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metric measures

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**NAYE PAISE
PER FOOT
TO
NAYE PAISE
PER
METRE**

**RUPEES
PER FOOT
TO
RUPEES
PER
METRE**

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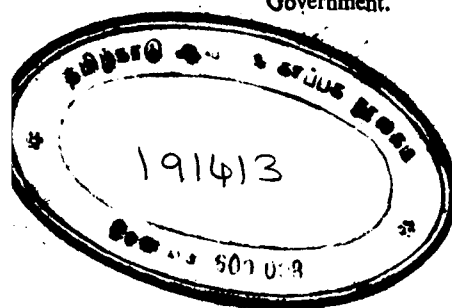
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Working Standard Balances: Part 1- Guiding Factors in Design

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

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

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

Importance of Balances

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

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

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

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

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

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

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

Guiding Factors in Design of Balances

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

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

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

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

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

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

Capacity

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

Sensitivity

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

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

Accuracy

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

Durability

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

Portability

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

Other Points in Design of Balance

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

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

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

Beam, Knife Edges and Bearings

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

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

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

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

Supporting Stand

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

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

Pans

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

Protective Casing

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

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

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

Conclusion

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

Metric System & Building Engineer

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

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

With the adoption of the metric system

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

Handbook for Building Engineers

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

and Supply, Government of India, in September 1959.

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

- (1) Quantities, Units and Conversion Factors.
- (2) Mathematical Formulae and Tables.
- (3) Structural Sections and Allied Data.
- (4) Materials of Construction.
- (5) Loads on Buildings.
- (6) Structural Analysis—Formulae and Tables.
- (7) Masonry Structures.
- (8) Timber Structures.
- (9) Soil Mechanics and Foundations.
- (10) Plain and Reinforced Concrete.
- (11) Pre-stressed Concrete.
- (12) Shell Structures.
- (13) Steel Structures.
- (14) Earthquake Engineering.
- (15) Multi-Storeyed Buildings.
- (16) Building Construction—Miscellaneous Items.
- (17) Water Supply Engineering.
- (18) Sanitary Engineering.
- (19) Surveying.
- (20) Ventilation and Air-Conditioning.
- (21) Electrical Installations in Buildings.
- (22) Measurement of Building Works.
- (23) Building Construction Equipment.
- (24) Miscellaneous Information for the Building Engineer.

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

TABLE 1
Quantities, Units and Conversion Factors

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

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

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TABLE 1—contd.

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

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TABLE 2
Properties of Reinforcing Round Bars

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

$$10 \text{ cm} = 1 \text{ km or } \frac{1}{10\ 000}$$

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

(3) *Small Scale Surveys and Layouts*
1 cm = 10 m or $\frac{1}{1\ 000}$

$$1 \text{ cm} = 8 \text{ m or } \frac{1}{800}$$

$$1 \text{ cm} = 4 \text{ m or } \frac{1}{400}$$

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

$$1 \text{ cm} = 4 \text{ m or } \frac{1}{400}$$

$$1 \text{ cm} = 2 \text{ m or } \frac{1}{200}$$

$$1 \text{ cm} = 1 \text{ m or } \frac{1}{100}$$

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

$$1 \text{ cm} = 2 \text{ m or } \frac{1}{200}$$

$$1 \text{ cm} = 1 \text{ m or } \frac{1}{100}$$

$$1 \text{ cm} = 0.5 \text{ m or } \frac{1}{50}$$

(6) *Large Scale Drawings : General Details*

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

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

(7) *Enlarged Details*

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

$$1 \text{ cm} = 5 \text{ cm or } \frac{1}{5}$$

$$1 \text{ cm} = 1 \text{ cm or Full size.}$$

Other Useful Information

(1) Net weight of cement in a bag will be 50 kg.

(2) Cross sectional dimensions of structural steel sections will be in millimetres and length in metres.

(3) Metric surveying chains will be of two lengths, 20 metres and 30 metres. There will be 5 links to a metre.

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

(1) *Topographical Maps*

$$1 \text{ cm} = 0.5 \text{ km or } \frac{1}{50\ 000}$$

$$1 \text{ cm} = 1 \text{ km or } \frac{1}{100\ 000}$$

$$1 \text{ cm} = 2.5 \text{ km or } \frac{1}{250\ 000}$$

(2) *Town Surveys*

$$2 \text{ cm} = 1 \text{ km or } \frac{1}{50\ 000}$$

$$4 \text{ cm} = 1 \text{ km or } \frac{1}{25\ 000}$$

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

Metric Weights and Measures for Medicines*

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

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

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

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

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

METRIC WEIGHTS AND MEASURES FOR MEDICINES

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

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

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

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

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

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

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

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

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

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

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

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

Schedule of Apothecaries and Metric Quantities

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

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

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

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

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Metric System in Engineering Industry

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

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

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

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

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

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

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

APPENDIX I

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

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

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

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

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

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

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

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

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

To sum up, it is suggested that :

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

BASIC AND AUXILIARY STANDARDS FOR ENGINEERING INDUSTRY

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

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

News and Views

Recent Notifications

(1) Introduction of Capacity Measures

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

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

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

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

UNION TERRITORIES

Jesh ..	Districts of Mandi and Sirmur.
..	Municipal area of Imphal.
..	Municipal area of Agartala.
Nicobar ..	Port Blair.
..	Whole State.

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

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

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

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

TABLE 'A'

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

TABLE 'B'

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Cotton textile mills in so far as they undertake the purchase of cotton or sale of yarn and cotton textile products, or the stamping of cloth, yarn and other cotton textile products. 2. Iron and Steel factories in so far as they undertake the purchase of raw materials or sale of iron and steel products. 3. Factories engaged in engineering industry in so far as they undertake the sale of their products. 4. Factories engaged in the manufacture of heavy chemicals in so far as they undertake the purchase of raw materials or sale of their products. 5. Factories engaged in the manufacture of cement in so far as they undertake the sale of cement. 6. Factories engaged in the manufacture of salt in so far as they undertake the sale of salt. 7. Factories engaged in the manufacture of paper, pulp, or paper board in so far as they undertake the sale of paper, pulp, or paper board. 8. Factories engaged in the manufacture of refractories, in so far as they undertake the sale of refractories. 9. Coffee Board, in so far as it undertakes the sale of coffee from the surplus pool either by itself or through its agents. 10. Factories engaged in the manufacture of copper, aluminium, lead, antimony and tin in so far as they undertake the sale of copper, aluminium, lead, antimony and tin including alloys and products of these metals. 11. Associations recognised by the Central Government under section 6 of the Forward Contracts (Regulation) Act, 1952 (74 of 1952) in so far as they | <ol style="list-style-type: none"> undertake the regulation and control of forward contracts in cotton, and raw and manufactured jute. 12. Sale of raw rubber. 13. Jute mills in so far as they undertake the purchase of raw jute and sale of jute products. 14. Factories engaged in the processing of coir yarn or the manufacture of coir products in so far as they undertake the purchase of coir or coir yarn/or the sale of coir, coir yarn and other coir products. 15. The Central Coir Cooperative Marketing Societies in so far as they undertake the purchase of coir or coir yarn or the sale of coir, coir yarn and other coir products. 16. Factories engaged in the manufacture of sugar in so far as they undertake the purchase of sugar-cane or sale of sugar. 17. Factories engaged in the manufacture of Vanaspati in so far as they undertake the sale of Vanaspati. 18. Factories engaged in the manufacture of paints in so far as they undertake the sale of paints. 19. Factories engaged in the manufacture of biscuits in so far as they undertake the sale of biscuits. 20. Factories engaged in the manufacture of soap to the extent they undertake the purchase of raw materials for such manufacture and the sale of soap. 21. Factories engaged in the manufacture of drugs in so far as they undertake the sale of drugs or purchase of materials. 22. Sale and purchase of fertilizers. 23. Crude petroleum and petroleum products, produced, manufactured, distributed, bought or sold, whether by a producer, manufacturer or distributor |
|--|---|

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

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

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

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

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

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

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

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

(3) *Amendment to Notification Regarding Shipping Industry*

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

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

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

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

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

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

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

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

2. The Orders specified in the first column of the annexed Table are hereby amended to the extent and in the manner specified in the second column thereof.

TABLE

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

TABLE I (contd.)

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

Extension for Defence Department and Undertakings thereunder.

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

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

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

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

Hindi Abbreviations

The question of the Hindi abbreviations was gone into, so far as their use in Indian Standards was concerned, by a Panel set up by the Weights and Measures Sectional Committee, EDC, 41 of the Indian Standards Institution.

The recommendations, so far as the various units are concerned, made by this Panel and accepted by the Sectional Committee are as follows :

Units	International Abbreviations	Hindi Abbreviations used by the ISI in Standards Already Published	Panel's Recommendations Regarding Hindi Abbreviations
Length			
Millimetre	mm	—	मिमी
Centimetre	cm	सेमी	सेमी
Metre	m	मी	मी
Kilometre	km	—	किमी
Mass			
Milligram	mg	मिली	मिग्रा
Gram	g	ग्राम	ग्रा or ग्राम
Kilogram	kg	किलो	किलो or किग्रा
Quintal	q	—	किन्टल
Tonne	t	—	ट or टन
Capacity			
Millilitre	ml	मिलि	मिली
Litre	l	लि	ली
Kilolitre	kl	—	किली

New British Weights and Measures Bill

A new comprehensive Bill covering the various aspects of weights and measures legislation and replacing the existing legislation has been placed before the British Parliament for consideration. The Bill is divided into six parts. The first three parts

deal respectively with the basic units of measurement and the physical standards which represent them; with the units of measurement and the weighing and the measuring equipment which may be used for trade; and with the provision of public weighing and measuring equipment by local authorities. The interesting provisions in the first three parts relate to the following :

Part I which gives the units and standards of measurement defines the yard and pound by reference to the metre and kilogram instead of the Imperial standards. There is also a provision for the establishment of a Commission on Units and Standards of Measurement to advise the Board of Trade primarily on technical questions. The Bill abolishes the rod, pole or perch and after 5 years the bushel, peck and pennyweight will not be legal units.

The apothecaries ounce, drachm, scruple, fluid drachm and minim are also to be abolished after 5 years.

Part IV of the Bill covers transactions in a number of goods and lays down whether they should be sold by weight, measure or number. The sale of prepacked material is also governed by the quantities to be packed as prescribed in the Bill.

Part V provides for the administration and enforcement of the law by local authorities and their Weights and Measures Inspectors.

Part VI deals with miscellaneous and general matters.

The Bill is at present under consideration in the British Parliament.

Metric Training Institute, Calcutta

A Metric Training Institute has been formed and a centre opened at Nutan Bazaar Market Office, Jorasnako, Calcutta. The Institute, which started the Centre from 29 January 1961, has been sponsored by the Calcutta Grocers' Association with the object

of the propagation of the metric system and particularly for training the general public in its use. It is intended to open more centres as required. The Institute is at present open on Tuesdays and Fridays between 3 and 5 P.M. Those who are interested may contact Shri H. N. Bhattacharji, General Secretary, Calcutta Grocers' Association, C/o Pure Food Supply Corp. Ltd., 135, Canning Street, (3rd Floor), Calcutta-1.

This is a welcome step taken by the Calcutta Grocers' Association and deserves to be emulated in other parts of the country as well.

Metric Handbook for Building Engineers

In the article 'Metric System & Building Engineer' by J. K. Varshneya, published in this issue, it has been mentioned that the National Buildings Organisation was preparing a comprehensive Handbook on engineering formulae and data in the metric system. This Handbook which is divided into 24 parts, is now being compiled chapter-wise. Each chapter is circulated for com-

ments to about 120 construction departments, research institutions and practising engineers. After considering the comments each chapter would be finalised for publication. The Handbook is being compiled and edited by Shri J. K. Varshneya, Deputy Director (Metric), National Buildings Organisation, Ministry of Works Housing & Supply, New Delhi. Those interested may kindly contact Shri Varshneya directly.

Offer of Capacity Measures

M/s. Multan Engineering Works, Mir Jumla, Lal Kuan, Delhi-6, have offered a complete range of milk measures and, if desired, a set of brass weights free of cost to all the Controllers of Weights and Measures for exhibitions or other display purposes. The firm states that they would supply further information, literature and articles for demonstration purposes, as also a team of personnel, for publicity campaigns in the State and Union Territories. Those interested may contact M/s. Multan Engineering Works direct.

ADDENDUM

The following addition may be made in the list of Controllers etc. in States and Union Territories, published on page 31 of the January, 1961 issue of 'Metric Measures'. The Controller of Weights and Measures, Mysore is:

Shri K. R. Marudeva Gowda, I.A.S., Controller of Weights and Measures, Bangalore, & Chief Marketing Officer, Old Residency Office Buildings, Bangalore.

Book Review

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

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

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

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

The report is divided into six sections :

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

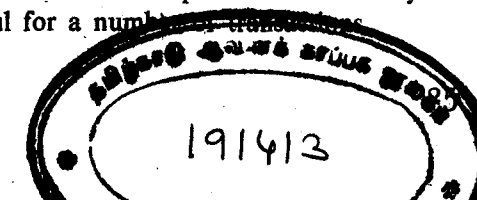
However, the present attempt backed as it is by the acceptance in principle of decimal coinage by the Australian Government is likely to be successful, particularly in view of the fact that among the Commonwealth countries, India, Pakistan and South Africa have recently changed over to the decimal coinage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

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

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

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

SL
X:52 m2, N58MM
N61.



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

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

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

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

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

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

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

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

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

Readers' Forum

Metric weights

Sir,

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

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

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

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

A. V. Mahajani

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

Standards News

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

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

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

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



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

Price : Rs. 2.50

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

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

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

Price : Rs. 2.00

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

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

Price : Rs. 2.00

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

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

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

Price : Rs. 2.00

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

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

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

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

Price : Rs. 4.00

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

The Indian Standards Institution has just published the following two specifications

concerning pressure pipes for water, gas and sewage :

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

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

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

Price : Rs. 4.50

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

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

(1) Untrimmed (Raw Stock) Paper Sizes (Doc: CDC 15(1318) and

(2) Substances of Paper and Pulp Board (Doc: CDC 15(1319).

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

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

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

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

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

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

Price : Rs. 1.50

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

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

Price : Rs. 1.50

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

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

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

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

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

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

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

MADHYA PRADESH (4)

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

Manufacturers

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

Manufacturers—(Contd.)

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

Dealers

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

Dealers (Contd.)

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

GWALIOR DIVISION

Dealers

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

Dealers—(Contd.)

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

Dealers—(Contd.)

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

JABLPUR DIVISION

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

INDORE-DIVISION

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

Dealers—(contd.)

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

Dealers—(contd.)

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

RAIPUR DIVISION

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

REWA DIVISION

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

REPAIRERS

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	The Avery Co. of India Private Ltd., Bombay	Weights, Measures, Weighing and Measuring Instruments.
(2)	Indo Aryan Traders, 7173 Vihar Pipe Road, Kurla, Bombay 37.	Weights, Measures and Weighing and Measuring Instruments.
(3)	J.K. Mistra and Brothers, New Dewas Road, Indore	Weights, Measures, Weighing and Measuring Instruments.
(4)	Laxmi Engineering Works, Raipur	Weights, Measures, Weighing and Measuring Instruments.

METRIC MEASURES, VOL. 4, MAY 1961

Licenses of following Manufacturers and Dealers in Madhya Pradesh which have appeared in May and July 1960 issue of *Metric Measures* have since been cancelled.

Manufacturers

	Name of Manufacturers.	Page No.	S. No.	Reference to issue of Metric Measures in which published
(1)	Bhopal Auto Repairing Works Motia Road, Bhopal.	34	1	May, 1960.
(2)	Dalvi Industries Kampoo Gwalior, Gwalior	34	3	May, 1960.
	DEALERS			
(1)	T. Ibrahim and Sons Siya Ganj, Indore	35	9	July, 1960.
(2)	Indore Nagarnivasi Sahkari Sanstha Ltd., 17 Krinpara Indore.	35	11	July, 1960.
(3)	Kamsuddin, Mhow	35	15	July, 1960.
(4)	Mhow Iron Industries, Mhow	35	21	July, 1960
(5)	J.K. Mistry and Bros. 24, New Dewas Road, Indore	35	22	July, 1960.
(6)	Jai Hind Stores Railway Road, Katni, (Dist. Jabalpur)	36	7	July, 1960.
(7)	Mughal Hussain Imdad Ali, Loha Bazar, Bhopal	37	9	July, 1960.
(8)	Nutan Traders Itwara, Bhopal	37	11	July 1960.
(9)	Sagarmal Banwat Gandhi-Chowk, Ashta Dist. Sehore.	37	12	July 1960.
(10)	Dinanath Badriprasad Lohia Bazar, Lashkar	37	5	July 1960.
(11)	Mukesh & Co. Madhoganj, Lashkar, Gwalior	38	14	July 1960.
(12)	Prakash Iron Stores, Lohia Bazar, Lashkar	38	18	July 1960.
(13)	Jankiprasad Laxmi Narain, Iron Merchant Bhindar, Gwalior.	37	29	July 1960.

MYSORE(4)

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

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(1)	Ahmed Sob Imamsab Tinwal, Durgadbai, Hubli	Litre Measures.
(2)	Agrawal Tin Manufacturing Co., and Engineering Works, Sultanganj (Near Paliwal Park), Agra.	Weights.
(3)	Associated Co., Ltd., Central Workshops, Shahabad (Gulbarga), Mysore State.	
(4)	Bansal Iron Foundry, Near Rly. Goods-shed, Belganjanj, Agra.	C.I. and Brass Weights.
(5)	Bhabavannarayana Iron Balance Works, Prop. Pinninti Janarohanam and Sons, Dowlashwaram (E.G. Dist.)	Weighing Instruments in Class 'I' and 'C'.
(6)	Central Metal Workshop, Prop: Sarfaraz Khan, House No. 15-1-457, Hyderabad.	Litre Measures.
(7)	Davi Sahai Gopal Das, Iron Foundry, Chhipitola, Agra	C.I. Weights.
(8)	Goyal Industries, Mon Bhavan, 3681, Sultanganj, Agra	Brass Weights.
(9)	India Casting Company, Near Bilochpura Rly. Station, Agra.	C.I. Weights.
(10)	Indian Iron Industries, Mahavir Nagar, Near Water Works, Agra.	C.I. Weights.

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

Manufacturers—(contd.)

Sl. No.	Name and Address of Manufacturer	Details of Articles Manufactured
(11)	B.C. Iron Foundry, Engineers and Foundrs, Sultan Ganj, Agra.	C.I. Weights.
(12)	S.K. Iron Foundry and Engineering Co., Rambagh, Agra.	Weights.
(13)	S.S. Iron Foundry and Engineering Works Rombash P.O. Jumma Bridge, Agra.	C.I. Brass Weights.
(14)	Jaiswal, Trading Company, Dari Mohalla, Dhanbad (P.O.) Bihar.	Weights.
(15)	Jain Industries, 1166 Phatak Surajbhan, Agra (U.P.)	C.I. Weights, Measures & Weighing Instruments.
(16)	Jaya Krishna Iron Industrial Works, 3/246, Kothapeth Street, Dowlaiswaram.	Beam Scales.
(17)	Jeewanlal (1929) Ltd., Prop: Sree Ganeshar Aluminium Works, No. 1-2 Singara Garden, 4th Lane Washermanpet, Madras-21.	Litre Measures.
(18)	Karnatak Scales Centre, Prop: Abdul Salam Badal, H. No. 2-1-93, Mylapur Gate, Yadgir.	Litre Measures.
(19)	Krishna Iron Works, Dowlaiswaram, (East Godavari Dist.)	Beam Scales.
(20)	Luhar Khodanath, Savar Kundla, Near River Bank, (Saurashtra).	Beam Scales.
(21)	Luhar Mulgi Naran, Manibhai Road, Savarkundla (Saurashtra).	
(22)	Mital Brass Industries, 4509, Raja Mandi, Agra	Weights.
(23)	Mohd. Afaq., 1362, Bazaar Chitti Qabar, Delhi	Brass and Bullion Weights.
(24)	Narain Singh Babulal Iron Foundry, Behind Police Station, Lohamandi, Agra.	C.I. Weights.
(25)	National Industries, Sri Krishnarajendra Road, Davangere.	C.I. Weights.
(26)	National Metal Industries, Parel Village Road, Bombay-12	Weights and Measures.
(27)	Oriental Metal Pressing Works (P) Ltd., 131 Worli Bombay-18.	Capacity and Linear Measures.
(28)	Panduranga Engineering and Moulding Works, 13/56-A Tadpatri (Andhra Pradesh).	Cast Iron Weights.
(29)	Pappu Veeranna and Sons, Mechanical Engineering Industries, Dowlaiswaram, P.O. Rajamundry.	Beam Scales.
(30)	Pappu Yerakaaya and Sons, Mechanical Engineering Industries, Dowlaiswaram, P.O. Rajamundry.	Beam Scales.
(31)	Riaz Brothers, 6377, Sadar Bazar, Qusabpura Bari Masjid, Delhi.	(1) Bullion and Brass Weights. (2) Beam Scales. (3) Counter Machines.
(32)	Saples Scales Manufacturers Co., (P) Ltd., 180 B. Galiwadi, Girgaum Road, Bombay-4.	Weights and Precision Balances.
(33)	K.K. Sharma Iron Foundry, Pathwari, Belanganj, Agra	Cast Iron and Brass Weights.
(34)	R.K. Sheet Metal Works, Tin Manufacturers and Tin Work Contractors, Door No. 60 of Ward No. 10-7-S. No. 307, Jumma Musjid Road, Bangalore-1.	Litre Measures.
(35)	South India Metal Co., Simco Workshop, Shoranpur	Cast Iron Weights.
(36)	Standard Engineering Corporation, Ganning Factory Buildings, Lane Gaushala, Pathwari, Agra.	Weights and Measures.
(37)	R. Subbiah Setty and Sons, No. 1148/1, 6th Cross, Malleswaram, Bangalore.	Litre Measures.
(38)	Unicorn (P) Ltd., 29, Mount Road, Madras-2	Cast Iron and Brass Weights.

DEALERS

DEALERS LICENCED FOR WEIGHTS, MEASURES, WEIGHING AND MEASURING INSTRUMENTS.

Sl. No.	Name and Address of Dealer	Sl. No.	Name and Address of Dealer
(1)	M. Abdul Rahim & Sons, 198, Avenue Road, Bangalore-2.	(26)	I. Bheemasena Setty, Merchant, Near Vegetable Market, Hospet.
(2)	Abdul Rahman & Bros., Hardware Merchants, Kankapura P.O. Bangalore-2.	(27)	Bhuvaneshvari Stores, Prop. Srinivasa Setty & Sons, Iron Merchants, Kadur.
(3)	P. Abdul Razack Sahib Sons, Hardware & Paint Merchant, 1/1, Gundopunth Street, Bangalore-2.	(28)	Bonafid Traders, 25, St. John's Church Road, Bangalore.
(4)	Adappa Nagappa Balaganoor, Merchant, Muddlebiha, Dist. Bijapur.	(29)	R. E. Bramhadeviah, General Merchant, Chamarajanagar.
(5)	Adigi Raghavendra Shenny & Co., Hardware & Paint Merchant Car Street, Mangalore.	(30)	Calcutta Machinery & Metal Mart, 13-A Gundapanth Street, Bangalore.
(6)	P. S. Agricultural Stores, Moodbidri Post Office, S. K.	(31)	Chandras, Ramakrishna Raikar, General Merchant, Karwar.
(7)	Agriculturists Industrial & Commercial Co-operative Society Ltd., Mandipet, Devangere.	(32)	D. D. Chavan Prop. Chavan Industries, Dealers & Repairers, Nipani, Belgaum District.
(8)	A. Ahmedally & Co., Ltd., 14/17, Sri. Narasimharaja Road, P.O. Box 516, Bangalore-2.	(33)	Chikaballapur Taluk Primary Agricultural Produce Cooperative Marketing Society, Ltd., Chikaballapur.
(9)	S. Alappa Setty & Sons, Bangalore-Mangalore Road, Sakleshpur, Hassan District.	(34)	H. B. Dharamendrapa, Hardware Merchant, Bellurli Galli, Davangere City.
(10)	V. R. Amble, Hardware Merchant, Nipani, Chokodi Taluk.	(35)	B. Damodar Bhandary, Hardware Merchant, Golikatta Bazar, P.B. No. 96, Mangalore.
(11)	Ambalal Lalchand Shah, Kirana Bazar, Bijapur.	(36)	Davangere Taluk Agricultural Produce Co-operative Marketing Society Davangere.
(12)	C. S. Amewadikar & Sons, 341, Patil Calli-Belgaum.	(37)	District Marketing Co-operative Society Ltd., Hassan.
(13)	Anant Govind Soundaligekar, 398 Saraffi Shop, Guguwarpeth, Nipani District, Belgaum.	(38)	Doddi Abdul Sattar Sahib & Sons, Car Street, Bellary.
(14)	A. R. & Co., Hardware Merchants, 197, Avenue Road, Bangalore-2.	(39)	Dundayya Basaya Karpurmah, Grocery Merchant, Market, Bijapur.
(15)	Shri K. V. Apte, Hardware Merchants, Jamkhandi, Bijapur Dist.	(40)	B. Ganapathi Bhandarkar, Prop. South India Lead Shots Works P.O. Box 41, Market Road, Mangalore-1.
(16)	Arun Machinery & Hardware Stores, Anjuman Buildings, Dharwar.	(41)	G. R. Traders Corporation, Floor Ambika Buildings 116, Avenue Road, Bangalore-2.
(17)	Babu Rao, (Alias Siddapp, N. Dodamanji Rauk Dist. Dharwar.	(42)	Geetha Stores, Prop. Venkataramana & Sons Car Street, Perdur S. K.
(18)	Dadri Venkatesappa Setty, Commission Agent Main Bazar, Kattur, Dist. Bellary.	(43)	General Engineering Works, Fort, Bellary.
(19)	Bagalkot Traders, Extension Bagalkot, Bijapur District.	(44)	G. Ghanteppa Setty, Kirani Merchant, Kudlig, P.O. Bellary Dist.
(20)	K. Balakrishna Setty, Hardware & Paint Merchant, Market Road, Mangalore-1.	(45)	V. G. Gote, Confectioners, Near S. S. High Schools, Bijapur.
(21)	Balheem Bros., Manufacturing Work Dr. Shamparasad Mukarji Road, R. S. No. 317/1, Balgaum-1.	(46)	Government Central Industrial Workshop, Bangalore-18.
(22)	Bander Chinnana, Commission Agent, Kudligi, Bellary Dist.	(47)	Govind Gopalshet, Awekar, Shroff & Gold Smith Tools Merchant Khade Bazar, Shahpur, Belgaum.
(23)	Basavaraj Metal Stores, Prop. Kantappa Mahadevappa Sirse, Main Bazar, Kalyan Dist. Bidar.	(48)	Govindya & Sons, Agents Venson Transport, Mandya.
(24)	T. R. Bestwood & Sons, Hardware Merchant, Kuker, Belgaum District.	(49)	Gurunathappa Bondade, Iron & Hardware Merchant, Davangere.
(25)	Bharat New Scale Centre, Prop. Basheer Ahmed S/o Mohamed Ibrahim, Kirana Merchant, Mailapur Road, Yadgir Gulbarga District.	(50)	Hajee Abdul Rahim Sahib Sons, General Hardware Merchant, No. 4, Gundapanth Street, Bangalore-2.
		(51)	Hajee Abdul Subhan Sahib & Sons, Hardware & Paint Merchant, 203-204, Avenue Road, Bangalore-2.

Dealers (Contd.)

Sl. No.	Name and Address of Dealer	Sl. No.	Name and Address of Dealer
(52)	K. Hajee Kader Bath Sabib Sons, Hardware & Paint Merchant, Gundopanth Street, Bangalore-2.	(80)	Malali Venkataramaniah Shetty & Sons, Station Road, Kadur.
(53)	D. D. Hanchate & Sons, Hardware Merchants, Talikoti, Bijapur, Dist.	(81)	R. Mallappa, General Merchant, Car Street, Hospet.
(54)	Harsukh Balkishan Bhutada, General Merchants & Commission Agents, Mahaveer Road, Bijapur.	(82)	Mallikarjanappa, Mahadewappa, Amma-bhave Bazar Road, Sudati P.O. Belgaum Dist.
(55)	P. K. Hedayathulla & Bros., Hardware Merchants, K. 98, Ragipet, Bangalore-2.	(83)	H. K. Manavi, Hardware Merchant, Talikot, Bijapur District.
(56)	S. K. Industries, Shop No. 4/1136, Sharaf Bazar, Gulbarga.	(84)	Mainikalal Vidhya Chandra Bros. S. S. Road, Bijapur.
(57)	Ishwar V. K. Owdi & Sons, Hubli Road, Dharwar.	(85)	Manjunath Laxman Nayak, General Merchant & Manufacturer of Brass & Copper Vessels, Car Street, Mangalore-1.
(58)	B. C. Jakkannavar, Subhas Rd. Dharwar.	(86)	Manunatha Trading Co., Bazar Street Arsikere.
(59)	S. Jaya Ram Roa, 414 Avenue Road, Cross, Bangalore City.	(87)	Maruthi Hardware Stores, Golikatta Bazar, Mangalore-2.
(60)	Jinnappa, Totappa Bagi, Post Hukeri Dist. Belgaum.	(88)	Mehta Brothers, 1827-1, 2nd Cross Road, Malleswaram, Bangalore-2.
(61)	G. G. Kalyani Merchants, Hole-Alar, Dist. Dharwar.	(89)	Mir Kasim Ali, C/o Mysore House, K. R. Market, Bangalore.
(62)	Karkarl Stores, Prop. B. B. Nayak Hardware & General Merchants, Temple Street, Mangalore-1.	(90)	A. Mohamed Ibrahim & Bros., 7/8 Gundopanth Road, Bangalore-2.
(63)	Katta Nanjappa Setty & Sons, P.O. Box No. 27, Hospet, Bellary District.	(91)	Mohamed Ibrahim, Hardware Merchants, Ramanagaram.
(64)	Keshawlal & Co., 71, Narasimharaj Road, Bangalore.	(92)	Mohamed Jehangir, Old Contractor, Weights & Measures, Chandbada, Shahabad, Chitapur Taluk (Gulbarga Dist).
(65)	M. Krishna R. Nayak & Sons, P. O. Box No. 20, Mangalore.	(93)	Monthu Pai, Copper Merchants, Coondapoor S. K.
(66)	M. D. Khadesab & Sons, Hardware Merchants, Station Hospet, Bellary Dist.	(94)	Murali & Company, G. 40 Subuvani Buildings, Post Box No. 740, Sir. Narasimharaja Road, Bangalore.
(67)	B. S. Kojagari, Dealer in Weights & Scales Mahaveer Road, Bijapur.	(95)	Murthi & Co., General Merchants, Holakere Chitaldrug District.
(68)	Korgal Venkatappa Sethi & Sons Iron & Hardware Merchants Hospet, Bellary Dist.	(96)	Mysore State Hardware, 12, Gowdown Street, Bangalore-2.
(69)	T. T. M. Kotrabasiah Hamasagar, (Via Hospet) Mallapuram Taluk, Bellary Dist.	(97)	S. Nagappa & Bros., Iron Merchants, Car Street, Bellary-2.
(70)	Kottureshwara Stores, Pro. S. S. Varumurti Nehru Market, Ranibennur.	(98)	Nagenahli Kotrappa & Bros., General Merchant, Kottur (Bellary Dist).
(71)	Krishna Trunk Factory, 67, Ragipet, Bangalore-2.	(99)	Naik & Co., 283 Cotton Pet, Main Road, Bangalore.
(72)	Krishna Setty, S/o, M. Eswarappal, Merchant Harihar.	(100)	Narasappa Hanamantappa, Gangoji, C. V. Oil, Agent & Coconut Merchants, Hoel Alur, Taluk Ron; Dharwar Dist.
(73)	Krishna & Co., Paint & Hardware Merchants, Nanjangud.	(101)	R. Narasimba Venkatesh Shenoy, Hardware Merchants, P.O. Korkala, S. K.
(74)	Krishnaya Shah Bhague, Stationery & General Merchants, P. B. Shop, No. 20 W.J. Coondapoor (S. K. Dist.)	(102)	K. Narayana Hedge Sons, General Merchants, Thirthath, Shinga Dist.
(75)	Kusum Jet Stores Prop. Shah Nenshi Maghji Nagada, Dealer in Scales W/M, Grain Market Road, Gadag.	(103)	K. V. Narayana Setty & Co., General Merchants, Gouribidnur (Kolar Dist).
(76)	S. B. Lahoti, Hardware Merchant, Jamkandi.	(104)	Neo Hardwares, Golikatta, Bazar, Mangalore-1.
(77)	Laxmi Hardware Stores, 189, Avenue Road Bangalore-2.	(105)	Nipani Hardware Mart, Prop. Gopal Nagesh Purandare, Dalal Peth, Nipani, Belgaum Dist.
(78)	Laxmi Stores, Prop., T. S. Gurufingappa, & Sons, Kottur Bellary Dist.	(106)	K. Padmanabha Kamath, General Merchants, Coondapoor, S. K. District.
(79)	Mahobooob Ali, Mohamed Yakub & Sons, Iron & Hardware Merchants, Gulbarga.		

Dealers—(contd.)

Sl. No.	Name and Address of Dealer	Sl. No.	Name and Address of Dealer
(107)	V. B. Pasmit & Bros, Iron & Hardware Business, Main Bazar Road, Yadgir, Gulbarga Dist.	(138)	Shivanand Manjunath Shetti, General Merchant, Ankola (N. K. Dist.).
(108)	K. S. Paste, Dealer in Stationery & Hardware Etc., Nehru Market, Ranabenur.	(139)	M. S. Shivayoginath, Merchant & Dealer, Muddebihal, Bijapur Dist.
(109)	Patted & Nandihal Comany, General Merchant, & Commission Agent, Gajendragad, Taluk Ron.	(140)	Somlingappa Basappa, Aribenchi Ramd, Belgaum Dist.
(110)	Peeran Saheb, Iron Merchant, Kattur, Bellary Dist.	(141)	Souza & Co., New Market Road, Mangalore-1.
(111)	Pendkur Govindappa Sons, Merchant & Commission Agent, Main Road, Hospet, Bellary Dt.	(142)	Spencer & Co., Ltd., Mahatma Gandhi Road, Bangalore-2.
(112)	Popular Stores, Santhekotte Udupi. S. K.	(143)	A. V. Subbiah Setty & Sons, General Merchant, Kollegal, Mysore Dist.
(113)	C. R. Prabhantha & Sons, Hardware & Paint Merchant, Tumkur.	(144)	Sudrshan, Hardwares, Gandhi Bazar, Shimoga.
(114)	Prakash Trading Co., Hardware Merchants, Chikmangalore.	(145)	B. C. Suryanarayana Setty & Sons, Chemists & General Merchants Sakleshpur, Hassan District.
(115)	Raghvendra Sidramappa, Main Road, Athani Post, Belgaum Dist.	(146)	Suryakant R. Bhatta Iron & Hardware Merchant, 835, Raviwarpeth, Belgaum.
(116)	Ram Hardware Mart. Prop. Shri F. Jadiyappa Setty & Sons, Hospet, Bellary	(147)	C. P. S. Swamy Prop. Laxminarayana Store, New Bus Stand, Chickkanayakanaha yakanahanahally, Tumkur Dist.
(117)	K. B. Ramachandra Gopal Krishna, Shenoy, General Merchant, Karkala (S. K.).	(148)	Swamy Stores, Chickkanayakanahalli Tumkur Dist.
(118)	K. S. Ramaiah Sheety & Sons, General Merchants, Kadur.	(149)	M. Syed Yakub & Sons, 209, Gundopanth, Street, Bangalore.
(119)	Ramakrishna Stores, Mandipet, Davangere.	(150)	Taluk Agricultural Produce Co-operative Marketing Society Ltd., Sira.
(120)	Ramnath Shenoy, General Merchant, Bunder, Bangalore.	(151)	Town Hardware Stores, 5-Godown Street, Bangalore.
(121)	U. Ramanatha Shenoy, Car Street, Coondapoor (S. K.).	(152)	N. M. Traders, Iron & Hardware Merchants, Bangalore Road, Bellary-2.
(122)	Ranga Narasinha Nayak & Sons, General Merchants, Byndoor, S. K.	(153)	Union Hardware, 54, Ragipet, Bangalore-2.
(123)	Raja Hardware Paint & Sons Iron Merchant, Tumkur.	(154)	Vani Vilasa & Coy General Merchants., & Commission Agents, Hiriyur Town, Chitradurga Dist.
(124)	Revenna Gurusiddappa, No. 1, Gowdown Street, Bangalore-2.	(155)	Vattam Subramanayam Chetty & Bors Iron Merchants, & Fabricators etc, Bellary.
(125)	Revathi Agencies, C. 30/1, Nehru Nagar, Sheshadripuram, Bangalore-2.	(156)	B. Venkateshprabhu, Hardware Metal & Paints, Goodapoor S.K.
(126)	L. Rasool Sahib & Sons, Cart Street, Ballary-2.	(157)	Veerabhadhrashware, General Stores, V. V. Road, Krishnarajanagar, Mysore.
(127)	Rao & Brothers, Maidan West Road, Mangalore-1.	(158)	Veerappa Magundappa Kotagi, General Merchant, Ron Dist. Dharwar.
(128)	Rathna Chand, Bhooraji & Sons, Soji Street, Ashoka Road, Cross, Mysore-1.	(159)	K. L. Venkataravanappa, Merchant Anekal Bangalore Dist.
(129)	Rudrappa Pakirappa Barker, Mulgund, Gadag Taluk.	(160)	Venkiah & Sons, General Merchants, Sira.
(130)	Samed Bros., Bazar Street, Mandya.	(161)	B. N. Vijam & Co., Hardware Merchants, 11 Gundopanth Street Bangalore-2.
(131)	U. Shankareppa & Bros., General Merchant Shikaripur, Shimoga Dist.	(162)	Vijayalaxshimi Trading Co., B. B. Road, Chikballapur.
(132)	Shasty & Co. Hampankatta, Mangalore.	(163)	Vogish Coffee Works & General Stores, Near Post Office, Ranehennur, District, Dharwar.
(133)	A. S. Shettar, Hardware & Tobacco Merchant, Gadag.	(164)	Yadgir Taluk Agricultural Produce Co-operative Marketing Society (Ltd.) Yadgir.
(134)	N. Shikantayya & Sons, 42, Cemenrry Road, Tasker Town, Bangalore-2.	(165)	Yeshwant & Co., Raviwarpeth, Near Pioneer Bank, Belgaum.
(135)	Hon. Shroff Verthakara Sangha (Regd.), Ashoka Road, Mysore.	(166)	M. Zahir Lashkarwala, Druggist, No. 5 Avenue Road, Bangalore-2.
(136)	Siddeshwara Stores, Hardware, Paint & Stationery Merchants, Gandhi Bazar, Shimoga.	(167)	Zanwar, Iron & Hardware Merchants, C.T.S. No. 2520 Gokak.
(137)	Sivaji & Chandranath, Madhakar, Harikur P.O. Dharwar District.		

Repairers

REPAIRERS LICENSED FOR WEIGHTS, MEASURES, WEIGHING AND MEASURING INSTRUMENTS

Sl. No.	Name and Address of Repairer	Sl. No.	Name and Address of Rapairer
(1)	M. G. Abdul Khalak, Cutlery Shop, Main, Road, Ramanagaram.	(7)	K. R. Gundu, Nayak & Sons, Car Street, Udupi.
(2)	Ameer Jan, No. 9, Motinagar, Bangalore-2.	(8)	Hiralal & Sons, 681, Raviwarpeth, Belgaum.
(3)	B. M. Bava, Repairer of Weights & Measures, Doddamane Muky P. O. Mangalore Taluk (S.K.).	(9)	S. M. Mahboob Baig, Nallagadda, Bangalore Road, Bellary.
(4)	B. Bhavani Singh, Gun Repairer & Manufacturers, Main Road, Chikmangalur.	(10)	M. Nabi Baig (Seer Maker) Mear Gandhi Chouk, Hospet.
(5)	Chavan & Sons, Prop. D. D. Chavan, Old Motor Stand Nipani, Belgaum District.	(11)	S. B. Pannalkar, No. 558, Theobald Road, Nazerbad, Mysore.
(6)	Government Central Workshop, Mysore Road, Bangalore-18.	(12)	Sangameshwar, Repairing Works, Station Road, Gadag.
		(13)	Savagan, Raviwarpeth, Gokak.
		(14)	S. C. Welling Works, B. C. 85, Belgaum Cantt.

ORISSA (5)

In the March, July and November 1960 and March 1961 issues of *Metric Measures* lists of licensed manufacturers, dealers and repairers of weights and measures in Orissa state were published. The following is a list of manufacturers, dealers and repairers subsequently licensed under the Orissa Weights and Measures (Enforcement) Act, 1958.

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Articles manufactured
(1)	Asiatic Machinery Corporation Private Ltd., 10/1, Kailash Chandra Lane, P.O. Santkagachi, Howrah.	Platform weighing machines.
(2)	National Foundry & Rolling Mills Ltd., Nayabazar, Cuttack-4.	Cast Iron Weights.
(3)	Utkal Metal Industries, P. O. Khetarajpur, District Sambalpur.	Flat Cylindrical Weights and also Bullion Weights.
(4)	Vudatha Subbaiah, Proprietor Sree Seetha Rama Engineering Works, P.O. Dowlais hwaram, Dist. East Godavari.	Beam Scales.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Avery Co. Private Ltd., Station Road, Cuttack-3	Weights, Measures, Weighing and Measuring Instruments.
(2)	Puskarlal Hariprasad, P.O. Baripada, Dist. Mayurbhanj	Weights

Repairers

Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	Avery Company of India Private Ltd., Cuttack-3	Weights, Measures and Weighing and Measuring Instruments.

PUNJAB (9)

In the July and September 1959, March, July, September 1960 and January and March 1961 issues of *Metric Measures* lists of Manufacturers, dealers and repairers of Weights and Measurers in Punjab State were published. The following is a list of dealers and repairers subsequently licensed by the Government of Punjab under the Punjab Weights and Measures (Enforcement) Act, 1958.

Dealers

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	S. C. Engineering Company, Amritsar	Weighing Instruments of specified capacities and type. Weigh-bridge capacity 20 tonne, Platform machines capacity 500Kg. counter machine 10 Kg.
(2)	Jagan Nath Kimat Lal, Karnal	Weights, Measures, Beam-scales.
(3)	Sharman Steel works, Ambala City	Cast Iron Weights 100 g to 50 kg
(4)	Sujan Singh & Sons, Ambala Cantt.	Weights, Measurers, Weighing and Measuring Instruments.

Repairers

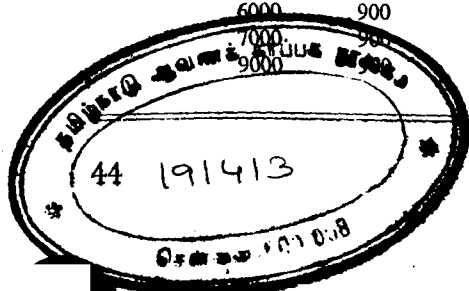
Sl. No.	Name and Address of Repairer	Details of Articles Repaired
(1)	Avery Company of India, Private Ltd., Amritsar	Weights, Weighing and Measuring Instruments.

CORRIGENDUM

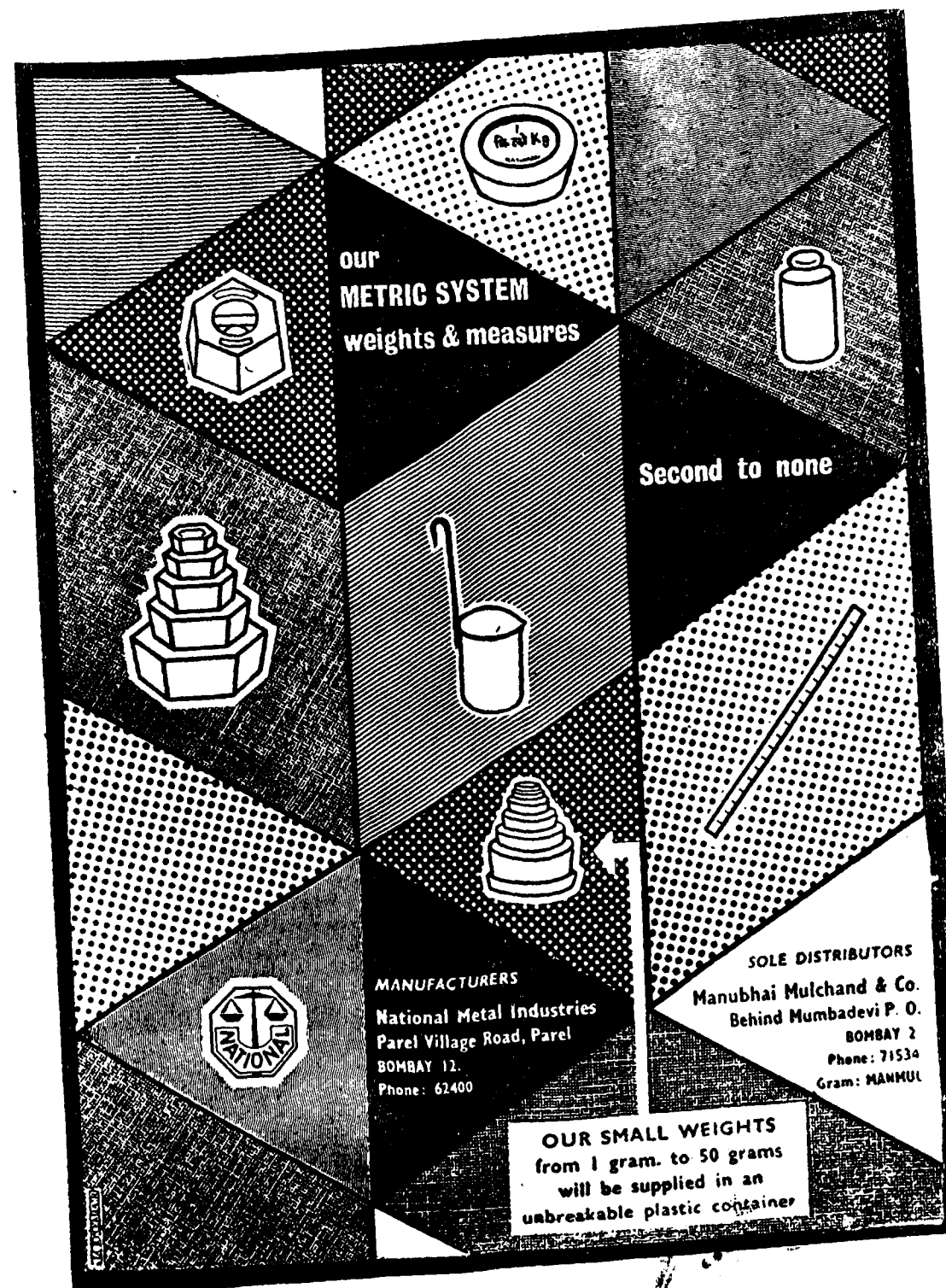
In the Standards of Weights and Measures (Conversion of Land Areas) Rules, 1960 published in March 1961 issue of *Metric Measures* the following corrections may be carried out on pages 25 to 28 in the relevant entries;—

The word "Acres" appearing in the heading on page 25 under column 50 Cents may be deleted.

Against entry		Read		For	
Acres	Cents	Hectares	Ares	Hectares	Ares
7	90	3	19.70	3	19.17
73	20	29	62.29	29	72.29
84	20	34	7.44	34	7.34
1000	100	445	15.30	445	15.36
8000	400	3399	35.05	33.99	35.05
6000	900	2792	32.36	2792	32.37
7000	900	3197	0.82	31.97	0.83
9000	900	4006	37.73	4006	37.75



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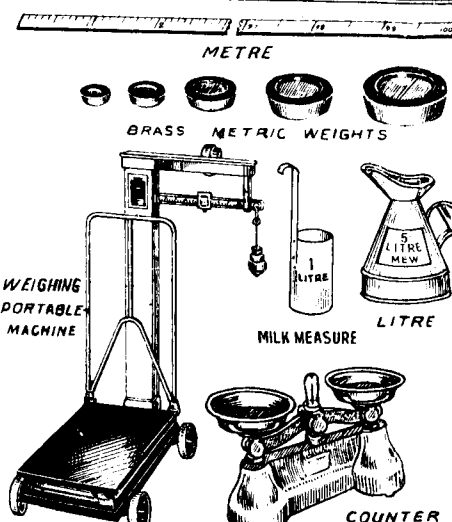
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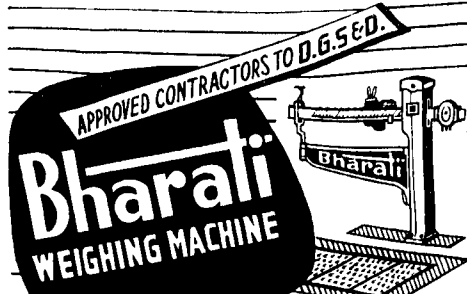
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