Road, Sellur, Madurai	Weights and Measures.
(4)	Kaka Indian Foundry, Tiruthangal, Sivakasi	Weights and Measures.
(5)	Metric Scale Industries and Engineering Works, 16, East Mada Street, Villivakkam.	Weights and Measures.
(6)	Srinivasa Foundry, 127, Agraharam Street, Erode	Weights.
(7)	Venugopal M. Santhiapet, Guditham	Weights.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	O.K. Abdul Ghani Rowthar, Hardware Merchant, Vridhachalam.	Weights and Measures.
(2)	E.A. Alimohammed & Co., 340-42, Rosappachetty Street, Madras-3.	Weights and Measures.
(3)	K.P. Arunachalam & Company, Netaji Chowk, Santhapet, Gudiatham.	Weights and Measures.
(4)	Ayya Nadar V.A. & Sons, 30, Elukadal Agraharam, Madurai-1.	Weights and Measures.
(5)	Ayyaswamy, Bell Studio, 21, Asiliaman Koil Street, Tiruvannamalai.	Weights and Measures.
(6)	Desi S. Jaya Trading Co., 129-B, Car Street, Tiruvannamalai.	Weights and Measures.
(7)	Gordon Woodraff & Company (Madras) Private Ltd., 1/21, North Beach Road, Madras-1.	Weights and Measures.
(8)	Hateembhai, 37/38, Rasappa Chetty Street, Madras-3	Weights and Measures.
(9)	Janakiraman Pillai, V.G. 29, Govindappa Naick Street, Madras.	Weights and Measures.
(10)	Kanak Machinery Mart, 158, Broadway, Madras-1	Weights and Measures.
(11)	M.N.D. Kasiraja Nadar & Co., 373-375, Big Bazar, Virudhunagar.	Weights and Measures.
(12)	Kausal S.N., Standard Steel Iron Foundry, 1836-A, Jeoni Mondi, Laxmi Mills Buildings, Agra.	Weights and Measures.
(13)	Krishnamoorthy Nadar P., East Vanniya Street, V. Marudur, Villupuram.	Weights and Measures.
(14)	P.S. Krishnaswamy Naidu, 48, Kanniambadi Street, Vaniyambadi.	Weights and Measures.
(15)	E.A. Lakshmana Nadar & Bros., 90, East Masi Street, Madurai.	Weights and Measures.
(16)	Lakshmipathy Chetty & Sons, 229-230, Bazaar Street, Villupuram.	Weights and Measures.
(17)	K.S. Narasimmalu Naidu, 112, Bazaar Street, Villupuram	Weights and Measures.
(18)	Natesan C. Subramaniaswamy Koil Street, Tittagudi	Weights and Measures.
(19)	Pandi Nadar & Co., Hardware & Paint Merchants, 87, East Masi Street, Madurai.	Weights and Measures.
(20)	V.A. Ponnaiyappa Nadar & Co., 247, East Masi Street, Madurai.	Weights and Measures.
(21)	N. Ponnuswamy Udayar & Sons, Bazaar Street, Ulundurpet.	Weights and Measures.
(22)	Ramakrishnan, 33/2, Katpadi Road, Vellore	Weights and Measures.
(23)	T.S.G. Ramanathan Chettiar, Hardware Merchant, Penadam, Vridhachalam.	Weights and Measures.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(24)	Royal Hardware Mart, 30, Devaraja Mudali Street, Madras-1	Weights and Measures.
(25)	P.S. Seshachalam, 26, N.N.S. Bose Road, Main Bazaar Road, Saidapet, Vellore.	Weights and Measures.
(26)	Shaik Abdul Khadar V.M. Old Iron Merchant, 224, Tham-buchetty Street, Madras-1.	Weights and Measures.
(27)	V.A.S. Shanmugasundara Nadar & Sons, 43, Amman Sannidhi Street, Madurai.	Weights and Measures.
(28)	D.K. Srinivasan, 200, Main Bazaar Road, Saidapet, Vellore	Weights and Measures.
(29)	T. S. Swaminathan, 34, Then Mathathi Street, Tiruvannamalai	Weights and Measures.
(30)	V. Thangayel Chettiar 13-A, South Kottai Street, Vridhachalam.	Weights and Measures.
(31)	K. Venkatesan Chettiar, Pakkiri palayam Street, Pudupet P.O. Panruti.	Weights and Measures.

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles repaired
(1)	Bharat Mechanical Engineering Works, Keelayar, Tirukoilur.	Weights and Measures.
(2)	Gordon Woodraff & Co. (Madras) Private Ltd., 1/21, North Beach Road, Madras.	Weights and Measures.
(3)	Industrial Machine Tools Company, Post Box No. 44, 25, P.P.V. Nandavan Street, Virudhunagar.	Weights and Measures.
(4)	Messeys, 4-B, 4-C, North Railway Terminus Road, Royapuram, Madras.	Weights and Measures.

MYSORE (1)

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Annapurna Cooker Company, Basavangudi, Bangalore-4 ..	Brass Weights.
(2)	Bharat Iron Works, Dharwar Road, Belgaum	Cast Iron Weights.
(3)	Machinery and Foundry Works (P) Ltd., Tumkur Road, Yeshwanthpur, Bangalore.	Cast Iron & Brass Weights.
(4)	P.M. Madurai Mudaliar & Sons, Jolly Mohalla, Bangalore-2.	Cast Iron Weights.
(5)	A.A. Maniya, Raviwarpet, Belgaum	Cast Iron Weights.
(6)	Metro Malleable Manufacturer (P) Ltd., Silver Jubilee Park Road, Bangalore.	Cast Iron Weights.
(7)	Sunrise Industries, 5th Main Road, Srirampuram, Bangalore-2.	Cast Iron Weights.
<i>Outside Manufacturers Authorised to sell Weights in Mysore State through their Agent in Mysore State.</i>		
(8)	Avery Company (P) Ltd., Alipur, Calcutta	Cast Iron & Brass Weights.
(9)	S.K. Industries, Hyderabad	Cast Iron Weights.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Abdul Salam Badal, No. 2-1-93 Mylapur Gate Street, Yadgir.	Weights and Measures and Weighing and Measuring Instruments.
(2)	H.P. Anantharajaiah, General Merchant, Gendhi Bazaar, Hassan.	Weights, Measures and Weighing Instruments.
(3)	Arasikere Taluk, Agricultural Produce Market Committee, Arasikere.	Weights, Measures and Weighing Instruments.
(4)	Avery Company of India Private Limited, 7, Sri Ramakrishna Buildings, 1, Narasimha Raja Road, Bangalore.	Weights, Measures and Weighing Instruments.
(5)	N.S. Baitmangalkar & Co., 66, Vivekanand Asok Nagar, Hubli.	Weights, Measures and Weighing Instruments.
(6)	Belagur Venkanna Sons, Gandhi Bazaar, Shimoga	Weights, Measures and Weighing Instruments.
(7)	A.I. Beleri, Wakil Chawal, Gadag Dist. Dharwar	Weights, Measures and Weighing Instruments.
(8)	Bidar Weights and Measures Dealing & Repairing Co., Near Kunni Chabutra Bidar.	Weights and Measures and Weighing and Measuring Instruments.
(9)	H.A. Bommannaiah & Sons, Brass & Copper Merchants, Gandhi Bazaar, Hassan.	Weights, Measures, and Weighing Instruments.
(10)	Chandra Stores, Stationery and Government Book Seller, Main Road, Ramanagaram.	Weights and Measures and Weighing and Measuring Instruments.
(11)	Denova Traders, 49, Central Street, Bangalore-1	Weights, Measures and Weighing Instruments.
(12)	General Investment & Commercial Corporation Private Ltd., Sree Ramakrishna Building, Post Box No. 25, Udipi (S. Kanara).	Weights, Measures and Weighing Instruments.
(13)	C.R. Gurusiddappa, Iron, Hardware & Paint Merchant, Mandipet, Tumkur.	Weights, Measures and Weighing Instruments.
(14)	S.V. Halavaggli, Tea Merchant, Eastern Gadag, Namjash Road, Gadag.	Weights, and Measures and Weighing and Measuring Instruments.
(15)	N.R. Haranath, Areca Commission Agent, S.P. Mukharji Road, Shimoga.	Weights, Measures and Weighing Instruments.
(16)	K.Y. Iron Stores, Mandipet Tumkur (Mysore Dist.)	Weights, Measures and Weighing Instruments.
(17)	C.R. Kappanna & Sons, General Merchants, Tiptur	Weights, Measures and Weighing Instruments.
(18)	Karnatak Traders, 99, B. Osman Khan Road, Bangalore-2.	Weights, Measures and Weighing Instruments.
(19)	Kasi Puttaswamy Setty & Sons, Iron & General Merchants, Arasikere (Hassan Dist.).	Weights, Measures and Weighing Instruments.
(20)	M.R. Krishnappa, Proprietor, Majdoor Stores, Bazaar Street, Mandya.	Weights, and Measures and Weighing and Measuring Instruments.
(21)	Lakshmi Iron Mart (Regd.), Stock Holders of Iron and Steel, Car Street, Bellary-2.	Weights, Measures and Weighing Instruments.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(22)	Machinery and Foundry (P) Ltd., Tumkur Road, Yeshwanthapuram, Bangalore-3.	Weights, Measures and Weighing and Measuring Instruments.
(23)	S.M. Mahboob Beig Sheib, Nallogadda, Bangalore Road, Door No. 27, Wend XVI B.P. Bellary-2.	Weights and Measures and Weighing and Measuring Instruments.
(24)	Mahavir Cottage Industries, No. 365/6 Nazarbad, Mysore.	Weights, Measures and Weighing Instruments.
(25)	Metro Malleable Manufactures (P) Ltd., Silver Jubilee Park Road, Bangalore-2.	Weights, Measures and Weighing Instruments.
(26)	Misquita Motor Service, Misquita (Prop.), Hampankatta, Mangalore-1.	Weights and Measures and Weighing and Measuring Instruments.
(27)	Misrilal Motilal, Saraf Bazaar, Gulbarga	Weights, Measures and Weighing Instruments.
(28)	A.R. Mohamed Ameer, Iron Merchant, 623, Soji Street, Mysore.	Weights and Measures and Weighing and Measuring Instruments.
(29)	Mohamed Amir Ali Maniyar, Ganj Road, Gulbarga	Weights, Measures and Weighing Instruments.
(30)	Murigappa Channabasappa, Belluli, Murigappa Street, Davanagere City.	Weights, Measures and Weighing Instruments.
(31)	Mysah Traders, Silver Jubilee Park Road, Bangalore-2	Weights, Measures and Weighing Instruments.
(32)	L. Nagappa & Sons, General Merchant, Hunsur, Mysore State.	Weights and Measures and Weighing and Measuring Instruments.
(33)	A. Nagappa Setty & Bros. Hardware & General Merchant, B.H. Road, Bhadravatti.	Weights and Measures and Weighing and Measuring Instruments.
(34)	National Engineering & Sale Corporation, Golikatta Bazaar, Bunder, Mangalore.	Weights, Measures and Weighing Instruments.
(35)	Prabaker Stores, Prop. H.V. Prabhakar, Jayanagar, Shimoga	Weights and Measures and Weighing and Measuring Instruments.
(36)	Radha Krishna & Bros., Nehru Ganj, Post Box 27, Gulbarga	Weights, Measures and Weighing Instruments.
(37)	Rahman Stores, Channagiri Road, Bhadravatti	Weights and Measures and Weighing and Measuring Instruments.
(38)	Raja Lakshmi Street, Bazaar Street, Kanakapur	Weights and Measures and Weighing and Measuring Instruments.
(39)	M.N. Raman, 8/1, Jummamasjid Road, Bangalore	Weights, Measures and Weighing Instruments.
(40)	Ranganatha Hall, Proprietor Sree H.V. Lakshmana Setty, Gandhi Bazaar, Hassan.	Weights, Measures and Weighing Instruments.
(41)	K.A. Ranganathan & Co. 2847, III Cross, Chamundipuram, Mysore.	Weights, Measures and Weighing Instruments.
(42)	H.R. Rao, Old Contractor, Farm Road, Raichur	Weights, Measures and Weighing Instruments.

Dealers (contd.)

Sl. No	Name and Address of Dealer	Details of Articles Sold
(43)	N. Rayappa & Sons, Brass & Copper Merchants, Chickpet, Tumkur.	Weights, Measures and Weighing Instruments.
(44)	Rekha Industries & Traders, Santhakatte, Suratkal, South Kanara District.	Weights and Measures and Weighing and Measuring Instruments.
(45)	S. Revanaradhya & Sons, Hardware & General Merchants, Mandipet, Post Box No. 15, Tumkur.	Weights and Measures and Weighing and Measuring Instruments.
(46)	Saifoo & Company, 14, A Old Bambo Bazar Road, Bangalore	Weights and Measures and Weighing and Measuring Instruments.
(47)	Salebe Omar C/o Patel Cycle Taxi Attar Bazar, Gulbarga ..	Weights and Measures and Weighing and Measuring Instruments.
(48)	Shaik Budhan Sahib, Dealer in Weights, Raichur	Weights, Measures and Weighing Instruments.
(49)	T. Shivaram, T. 43, Sanjeevappa Lane, Avenue Road, Cross, Bangalore.	Weights, Measures and Weighing Instruments.
(50)	H.V. Sreeranga Setty & Sons, Gupta Stores, Hassan ..	Weights, Measures and Weighing Instruments.
(51)	M.S. Srinivas Company Prop: M.S. Srinivas H Jayachamara-jendra Road, Bangalore.	Weights and Measures and Weighing and Measuring Instruments.
(52)	C. Subba Batta & Sons, General Merchants, Koppa, Kadur.	Weights and Measures and Weighing and Measuring Instruments.
(53)	H.K. Subbaraya Setty, General Merchant, Ganesh Temple Street, Hunsur.	Weights, Measures and Weighing Instruments.
(54)	'Suresh Mart' Proprietor, Sri Surappa Setty P.S. Arsikere.	Weights, Measures, and Weighing Instruments.
(55)	Swamy Stores, C/o Sharda Press, Nehru Building, Shimoga	Weights, Measures and Weighing Instruments.
(56)	H. Tulasi Ram, Dealers of Weights & Measures, Farm Road, Raichur.	Weights, Measures and Weighing Instruments.
(57)	Uboroi Limited No. 2, Commercial Street, Bangalore-1 (Branch).	Weights, Measures and Weighing Instruments.
(58)	Uboroi Trading Company, 11 Mission Compound, Bangalore-2.	Weights, Measures and Weighing Instruments.
(59)	Vattam Narayanapah Chetty & Sons, Sabhapati Well Street, Bellary.	Weights, Measures, and Weighing Instruments.
(60)	S. Veerappa Shastry & Sons, General Merchants, Shikaripur Shimoga Dist.	Weights, Measures and Weighing Instruments.
(61)	K. Venkatachalappa, Sole Proprietor, P.O. Box No. 20, Sagar.	Weights, Measures and Weighing Instruments.
(62)	P. Venkatappa Setty & Sons, Hardware & Paint Merchants, Arasikere.	Weights, Measures and Weighing Instruments.
(63)	K.S. Venkataramana Setty & Sons, Hardware Merchants, Gandhi Bazar, Shimoga.	Weights, Measures and Weighing Instruments.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(64)	C. Venkata Ramanna Setty & Sons, Hardware Merchant, Arsikere.	Weights, Measures and Weighing Instruments.
(65)	P.V. Venugopal Mudaliar & Sons, 538, Lalbagh Fort Road, Viswespuram, Bangalore-4.	Weights, Measures and Weighing Instruments.
(66)	Vrijalal Laljee, Hardware Merchant, Asoka Road, Mysore	Weights and Measures and Weighing and Measuring Instruments.
(67)	Yankappa, Contractor, Weights and Measures, No. 6-1-31 Mohalla Timmapur Pet, Near Hanuman Talkies, Raichur Distt.	Weights and Measures and Weighing and Measuring Instruments.

ORISSA (1)

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Bharat National Foundry, Motiakhan, New Delhi-1 ..	Cast Iron Weights.
(2)	Bihar Agricultural Industries, Cantt. Road, Khagaul (Patna).	Brass and Cast Iron Weights.
(3)	National Industrial Co-operative Corporation, Jatni, Orissa.	Cast Iron Weights.
(4)	Riaz and Brothers, 134-138, Near Post Office, Sadar Bazar, Delhi-6.	Brass and Bullion Weights.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Bhagwanram Ramrajram, College Square, Cuttack-3, Orissa	Weights.
(2)	Bhuramal Rungta, Khetrampur, Sambalpur.	Weights.
(3)	Hadu Subudhi & Brother, Big Bazar, Berampur, Ganjam	Weights.
(4)	Nanagaram Agarwalla, Khetrampur, Sambalpur	Weights.
(5)	Orissa State Co-operative Marketing Society Ltd., Buxi-bazar, Cuttack-1.	Weights.

PUNJAB (3)

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

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Jainko Industries, Spatu Road, Ambala City	Spring balances, Dial type 100 kg capacity.
(2)	Sehgal Foundry Works, Jhajjar Road, Rohtak	Cast Iron Weights 20 kg to 100 g (20, 10, 5, 2 kg, 500, 200, 100 g). <i>Brass Weights</i>
(3)	Sikand Saini & Company, Weavers Colony, Panipat	20 g and 50 g Cast Iron Weights, 50, 20, 10, 5, 2 & 1, kg Brass Weights, 50 and 20 g.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Agricultural Industries (Regd.) Batala	Their own manufactured products.
(2)	Ajudhia Parshad Dalip Singh, Jhajjar (Rohtak)	Weights, Measures, Weighing and Measuring Instruments.
(3)	Bashesar Dass Nand Kishore, Sarafan Bazar, Ambala City	Weights, Measures, Weighing and Measuring Instruments.
(4)	Bhawani Sahai Bishambar Dayal, Rewari	Weights, Measures, Weighing and Measuring Instruments.
(5)	Bhim Sen Satish Kumar, Andulu Gate, Near Post Office, Raikot.	Weights, Measures, Weighing and Measuring Instruments.
(6)	Bindra Ban Mam Raj, Bandsi Gate, Hansi	Weights, Measures, Weighing and Measuring Instruments.
(7)	Brij Kishore Raj Kishore, District Karnal	Weights, Measures, Weighing and Measuring Instruments.
(8)	Chanan Ram Hari Ram, Saban Bazar, Ludhiana	Weights, Measures, Weighing and Measuring Instruments.
(9)	Chandu Lal Ram Dhari, Gohana Mandi	Weights, Measures, Weighing and Measuring Instruments.
(10)	Charanji Lall Bhagwan Dutt, Rewari	Weights, Measures, Weighing and Measuring Instruments.
(11)	Data Ram Ram Gopal, Giddarbha	Weights, Measures, Weighing and Measuring Instruments.
(12)	Devi Pershad & Sons, Narwana Mandi	Weights, Measures, Weighing and Measuring Instruments.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(13)	Dewan Chand & Company, Iron Merchants, Nabha	Weights, Measures, Weighing and Measuring Instruments.
(14)	Dewat Ram Jai Bhagwan, Iron Merchants, Pundri	Weights, Measures, Weighing and Measuring Instruments.
(15)	Dharam Singh & Sons, Tehsil Bazar, Tarn Taran	Weights, Measures, Weighing and Measuring Instruments.
(16)	Dula Ram Ram Nath, Shahbad Markanda	Weights, Measures, Weighing and Measuring Instruments.
(17)	Eleka Industries, Rainak Bazar, Jullundur	<i>Brass Weights</i> <i>Iron Beam Scales</i> Class B 100 kg
(18)	Ganpat Ram Harbans Lal, Railway Road, Karnal	Weights, Measures, Weighing and Measuring Instruments.
(19)	Gupta Iron Stores, Main Bazar, Kangra	Weights, Measures, Weighing and Measuring Instruments.
(20)	Hans Raj Tej Paul, Jindal, Malerkotla	Weights, Measures, Weighing and Measuring Instruments.
(21)	Hargopal Harji Ram, Saddar Bazar, Bhatinda	Weights, Measures, Weighing and Measuring Instruments.
(22)	Harphool Mal Puran Chand, Gohana Mandi	Weights, Measures, Weighing and Measuring Instruments.
(23)	Hukam Chand of M/s Tilak Iron and Hardware Merchants, Karnal.	Weights, Measures, Weighing and Measuring Instruments.
(24)	Ichhroo Mal Karam Chand, Katra Hari Singh, Amritsar	Brass Weights 1 kg to 1 g.
(25)	Jiwan Dass Jetha Nand of Hind Hardware Stores, Nangal Township.	Weights, Measures, Weighing and Measuring Instruments.
(26)	Kahan Chand & Sons, Railway Road, Tarn Taran	Weights, Measures, Weighing and Measuring Instruments.
(27)	Kushan Singh Gian Chand, Jaura Gate, Jullundur City	Weights, Measures, Weighing and Measuring Instruments.
(28)	Kidar Nath and Sons, Ambala Cantt.	Weights, Measures, Weighing and Measuring Instruments.
(29)	Khiali Ram Mam Chand, Jind	Weights, Measures, Weighing and Measuring Instruments.
(30)	Kishan Chand Balwant Rai, G.T. Road, Mandi	Weights, Measures, Weighing and Measuring Instruments.
(31)	Kishan Chand Ram Kumar, Iron Merchants, Charkhi Dadri	Weights Measures, Weighing and Measuring Instruments.
(32)	Kishore Chand Sudershan Lal, Pathankote	Weights, Measures, Weighing and Measuring Instruments.
(33)	Krishana Foundry Works, Ambala City	Cast Iron Weights, 50 kg to 100 g, Brass Weights 50 g, and 2 g.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(34)	Lal Chand Mehar Chand, Bazar Kathian, Amritsar	Weights, Measures, Weighing and Measuring Instruments.
(35)	Maghi Mal Mathra Dass, G.T. Road, Khanna	Weights, Measures, Weighing and Measuring Instruments.
(36)	Mahabir Parshad Bimal Parshad, Railway Road, Rohtak	Weights, Measures, Weighing and Measuring Instruments.
(37)	Mathra Dass Kedar Nath, Rupar	Weights, Measures, Weighing and Measuring Instruments.
(38)	Milkhi Mal Kheta Ram, Lajpat Rai Road, Jagraon	Weights, Measures, Weighing and Measuring Instruments.
(39)	Mohan Lal Shive Nath Rai, Samalkha	Weights, Measures, Weighing and Measuring Instruments.
(40)	Munshi Lal Kewal Ram, Chaura Bazar, Karnal	Weights, Measures, Weighing and Measuring Instruments.
(41)	Musadi Lal Mool Chand, Kosli (Distt. Rohtak)	Weights, Measures, Weighing and Measuring Instruments.
(42)	Panna Lal & Sons, Main Bazar, Dera Bassi	Weights, Measures, Weighing and Measuring Instruments.
(43)	Phool Chand Amritsaria Mal, Lajpat Rai Road, Jagraon	Weights, Measures, Weighing and Measuring Instruments.
(44)	Phuman Ram Chandan Lal, Main Bazar, Kharar	Weights, Measures, Weighing and Measuring Instruments.
(45)	Prithi Chand Munna Lal, Narwana Mandi	Weights, Measures, Weighing and Measuring Instruments.
(46)	Raj Kumar Swatantar Kumar, Patiala	Weights, Measures, Weighing and Measuring Instruments.
(47)	Rama Iron Store, Bogpur	Weights, Measures, Weighing and Measuring Instruments.
(48)	Ram Saran Dass Molu Ram, Lohakatli, Bhiwani	Weights, Measures, Weighing and Measuring Instruments.
(49)	Rameshwar Dass Lokhmi Chand, Market Bazar, Loharu	Weights, Measures, Weighing and Measuring Instruments.
(50)	Ramji Dass Ram Chander Dass, Bilaspur (District Ambala)	Weights, Measures, Weighing and Measuring Instruments.
(51)	Rati Ram Kewal Ram, Gharaunda Mandi	Weights, Measures, Weighing and Measuring Instruments.
(52)	Rup Chand Des Raj, Dhuri	Weights, Measures, Weighing and Measuring Instruments.
(53)	Sant Lal Inder Sain, 31, Lower Bazar, Simla	Weights, Measures, Weighing and Measuring Instruments.
(54)	Sant Lal Punnur Ram, Ladwa	Weights, Measures, Weighing and Measuring Instruments.

Dealers (contd.)

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(55)	Sat Parkash Ved Parkash, Sunam Mandi	Weights, Measures, Weighing and Measuring Instruments.
(56)	Sat Paul Kewal Krishan Gulati, Phillaur	Weights, Measures, Weighing and Measuring Instruments.
(57)	Sawmi Ram Jai Ram, Brass & Utensil & Hardware Merchants, Main Bazar, Kangra.	Weights, Measures, Weighing and Measuring Instruments.
(58)	Sesh Ram Behari Lal, Iron & Steel Stockists, Palampur	Weights, Measures, Weighing and Measuring Instruments.
(59)	Shamboo Ram Mohat Ram, Samana Mandi	Weights, Measures, Weighing and Measuring Instruments.
(60)	Shankar Dass Amar Singh, Railway Road, Rohtak	Weights, Measures, Weighing and Measuring Instruments.
(61)	Sher Singh Sant Singh, Kaithal	Weights, Measures, Weighing and Measuring Instruments.
(62)	Shiboo Mal Radha Mall, Grain Markets, Malerkotla	Weights, Measures, Weighing and Measuring Instruments.
(63)	Sita Ram Murli Dhar, Rori Bazar, Sirsa	Weights, Measures, Weighing and Measuring Instruments.
(64)	Sobti Iron Works, Railway Road, Nakodar	Weights, Measures, Weighing and Measuring Instruments.
(65)	Som Dutt Shiv Kumar, Azad Chowk, Narnaul	Weights, Measures, Weighing and Measuring Instruments.
(66)	Subhash Machinery Stores, Rohtak	Weights, Measures, Weighing and Measuring Instruments.
(67)	Sunder Dass Madan Gopal, Bazar Kaserian, Jullundur	Weights, Measures, Weighing and Measuring Instruments.
(68)	Swadeshi Iron & Trunk Stores, G. T. Road, Karnal	Weights, Measures, Weighing and Measuring Instruments.
(69)	Swaraj Foundry & Engineering Works, Batala	Cast Iron Weights 50 kg to 100 g.
(70)	Tilak Ram Ram Kishan, Giddarbha	Weights, Measures, Weighing and Measuring Instruments.
(71)	Tulsi Ram Ram Chander, Chaura Bazar, Karnal	Weights, Measures, Weighing and Measuring Instruments.
(72)	Vasdev Rangi Ram, Lehra Gaga	Weights, Measures, Weighing and Measuring Instruments.
(73)	Vidya Prakash Om Prakash, Lamba Bazar, Noor Mahal	Weights, Measures, Weighing and Measuring Instruments.

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	Gurcharan Singh, Railway Bazar, Jagadhari	Weights—Cast Iron & Brass, Measures of Length & Capacity.
(2)	Jai Parshad Gupta, House No. 2641, Vengali Mohalla, Ambala Cantt.	Weights—Cast Iron & Brass, Measures of Length & Capacity.
(3)	Nathu Ram, House No. 3213/2, Ashoka High School, Katcha Bazar, Ambala Cantt.	Weights—Cast Iron & Brass, Measures of Length & Capacity.

TRIPURA (1)

Delears

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Banerjee & Co. Motor Stand Road & Central Road Junction, Agartala.	Weights & Measures.
(2)	Shree Bhandar, Central Road, Agartala	Weights & Measures.
(3)	Das Gupta & Sons, Mogra Road, Agartala	Weights & Measures.
(4)	Shree Durga Bhandar, 99, Bat-tala Road, Agartala	Weights & Measures.
(5)	Ghatak Brothers, 18, Hariganga Basak Road, Agartala	Weights & Measures.
(6)	Paresh Chandra Kar & Co., 34/1, Central Road, Agartala	Weights & Measures.
(7)	Parimal Aluminium Stores, Mogra Road, Agartala	Weights & Measures.
(8)	Tripura Paint & Hardware Stores, 58/2, Central Road, Agartala.	Weights & Measures.

WEST BENGAL (1)

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Asiatic Machinery Corporation (Private) Ltd., Factory & Office: 10/1, Kailash Chandra Lane, Satragachi, Howrah.	Weighing Instruments other than Beam Scales.
(2)	Avenue Weighing Scales Company, Factory & Office: 135, Netaji Subhas Road, Howrah.	Weighing Instruments excluding Beam Scales.
(3)	Avery Company of India Private Ltd., Factory: Hide Road Extension, Alipore and Office: 28/2, Waterloo Street, Calcutta-1.	Weighing Instruments including Beam Scales.
(4)	Bengal Chemical & Pharmaceutical Works Ltd., Factory : 164, Maniktolla Main Road, Calcutta—Office: 6, Ganesh Chandra Avenue, Calcutta-13.	Precision Balances & Metallic Volume Measures.
(5)	Bharat Weighing Scales & Engineering Syndicate, Factory & Office : 75/1, Kalachand Nandy Lane, Howrah.	Weighing Instruments including Beam Scales.
(6)	Bharati Scales & Engineering Company, Factory & Office : 4/1, Haldar Para Lane, Howrah.	Weighing Instruments including Beam Scales.
(7)	Calcutta Balance and Weight Works, Factory & Office : 197, Maharaj Nanda Kumar Road, (S), Baranagar, Calcutta-36.	Beam Scales.
(8)	S. C. Das & Sons, Factory 30, Atulkrishna Bose Lane, Calcutta-36. Office : 67, Khangrapatti Street, Calcutta-7.	Beam Scales.
(9)	Dass & Co., Factory & Office: 42, Pramanick Ghat Road, Calcutta-36.	Beam Scales.
(10)	H. P. Dass & Co., Factory & Office: 22 Srigopal Mullick Road, Aridaha, 24=Parganas.	Beam Scales.
(11)	D. C. De & Sons, Factory & Office: 150, Narasinghdutta Road, Howrah.	Cast Iron Weights.

Manufacturers (contd.)

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(12)	Dragon Iron Works, Factory & Office: 31, Kissenlal Burman Road, Howrah.	Cast Iron Weights.
(13)	East India Engineering & Agency Co., Factory & Office: 63/1, Benaras Road, North Bantra, Howrah.	Cast Iron Weights.
(14)	East India Metal Company (Private) Ltd., Factory-P 85, Benaras Road, Howrah—Office : 4A, Durgacharan Chatterjee Lane, Calcutta-3.	Cast Iron Weights.
(15)	A.C. Ghosh, Factory & Office: 114, Makarda Road, Howrah	Cast Iron Weights.
(16)	Girish Chandra Gosh, Factory : 37, Barrackpore Trunk Road, Cossipore, Calcutta-2, Office : 58 Clive Street, Calcutta-7.	Beam Scales & Counter Scales.
(17)	Guchait & Sons (Private) Ltd., Factory & Office : 2, Madhusudhan Pal Chowdhury Road, Howrah.	Weighing Instruments excluding beam Scales and Cast Iron Weights.
(18)	Howrah Engineering & Galvanising Works, Office & Factory: 68, Benaras Road, North Bantra, Howrah.	Cast Iron Weights.
(19)	India Die Casting Co. Private Ltd., Factory : P. 2, Taratolla Road, Paharpur, Calcutta-24. Office : 178, Mahatma Gandhi Road, Calcutta-7.	Cast Iron Weights.
(20)	India Machinery Company Ltd., Factory: Dasnagar, Howrah, Office : 29, Strand Road, Calcutta.	Weighing Instruments including Beam Scales & Cast Iron Weights.
(21)	Lakshmi Foundry Works (Private) Ltd., Factory & Office : 67, Benaras Road, Howrah.	Cast Iron Weights.
(22)	Laxmi Scale Works, Factory & Office : 4, Chandi Charan Banerjee Lane, Calcutta-35.	Beam Scales.
(23)	Luxmi Engineering Co. (Private) Ltd., Factory & Office : 123 Narasingh Dutta Road, Howrah.	Cast Iron Weights.
(24)	Nabakumar Routh, Factory-P 33, Benaras Road, Howrah, Office : 78 Netaji Subhas Road, Calcutta.	Beam Scales and Cast Iron Weights.
(25)	Nagendra Nath Karmakar, S/o Wooma Ch. Karmakar, Props: Sri Gajendra Nath Karmakar & Sri Gouri Charan Karmakar Workshop: 16 & 17, Narikeldanga Main Road, Calcutta-11, Office : 213, Harrison Road, Calcutta-7.	Beam Scales and Counter Scales.
(26)	Nagendra Nath Karmakar, S/o Wooma Chran Karmakar, Props : Sri Makhan Lal Karmakar & Sons, Factory : 16 & 17, Narikeldanga Main Road, Calcutta, Office : 208, Mahatma Gandhi Road, Calcutta-7.	Beam Scales and Counter Scales.
(27)	Panchkari Ghosh & Sons Private Ltd., Factory & Office : 166, Bellilias Road, Howrah.	Cast Iron Weights.
(28)	K. C. Samanta & Co., Factory & Office : 19, Atulkrishna Bose Lane, Calcutta-36.	Beam Scales.
(29)	D. Saroj & Co., Factory & Office : 16, Biswas Nursery Lane, Bellaghata, Calcutta-10.	Beam Scales.

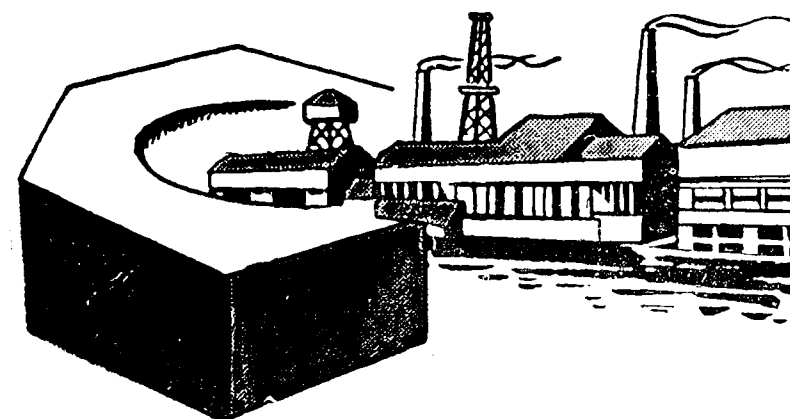
Manufacturers (contd.)

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(30)	Satis Chandra Das & Co., Factory : 25/A & 23/1, Ratan Babu Road, Calcutta-2, Office : 113, Khangrapatti Street, Calcutta-36.	Beam Scales and Brass Weights.
(31)	W. B. Scales Co., Factory & Office : 10, Kailas Chandra Lane, Satragachi, Howrah.	Weighing Instruments other than Beam Scales.
(32)	Subali Chandra Das, Factory & Office : 13, Atulkrishna Bose Lane, Calcutta-36.	Beam Scales.
(33)	O. K. Weighers (India) Private Ltd., 15 & 16, Madhusudhan Pal Chowdhury Lane, Howrah.	Weighing Instruments excluding Beam Scales.
(34)	Wooma Churan Kurmakar, Factory : 23 B, Narikeldanga Main Road, Calcutta. Office : 58 Clive Street, Calcutta.	Beam Scales and Counter Scales.
(35)	Wooma Churan Karmakar, Factory & Office : 23/C, Narikeldanga Main Road, Calcutta-11.	Beam Scales.

Repairers

Sl. No.	Name and address of Repairer	Details of Articles Repaired
(1)	Avenue Weighing Scales Co., Workshop & Office : 135, Netaji Subhas Road, Howrah.	Weighing Instruments & Counter Scales including Beam Scales.
(2)	Bengal Chemical and Pharmaceutical Works Ltd., Workshop : 164, Manicktalla Main Road, Calcutta-11. Regd. Head Office : 6, Ganesh Chandra Avenue, Calcutta-13.	Beam Scales including Precision Balances, Weights, Measures and Measuring Instruments.
(3)	Calcutta Machine Manufacturing Co., Workshop & Office : 26, Barwaritala Road, Calcutta-10.	Weighing Instruments including Beam Scales and Counter Scales.
(4)	Girish Chandra Ghosh, Workshop : 37, Barrackpur Trunk Road, Calcutta-2. Office : 58, Clive Street, Calcutta-7.	Beam Scales, Counter Scales and Cast Iron Weights.
(5)	Hindustan Scales Corporation, Workshop : 66/1, Kantapukur 3rd bylane, Howrah. Office : 56 Netaji Subhas Road, Calcutta-1.	Weighing Instruments including Beam Scales and Counter Scales.
(6)	Jatindra Nath Ghose, Workshop : 37, Barrackpur Trunk Road, Calcutta-2. Office : 58, Clive Street, Calcutta-7.	Beam Scales, Counter Scales and Cast Iron Weights.
(7)	Naba Kumar Routh, Workshop : B33, Benaras Road, Howrah. Office : 78, Netaji Subhas Road, Calcutta-7.	Beam Scales and Cast Iron Weights.
(8)	Satish Chandra Das & Co., Workshop : 25A & 23/1, Ratan Babu Road, Calcutta-2. Office : 113, Khongrapati Street, Calcutta-7.	Beam Scales and Brass Weights.
(9)	P. W. Wormald, Workshop : 4 Kings Court, Calcutta. Office : 74, Theatre Road, Calcutta-17.	Spring Balances.

More Industries



Go METRIC

On October 1, 1958, when the change-over to the Metric System began, a number of important industries—jute, iron and steel, textiles, cement, paper, salt, engineering, coffee, non-ferrous metals, raw rubber etc.—started adopting Metric weights and measures.

Since then the transition has begun in more industries.

Use of the Metric System was permitted in the COIR industry from October 1959. In the SUGAR industry the change-over started from November 1, 1959.

The pace will further quicken from April 1960 when the VANASPATI and PAINT industries 'go metric'.

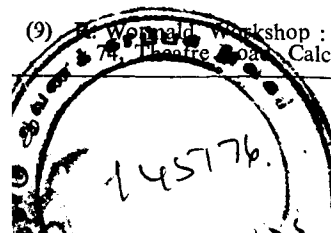
The entire distribution of PETROLEUM and PETROLEUM PRODUCTS will be in litres and metric units from April 1, 1960.



Another Major step will be taken when the Customs and the Central Excise adopt the Metric System from August, 1960.

CHANGE TO METRIC SYSTEM

FOR SIMPLICITY & UNIFORMITY
ISSUED BY THE GOVERNMENT OF INDIA



CONVERSION TABLES OF PRICES FOR WEIGHTS

TABLE A

(Factor used : 1 kg. = 2.20462 lb)

Rupees per lb to Rupees per kg.

Rs./lb.	0	1	2	3	4	5	6	7	8	9
	Rs/kg	Rs/kg	Rs/kg	Rs/kg	Rs/kg	Rs/kg	Rs/kg	Rs/kg	Rs/kg	Rs/kg
0	0	2.20	4.41	6.61	8.82	11.02	13.23	15.43	17.64	19.84
10	22.05	24.25	26.46	28.66	30.86	33.07	35.27	37.48	39.68	41.89
20	44.09	46.30	48.50	50.71	52.91	55.12	57.32	59.52	61.73	63.93
30	66.14	68.34	70.55	72.75	74.96	77.16	79.37	81.57	83.78	85.98
40	88.18	90.39	92.59	94.80	97.00	99.21	101.41	103.62	105.82	108.03
50	110.23	..	..	..	..	..	..	..	..	..

TABLE B

(Factor used : 1 kg = 2.20462 lb)

Naye Paise per lb to Rupees & nP. per kg

nP/lb.	0	1	2	3	4	5	6	7	8	9
	Rs/kg	Rs/kg	Rs/kg	Rs/kg	Rs/kg	Rs/kg	Rs/kg	Rs/kg	Rs/kg	Rs/kg
0	0	0.02	0.04	0.07	0.09	0.11	0.13	0.15	0.18	0.20
10	0.22	0.24	0.26	0.29	0.31	0.33	0.35	0.37	0.40	0.42
20	0.44	0.46	0.49	0.51	0.53	0.55	0.57	0.60	0.62	0.64
30	0.66	0.68	0.71	0.73	0.75	0.77	0.79	0.82	0.84	0.86
40	0.88	0.90	0.93	0.95	0.97	0.99	1.01	1.04	1.06	1.08
50	1.10	1.12	1.15	1.17	1.19	1.21	1.23	1.26	1.28	1.30
60	1.32	1.34	1.37	1.39	1.41	1.43	1.46	1.48	1.50	1.52
70	1.54	1.57	1.59	1.61	1.63	1.65	1.68	1.70	1.72	1.74
80	1.76	1.79	1.81	1.83	1.85	1.87	1.90	1.92	1.94	1.96
90	1.98	2.01	2.03	2.05	2.07	2.09	2.12	2.14	2.16	2.18
100	2.20	..	..	..	..	..	..	..	..	..