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metric measures

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CONTENTS

Metric Reform in Madras S. Moni	3
Sixth Conference of Controllers	7
French Experts' Report Considered	13
Amending Weights and Measures Laws	21
Training Students in France	25
Length Measures Compulsory from October 1962	28
News & Views	30
Book Review	32
Standards News	34
Licensed Manufacturers, Dealers and Repairers of Weights and Measures (22)	38

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metric measures

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Metric Reform in Madras

S. MONI

Controller of Weights & Measures,
Madras

AS elsewhere in India, the reform of weights and measures in Madras State has also had a chequered career. The need for uniformity of weights and measures had been realised all along, but half-hearted attempts of successive rulers in South India without reference to conditions prevailing outside their territory made these attempts infructuous.

As in the North, commercial weights in Madras State were for long based on multiples of local coins issued by various rulers from time to time. And when, with the advent of the British rule, a compromise was attempted between the Imperial system and the old weights and measures, new sets of values came to be attached to old local units, without a change of local names. The standardisation attempted by the British Government only added to the confusion of weights and measures which were based on traditional values or peculiarities caused by trade practices. Under these conditions the efforts of the Government of Madras to evolve uniformity out of the confusion by legislation were doomed to failure. The last such attempt was in 1948. The chief local units continued *viz.*, the carat, tola, palam, seer, viss, maund, kundu, kandy and the thulam but the contents of many of these weights and measures varied from district

to district and even within local areas, though the names remained unaltered.

The Madras Weights and Measures (Enforcement) Act, 1958, is thus the first effective step to introduce uniformity in weights and measures, through the adoption of the metric system, giving up all attempts to correlate new and old weights.

Under this Act the Madras Government introduced metric weights in four districts, *viz.*, Madras City, Chingleput, South Arcot and North Arcot from 1-10-1958 with the option to use old weights for two years i.e. the use of only the metric weights became compulsory there from 1-10-1960. Metric weights were introduced optionally in the remaining nine districts from 1-4-1960, and compulsorily from 1-4-1962. Metric capacity measures were introduced in the districts of Madras, South Arcot, North Arcot and Chingleput from 1-4-1961, in Salem, Tanjore, Tiruchirapalli and Ramanathapuram from 1-10-61 and in the remaining districts from 1-4-62. Their use became compulsory in the first two stages from 1 April and 1 October 1962 respectively. They will become compulsory throughout the State from 1 April 1963. Linear measures were introduced in the whole State from 1-10-61 and their use has become compulsory from 1-10-62.

Organisation

The Organisation to enforce the Madras Act was established in 1958 with a Special Officer under the administrative control of the Board of Revenue, with five Inspectors in the four districts selected for enforcement. The Weights and Measures Department became a separate Department early in 1960. The strength of the Inspectors was increased to 34 for the State in 1960 and a full time Controller was appointed in the senior time scale of the I.A.S. To conform with the pattern of organisation approved by the Fifth All India Controllers Conference, the field staff has been recently increased.

The implementation of a reform of this magnitude is a complicated, arduous and prolonged task. It requires trained technical personnel. The 'Stamping Smith' attached to the Taluk Officers, who stamped weights and measures according to rough standards (but not weighing and measuring instruments) prescribed under the Madras Weights and Measures Act, 1948, and collected a nominal fee, had to be replaced by qualified Inspectors trained to handle precision equipment. These Inspectors had to acquire a sound knowledge of the working of various types of complex weighing machines. It took almost a year to get the first batch of half a dozen Inspectors trained in Bombay and put them in position.

Difficulties of Trade and Public

The apathy of the public and the trade in the early stages of the reform had to be overcome by persuasion and propaganda. To the small trader, the investment on a new set of cast iron weights was an added burden, not to mention the stamping fees. To the common man, the kilogram and the calculations that went with the conversion of the old units appeared burdensome. Added to this was the difficulty in securing

within a short time a sufficient number of weights for use in trade.

In fact, in the early stages manufacturers had to be assured of a steady demand for metric weights. Leading firms engaged in foundry work had to be approached many times and persuaded to take up manufacture of metric weights and measures. It was much later that a Manufacturers' Association was formed.

To eliminate delays and ensure uniformity in prices of weights supplied to Government Departments rates were fixed for supplies to Government Departments. The market prices of weights and those fixed for supply to Government Departments do not differ much at present, though due to scarcity of raw materials and a sudden spurt in the demand there was an increase in prices in April and May 1962. We have enough manufacturers of metric weights at present. The need for price control no longer exists as weights have been purchased both by the trade and Government Departments. To check high prices a fairly liberal policy of getting weights from other States was followed.

There are not enough manufacturers of beam scales in this State. So a liberal policy of allowing imports from other States is followed. Instruments in use are also stamped. Of late, local manufacturers are coming forward and it is hoped that in a few months the position would ease considerably.

Capacity measures are available in sufficient numbers. The use of 'dry measures' for retail sale of foodgrains is a peculiar feature of Madras State. But there is still some difference of opinion among the public as well as the trade whether the struck measure for dry grains should be finally accepted. Enforcement of struck dry measures will be done cautiously.

Persuasion and Propaganda

To start with, one trade after another was taken up for enforcement of weights; the grocery, mutton and bullion trades being the first and firewood the last. Traders were approached through Trade Associations to the maximum extent possible. The Chambers of Commerce and Trade Associations co-operated with the authorities.

On the whole, the enforcement of weights and measures has been satisfactory and the response has been quick, both from the trade and the public. But care has been taken not to force the pace so far as weighing instruments are concerned. The enforcement of metric weights is being carried out first and inconvenience to the trade and confusion to the public avoided by not insisting on a complete change-over regarding beam scales simultaneously. Though many existing beam scales are sub-standard, particularly in Class 'C', in view of the paucity of good 'C' class beam scales and lack of manufacturers, some leniency had necessarily to be shown in this case.

As the Controller of Weights and Measures was also an Ex-officio Secretary of the Board of Revenue, the co-operation of the Revenue staff was easily obtained for persuasion and propaganda work in the early stages. As sugar was a controlled commodity, enforcement of metric weights in dealings in sugar was easy and this gave considerable publicity to the reform in 1959. Co-operative societies and regulated markets were also approached to change over to the metric system. The Triplicane Urban Co-operative Society of Madras City, a leading consumers' co-operative society in the State, gave a lead to retail traders in the city. The Department also took upon itself to supply weights to Government Departments in the beginning so that private bodies having contact with Government Departments may

switch over. All these measures helped to quicken the pace of the metric reform during a rather difficult period.

To keep up the momentum, officials of the Revenue Department of the grade of Tahsildars and Deputy Tahsildars were also empowered to exercise within their jurisdiction the powers of Inspectors of Weights and Measures under section 17 of the Madras Weights and Measures (Enforcement) Act, 1958, except physical verification of commercial weights with working standards. Quite recently, officers of the Agricultural Department have also been empowered to exercise the same powers within regulated markets.

Along with persuasion and propaganda work, the Inspectors of Weights and Measures undertook a survey of trading establishments and also the number of weights, measures etc., to be replaced owing to the change-over. The survey was initially taken up in the districts of Madras, Chingleput, South Arcot and North Arcot from December 1958 onwards, and was extended to the remaining nine districts in 1960. A resurvey of trading establishments was also undertaken and this opportunity was availed to assess the progress of enforcement, besides collecting data regarding the quarter and the year of stamping of metric weights and instruments used by them. The information gathered during resurvey was brought into a census register which will be useful for future work.

Publicity

A State Publicity Advisory Committee has been set up with representatives of the concerned Departments participating in its work.

The General Committees of District Development Committee under the Chairmanship of the Collector in each district review the progress of the enforcement of the

metric system and also help in publicity. The Assistant Controllers of Weights and Measures assist this committee.

This Department participates in all the Exhibitions held in the State. An Audio-Visual Publicity van of this department moves throughout the State including rural areas and makes announcements through a loudspeaker and exhibits films on the metric system. The Department has conducted three Publicity Weeks in 1959, 1961 and 1962. The last one was celebrated throughout the State with the active cooperation of District Collectors and Panchayat Unions.

In addition to various press advertisements and press releases issued both by the Director of Advertising and Visual Publicity and the State Government, this Department has issued considerable publicity material, like conversion tables, brochures, calendars, paper bags, posters, book marks etc.

Progress Achieved

The progress achieved so far may be summarised as follows:

(i) *Verified and stamped up to 31-8-62*

* (1) Weights	18,27,455
(2) Capacity measures (including dry measures)	2,42,008
(3) Linear measures	13,977
(4) Beam scales	52,404
(5) Other weighing instruments	5,956
(6) Measuring instruments	612

(ii) *Licences granted*

(1) Manufacturers	165
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(2) Dealers	732
(3) Repairers	152

(iii) *Approximate monthly production capacity*

(1) Weights	
(a) Cast iron	40,000
(b) Brass including bullion	10,000
(2) Capacity measures :	
(a) Pouring, dipping and conical measures	25,000
(b) Dry measures (other than aluminium)	12,000
(c) Linear measures	4,000
(d) Beam scales	2,000

(iv) *Revenue Collected*

	1959-60	1960-61	1961-62
	Rs. 12,936·34	Rs. 1,69,918·97	Rs. 3,11,100·85

(v) *Articles seized and detained upto 31-8-62*

(1) Weights	66,616
(2) Capacity measures	10,094
(3) Weighing instrument	654

The progress of enforcement of metric system in Government Departments, especially Departments like Public Works, Highways, Irrigation, Education etc., is proposed to be reviewed at meetings of concerned Heads of Departments once in every period of six months.

The response from the trading community and the public has been satisfactory and the change-over is being effected smoothly. With the same amount of co-operation from the trade and the public when switching over to capacity and linear measures, it is hoped that metric reform in this State will be implemented according to schedule.

Sixth Conference of Controllers

THE Sixth Conference of Controllers of Weights and Measures was held in Madras on 7, 8 and 9 August 1962.

The Conference was inaugurated by Shri V. Ramaiah, Minister for Public Works and Revenue, Madras. Shri K. V. Venkatachalam, Joint Secretary, Ministry of Commerce and Industry, New Delhi, presided. It was attended by Controllers of Weights and Measures in States and Union Territories and by representatives of the Ministries of Commerce and Industry, Finance (the Government of India Mint at Bombay and Calcutta), as also the Indian Standards Institution and the National Physical Laboratory.

Opening Remarks

Shri Moni, Controller of Weights and Measures, Madras, welcomed the delegates on behalf of the Madras Government. He thanked them for selecting Madras as the venue of the Sixth Conference. The Conference was a forum in which representatives of State Organisations responsible for enforcement of weights and measures met periodically to pool experience, exchange ideas and to devise means for a smooth transition to the metric system of weights and measures. The object of the reform of weights and measures was to secure public welfare by ensuring that only accurate and certified weights, measures and instruments were used for trading in the country. The metric system of weights and measures was being instituted throughout the country replacing the diverse weights and measures previously in use. One of the main

problems was to educate the public in the new system.

Inaugural Address

Shri Ramaiah, inaugurating the Conference, stressed the importance of standardizing weights and measures throughout the country. At one time, as many as 431 systems of weights were in vogue in the country. These had to be replaced by one system in the interest of trade and industry. The metric system was chosen for adoption throughout the country because of its many advantages. Over 85 percent of the world was already following the metric system. One could say that the ideas on which the system had been evolved had their origin in India. In 1956, Parliament enacted legislation to adopt the metric system. The enforcement of the new system was bound to be a difficult and complicated task. People throughout the country had to be made familiar with the system. Older people particularly were bound to find it difficult to get accustomed to a new system of weights and measures. Inspectors of Weights and Measures had, therefore, to function also as Public Relations Officers. It was their duty not only to enforce the use of the new weights and measures but to educate the public in it. The task called for perseverance, conviction, sympathy and tact.

The success of the reform depended on two parties—the trading community and public. Often the consumer insisted on transactions in the old system even after the trader had replaced his old weights. Traders

could not be blamed if they tried to satisfy customers by conducting business in the old units. Enforcement should, therefore, be tempered with understanding and sympathy. The public and the trading community in Madras had reacted favourably to the new system. The Government appreciated the difficulties of the trade and had allowed them sufficient time for the change. Little use had to be made of the penal provisions of the law. The Department of Weights and Measures had been strengthened to cope with its heavy responsibility. A precision laboratory would be set up in a year or two. The metric system, and the Government's programme for introducing it, had been publicized through all available media. Manufacturers of weights and measures had played their part by supplying new weights to the trading community at reasonable prices. He was confident the Conference would prove useful to Weights and Measures Departments in solving their problems and wished it success. He also thanked the Standing Metric Committee for the guidance it had given to Weights and Measures Organisations in the States.

Chairman's Speech

Shri Venkatachalam thanked the Minister for his advice to the Conference. It would be followed meticulously. In 1956, Parliament enacted legislation to adopt the metric system. It allowed a transitional period of 10 years for the complete replacement of existing weights and measures. Many people considered this period far too short. There were others who thought that such a reform should be put through quickly, that new weights and measures should be enforced throughout the country simultaneously, and that a long transitional period should not be allowed.

Earlier attempts to standardize weights and measures in the country had ended in failure. There was, therefore, much scepticism about the success of the new attempt.

There was no experience to guide Government in the reform. True, some States had experience in enforcing weights and measures; but there was no recent experience to guide the country in replacing its system of measurement in trade, industry, engineering and technology.

The first requisite was legal sanction for changing the system of measurement. Parliament had enacted a law for adopting the new system and State Governments passed laws for enforcing it. The State Governments had also set up competent Organisations for enforcing weights and measures. One of the main causes of failures of previous attempts had been the lack of such Organisations. There were now about 1,000 fully trained Inspectors of Weights and Measures working in the field. They had been equipped with standard weights, balances and other instruments for verifying traders' weights. The manufacture of standard weights and measures, balances and other equipment had been developed in India during the last 5 years.

Half the transitional period of 10 years allowed by the law was now over. A review of the progress achieved during the last 5 years gave room for reasonable satisfaction. The achievements had been substantial. Certain major tasks had been completed. The metric system had been adopted in all their transactions by organised industries, Government departments and public undertakings like the Railways and Posts and Telegraphs. Metric weights had come into use in trade in all the urban areas and over considerable rural areas. There was no doubt they would soon be in exclusive use everywhere. It would be reasonable to expect that by the end of 1963 metric weights and measures would have replaced other weights and measures in trade and industry throughout the country.

The transition to the new system had been relatively smooth. This was largely due to the

SIXTH CONFERENCE OF CONTROLLERS

free co-operation accorded by trade and industry. Programmes for adopting the new system were drawn up in close consultation with representatives of the trades and industries concerned. In many cases the programmes had been suggested by representative associations of trade and industry. He congratulated the representatives of the State Enforcement Organisations on their creditable achievement.

The task was, however, far from over. Three main tasks remained to be completed. First, the metric system had to be brought into full use in general and technical education. School books, particularly in subjects like arithmetic, had to be completely revised. Good progress was being made in this direction. Secondly, publicity had to be continued and intensified to make the man in the street familiar with the metric system. Thirdly, the metric system had to be adopted in the design of the various products of industry. This was bound to take time and might have to be spread over a number of years.

Shri P.N. Nayer, thanked the Minister for inaugurating the Conference and the Madras Government for the arrangements made for holding the conference and for accommodation of the delegates.

The following is a brief summary of some of the more important recommendations of the Conference :

(1) Enforcement of Metric Weights

Metric weights had come into almost exclusive use in areas where they were first introduced in October 1958. In other areas, a very large proportion of trading establishments had replaced seer and maund weights by metric weights. Trade was carried on mainly by the use of metric weights.

Sustained efforts would be continued over the next 6 months to eliminate non-standard weights still in use. Inspectors would go

round the markets and seize such weights wherever they were found in use or in the possession of traders.

(2) Enforcement of Metric Capacity Measures

Metric capacity measures were progressively coming into use in the areas where they had been introduced by law. No shortage of measures had been reported from any part of the country.

Non-metric capacity measures would be seized wherever they were found in use or in the possession of traders in areas where it was illegal to use them.

(3) Enforcement of Length Measures

The use in trade of length measures other than metre length measures would become illegal throughout the country from 1 October 1962. Licensed manufacturers and dealers were building up stocks of metric length measures.

(4) Enforcement Organisations in the States

(a) Personnel

Since the last Conference, there had been general strengthening of Enforcement Organisations in most of the States. Weaknesses were being remedied.

(b) Equipment

The Weights and Measures Departments had been supplied with sufficient numbers of working standard weights, capacity measures, Inspectors' balances, stamping seals, tools and other equipment to meet essential needs. Over 400 working standard length measures had been supplied by the Mint. The number was expected to rise to nearly 450 before October. The production of secondary capacity measures would be augmented and that of secondary standard length measures would be taken up as soon as the raw material became available. Specifications for secondary standard balances were ready and production would be started shortly.

(5) Publicity

Publicity would continue to be carried out through the various media. A new documentary film with commentary in all languages was under production.

An interesting recommendation for the readers of *Metric Measures* and *Metric Maaptol* is that special numbers should be published after every Conference.

(6) Dispensing Pumps at Consumers' Premises

All pumps installed at consumers' premises could not be treated as non-commercial measuring instruments. Such pumps were used by transport undertakings and other large consumers for distribution of oil. Persons employed in distribution were accountable for the quantities received by them and distributed through the pumps. Such pumps should, therefore, be treated as commercial measuring instruments and offered for verification and stamping by Weights and Measures Inspectors.

(7) Stamping of Small Weights

The smallest weight which could be stamped fully was of the denomination 50 mg. All commercial weights from 50 mg and above would be stamped with all the three stamps. Weights of 20 mg would be stamped with one stamp only, i.e. the date stamp. Weights of 10 mg and below would not be stamped at all. If they were contained in a box, the box would be stamped and certified. If there was no box, the weights would be authenticated by a certificate of verification.

(8) Standardization of Peg Measures

The Ministry of Commerce and Industry would set up a committee to recommend, (a) the sizes of metric peg measures to be used in selling liquors, and (b) the sizes, graduations and other particulars of glass beaker measures to be used in retail trade in liquor.

(9) Amendment of the States Weights & Measures (Enforcement) Acts

A draft Weights and Measures (Enforcement) Amendment Bill has been recommended to State Governments by the Ministry of Commerce and Industry. The following further amendment was proposed to State Governments :

Ban on Use and Possession of Non-standard Weights and Measures

The States Weights and Measures (Enforcement) Acts did not give sufficient powers to Controllers and Inspectors to ban the use or possession of non-standard weights, measures or to seize them when found in the possession of traders. The Act should be amended making the use or possession for use in commercial transactions of non-standard weights, measures or instruments, an offence and to give powers to Inspectors to seize any such weight, measure or instrument found in trading premises and to prosecute the persons using them or in whose possession they were found.

(10) Amendment of the States Weights & Measures (Enforcement) Rules

The Ministry of Commerce and Industry had circulated draft amendment to the Weights and Measures (Enforcement) Rules, based on the recommendations of the 4th and 5th Conferences. The following further amendments were recommended to the State Governments :

(a) 'A' Class Beam Scales

'A' Class beam scales should be used in commercial assays and in dharm kantas for verifying the weight of bullion and precious stones.

(b) Seizure of Weighing Instruments

Provision should be made to give Inspectors the power to seize weighing instruments of all kinds, including platform machines, which

have not been stamped under the provisions of the Act and the Rules.

(c) Period of Verification

All measuring instruments, and all weights, measures and weighing instruments used in factories and in the trade in bullion and precious stones, should be verified once every year. All other weights, measures and weighing instruments should be verified once every two years.

(d) Commercial Metre Measures

Commercial metre measures graduated at every centimetre could also be recognised and their use in trade permitted.

(e) Folding Rules

The Indian Standards Institution's specifications for folding rules should be incorporated, with suitable modifications, in the appropriate Schedule to the Rules.

To ensure uniformity of enforcement procedure, the draft Rules circulated by the Ministry of Commerce and Industry should be adopted by the States without any change in substance. If, for any special reasons in any State, it is necessary to make a change, the Central Ministry of Commerce and Industry should be consulted in advance. The Ministry would place the suggestion before the following Conference.

(11) Amendment of the (Central) Standards of Weights & Measures Rules, 1958

Rule 4 (1) should be amended by adding a proviso that reference standard length measures, if manufactured from nickel steel, should be verified at intervals of not more than 10 years.

(12) Weights, Measures and Instruments Manufactured in one State for Sale in Another

Every manufacturer of weights, measures or weighing and measuring instruments should obtain a licence from the Government of the State in which he had his manufacturing establishment. He need not obtain a licence from

the Government of any other State where his products might have a market.

A licensed manufacturer of one State might sell and deliver weighing machines other than beam scales directly to a user in any other State. He should, however, send advance intimation to the Inspector of Weights and Measures in whose jurisdiction the user's establishment is situated.

Commercial weights, measures and beam scales should not be sold by a licensed manufacturer of a State directly to users in another State. They should be sold only to agents appointed in consultation with the Controller of the State in which they are to be used. The agent should be a licensed dealer in that State.

(13) Weights, Measures and Instruments used in Stores Departments of Industrial Establishments

These weights, measures and instruments could not be regarded as non-commercial since persons employed in the Stores Departments were accountable for the stores for whose weightment or measurement the machines were used. They should, therefore, be verified and stamped by Inspectors.

(14) Control of More Complicated Instruments

(a) Electric Meters

The verification of meters for measuring electrical energy was complicated and involved the use of elaborate equipment. In the present stage of development, it was not practicable for Weights and Measures Departments in this country to attempt this task.

(b) Water Meters

The Indian Standards Institution had been approached to suggest a simple method for the verification of water meters.

(c) Gas Meters

The International Organization of Legal Metrology was studying methods for the verification of gas meters. The results of these studies should be awaited.

(d) *Taxi Meters*

The Indian Standards Institution's Sectional Committee on Weights and Measures had set up a Sub-committee to recommend specifications and a method for the verification of taxi meters. The Sub-committee had collected data on the methods being followed in other countries. The Sub-committee was likely to make its recommendations in time for consideration at the next Conference.

(15) Recognised Abbreviations for Metric Units

Government Departments as well as private and public undertakings should be advised to use only recognised abbreviations for the metric units of weights and measures. While specifying quantities, prices, rates, etc. in records and correspondence, the abbreviations used should be the recognised ones.

(16) Delegation of Powers Under Weights and Measures Laws to Officers Other Than Weights and Measures Inspectors

The periodical verification and stamping of weights, measures and instruments under the provisions of the Weights and Measures laws should be the exclusive responsibility of Weights and Measures Inspectors. The power to inspect weights, measures and instruments, might in special circumstances be exercised by other officials like Excise Inspectors in Excise controlled shops or Agricultural Marketing Inspectors. They should not, however, be declared Inspectors under the Weights and Measures (Enforcement) Acts. They might inspect weights and measures in the shops dealing in Excisable goods under the powers they already enjoy under the Excise Acts and Rules.

(17) Machines Converted to Metric System—Recognition of Non-Standard Capacities

Many machines converted to the metric system did not conform to the Rules in regard to capacity. The continued use of these machines should be permitted till the end of

their lives. The Controller should, at his discretion, write down the capacity of any such machine to the next lower capacity recognised by the Rules.

(18) Verification of Weights, Measures, etc. to be in the Vicinity of the Traders' Premises

A sufficiently large number of stamping centres should be set up to enable stamping being carried out at or near the premises. Mobile verification units should be organised, where necessary.

(19) Licensing of Importers of Measuring Instruments

An importer should have a licence under the Weights and Measures (Enforcement) Act if he wanted to sell the machines he imported. The importer should take out a licence from the Government of the State in which he had his business establishment. He should get all weights, measures and instruments intended for sale to persons within the State, verified and stamped by Inspector before delivery to the customers.

Weights, measures and instruments imported for commercial use should conform to the specifications in the Weights and Measures (Enforcement) Rules. It was the responsibility of the importer to ensure that only machines which complied with the Rules were imported.

(20) Verification of Weights of 10 g and below

Weights of 10 g and below could not be adjusted to correct errors. They should, therefore, be rejected outright if found to be in error beyond permissible limits.

(21) Net Weight of Material in Baby Food Containers

The Indian Standards Institution should suggest limits of errors to be permitted in the net weights.

(22) Standardization of Forms and Registers

The Conference agreed in principle that forms and registers to be maintained by manufacturers, repairers, dealers, Inspectors

FRENCH EXPERTS' REPORT CONSIDERED

and Controllers in the various States should be standardized.

(23) Inspectors' Manual

The Ministry of Commerce and Industry should compile a comprehensive Manual for Inspectors.

(This is an important recommendation from the point of view of the daily work of the Inspectors and would be a valuable tool in ensuring uniform application of the weights and measures laws of the country. The field to be covered by this Manual is vast as it will have to deal with the verification practice and other instructions for items ranging from ordinary cast

iron weights to the latest weighing and measuring instruments required in commercial transactions. It should not, therefore, be expected that the Manual would be ready in the very near future. —*Editor*)

(24) Study Tours of Inspectors

Selected Inspectors and supervisory officers of the Weights and Measures Departments should be given the opportunity to visit other States and study the work of enforcement there.

(25) Seventh Conference of Controllers

The next Conference should be held in Bhopal in January 1963.

French Experts' Report Considered

IT will be recalled that two French Experts M. Francis Viaud, General Engineer and Head of the French Department of Measuring Instruments, and M. Louis Krach, Chief Engineer of Measuring Instruments, France, were deputed by the French Government to visit India during November and December 1960.

The Experts submitted their report to the Government of India and the summary of it was published in the March 1962 issue of *Metric Measures*. The recommendations of the Experts were considered prior to the Sixth Conference of Controllers of Weights and Measures at Madras, on 6 August 1962. The main recommendations of the Experts and the views of the Conference on them are given below. In the following account the recommendations of the Experts are given first and the views of the Conference are given in smaller type.

(1) Definition of the Litre

The definition given in the Standards of

Weights and Measures Act, 1956, should be amended. Litre may be defined as equivalent to 1 cubic decimetre.

The present definition of the litre may be retained for the time being, pending revision of the international definition by the General Conference of Weights and Measures.

(2) Period of Verification of Reference Standards

Reference standards need be verified once in every 10 years only. Since these standards are not subject to much wear and tear, they retain their accuracy for fairly long periods. There is no need, therefore, to verify them once every 5 years.

There is no assurance that reference standards would retain their accuracy for as long a period as 10 years. They should, therefore, continue to be verified every 5 years. Meanwhile, the National Physical Laboratory will keep a few sets of reference standards under continuous observation, and study their behaviour during the next 5 years. After the initial verification of all the reference

standard weights issued to the States is complete the question may be reviewed.

The period of verification of reference standard length measures manufactured from nickel steel should be 10 years.

(3) Adoption of the Specification in Indian Standards in Laws on Weights and Measures

The specifications in the standards should not be mechanically adopted in the laws. They should be examined by the Weights and Measures Authorities, and adopted to the requirements of the law.

The recommendation was accepted. Indian Standard specifications have in the past been adopted in substance except in rare cases, where for practical reasons, it was found necessary to modify them.

(4) Representation of Controllers in Committees Drawing up Standards on Weights, Measures and Instruments

Controllers of Weights and Measures are not sufficiently well represented in these Committees. As a result, the Committees are dominated by the manufacturers of weights, measures and instruments. The interests of the users and the public go by default. At least half the members of these Sectional Committees should be representatives of Weights and Measures Departments.

The Sectional Committee should have one member representing the Weights and Measures Department of each of the main regions of the country.

(5) Improvement in Techniques of Manufacture of Commercial Weights

Documents on the manufacture of weights and measures in France will be sent to the Agra Smelters' Association. After they study these documents, a small study team of smelters may visit manufacturing establishments in France. Later, a French Foundry Expert may visit India to advise Indian manufacturers in improving their techniques.

Manufacturing techniques are sufficiently well developed in India, and it is not necessary to send a delegation of manufacturers to France.

(6) Uniformity in Enforcement Laws and Procedure

There must be uniformity throughout the country in regard to measuring instruments and their control.

Uniformity has been achieved in regard to weighing and measuring instruments, thanks to the adoption of Indian Standard specifications suitably adapted in the light of experience.

(7-8) Prior Approval of Designs of Weights, Measures and Instruments

In some States, manufacturers are required to secure prior approval by the Weights and Measures Authorities of the design of weights, measures, or instruments they manufacture. There is no such control in other States. Such control is necessary, and must be exercised on manufacturers throughout the country. Every manufacturer must be compelled to submit the designs to the Weights and Measures Authorities in advance for approval. After approval they might manufacture a few specimens. Scale manufacture must be allowed only after the specimens are examined and found satisfactory. A permanent Organisation should be set up under the Standing Metric Committee to examine and approve designs and samples. This Organisation will be advised by a Committee in which Controllers as well as the Indian Standards Institution will be represented. Technicians of this Organisation would keep in close touch with the Enforcement Organisations in the States, to ensure uniformity in Enforcement procedure. Where material differences are reported by these technicians, they would be brought to the notice of the Advisory Committee or the Controllers' Conference.

Training of Weights and Measures Engineers

In addition to Weights and Measures

FRENCH EXPERTS' REPORT CONSIDERED

Inspectors, it is also necessary to build up a Corps of Weights and Measures Engineers. These Engineers will be specialists in weighing and measuring instruments. Persons with a Degree of Bachelor in Science or Technology should be selected for training. Initially 10 to 20 Engineers having these qualifications might be selected, and sent to a training Institution in France Since a working knowledge of French is essential if they are to benefit by these courses in France, they should first learn French in India and if necessary, in France.

A French Engineer from the Weights and Measures Department will be deputed to India for 2 or 3 years to supervise the training of Weights and Measures Engineers, and to advise Government on the control of more complicated weighing and measuring devices.

The time is not ripe for setting up such an Organisation. The question may be reviewed after 3 years. Meanwhile, information may be collected from the U.K., France and other countries, on the practice they follow, in the examination and approval of type designs of weighing and measuring instruments.

(9) Initial Verification of Weights, Measures & Instruments

Initial verification of all weights, measures and instruments may be carried out at the place of manufacture. This verification should be accepted throughout the country. Where the weights are used in another State, the Enforcement Authorities there must not insist on the same weights, measures or instruments being verified again.

This is not practicable under the laws in force and the circumstances prevailing in this country.

(10) Duplicate Weights of the Denominations 20 kg, 2 kg, etc.

Many traders do not buy the duplicate weights, but are content with sets holding

single weights of 2 kg, 200 g, etc. Propaganda should be carried on to induce the users of weights to buy complete sets with 2 weights each of the denominations 2 kg, 200 g, etc.

The recommendation is accepted in principle. Publicity is being carried out to induce traders to provide themselves with duplicate weights of 2 kg and 20 kg.

(11—14) Verification of Commercial Weights

Steelyards may be used for verifying commercial weights of the denominations 5 kg and above. Equal armed beam scales may be used for the smaller weights. The following type of steelyards and beams are recommended :

Types	Denominations of weights for which this type will be used	Sensitivity		Accuracy mg
		mg	per division	
Steelyard	50 kg 20 kg (exceptional)	2,000		2,000
Steelyard	20 kg & 10 kg 5 kg (exceptional)	500		500
Equal armed beams	5 kg to 500 g 200 g (exceptional)	50		50
Equal armed beams Assay Balance Type	200 g to 1 g	1		1

Verification of Bullion Weights

Bullion weights are to be considered as precision weights. They are comparable with working standard weights in regard to the accuracy demanded. The same equipment and procedure may be used, therefore, in verifying bullion weights and working standard weights. They should be verified in the laboratory against secondary standard weights using secondary standard balances.

Inspector's Balances

The Inspector's balances now in use are far too sensitive for verification of ordinary commercial weights. They had to be of such high accuracy because they are also used in verifying bullion weights. It is wasteful to use balances of the precision required for bullion weights to verify ordinary commercial weights. Ordinary commercial coarser balances and steelyards of the types recommended in para (11) above. Bullion weights may be verified using secondary balances.

Balance Supplied by the Firm of 'Testut'

These balances are precision balances, and must be used for the verification of secondary standards, working standards and bullion and carat weights. They must not be taken from place to place. They must be used with a good deal of care by very well trained staff.

In the circumstances of our country, bullion weights cannot be verified against secondary standard weights. They must be verified against working standard weights by the Inspectors. The balances to be used by Inspectors must be sensitive enough for the purpose. The specifications laid down in the Rules for these balances have been found adequate. Steelyards would not be adequate for verifying bullion weights. Further, steelyards of the kind required are not manufactured in India.

(15) Working Standard Capacity Measures

The working standard measures in use are metal cylinders, with height and diameter equal. This type was used in France when the metric system first came into use in that country. It has since been superseded by standard measures made of glass and with graduated necks. Using the glass measures, it is easy to read out the error of the measure tested on the graduated neck. With the metal cylindrical measures, an instrument like the pipette may have to be used for measuring the error,

Glass standards of the kind proposed will be more convenient to use. But metal cylindrical standards have been manufactured and distributed. They may, therefore, continue to be used. The question may be reviewed after 5 years.

(16) Non-flexible Metre Measures

The metre measures in use in India are marked at every centimetre for the first 10 centimetres only. The rest of the length is marked at intervals of 5 centimetres only. It is preferable to mark the metre bar at every centimetre throughout its length.

The recommendation is accepted in principle. Metre measures marked at every centimetre would also be accepted. The Rules would be amended accordingly.

(17) Folding Rules

The use of folding rules must be encouraged. Specifications should be drafted and included in the Rules.

The recommendation is accepted. Indian Standard specifications for folding rules would be incorporated, with suitable modifications, in the Rules.

(18) Survey Chains

Survey chains have gone out of use in France. Surveyors use steel tapes instead. In India also, survey chains must be replaced gradually by steel tapes of length 100 metres or so.

The suggestion is impracticable. Steel tapes would have to be imported. On the other hand, chains are manufactured in India.

(19) Complicated Measuring Instruments

The use of more complicated measuring instruments like liquid meters, gas meters, and electric meters is bound to increase as the country develops industrially. Specifications and verification procedure for such instruments must be drawn up. Personnel must be trained for the control of these instruments,

FRENCH EXPERTS' REPORT CONSIDERED

The recommendation is accepted in principle.

(20) Training of Staff in Government Departments

Controllers and Inspectors of Weights and Measures should help other Departments of Government in training staff on the metric system and its use.

The recommendation is accepted.

(21) Metric System in Administrative Documents

All administrative documents should be drafted in metric units only.

The Controllers of Weights and Measuring will contact the departmental heads to assess how far non-metric units are still in use in the work of Government departments. They will send brief reports to the Ministry of Commerce and Industry. They will also try to induce departmental heads to do away with the old units as expeditiously as possible.

The State Government may be advised to instruct sub-Registrars to induce document writers to use metric units to the fullest extent possible, in the documents registered by them.

(22) Training of Inspectors

Inspectors are being trained at Institutions in Patna, Bombay and Lucknow. The Institution at Patna gives more advanced training than the two others. Training in none of the Institutions is, however, sufficiently advanced or comprehensive. The syllabus should include the following :

(i) General

(a) *Composition*—It should enable those receiving training to draft reports in clear and precise languages.

(b) *Law*—General laws of the country, special laws on weights and measures, legal procedures, etc.

(c) Mathematics.

(d) Mechanics including strength of materials.

(e) Physics.

(f) Chemistry.

(g) Electricity.

(ii) *Special Course on Weights & Measures*

(a) Weighing (current devices).

(b) Capacity measures.

(c) Length measures.

(d) Volume measurement.

(e) Gauging (tank lorries, tank wagons, etc.).

(f) Liquid meters.

(g) Electricity meters.

(h) Gas meters.

The minimum qualification for a person selected for training should be University degree. The length of the training course should be about one year. It should not, in any case, be shorter than 6 months. It would be preferable to have one Central Training Institution for all the States. If this is not practicable, 2 or 3 Centres may be set up for the whole country.

The standard of training of Inspectors must be improved. A Committee may be set up to devise a course of training for Inspectors and supervisory personnel employed in Weights and Measures Departments.

(23) Inspectors and Controllers to be whole-time officers

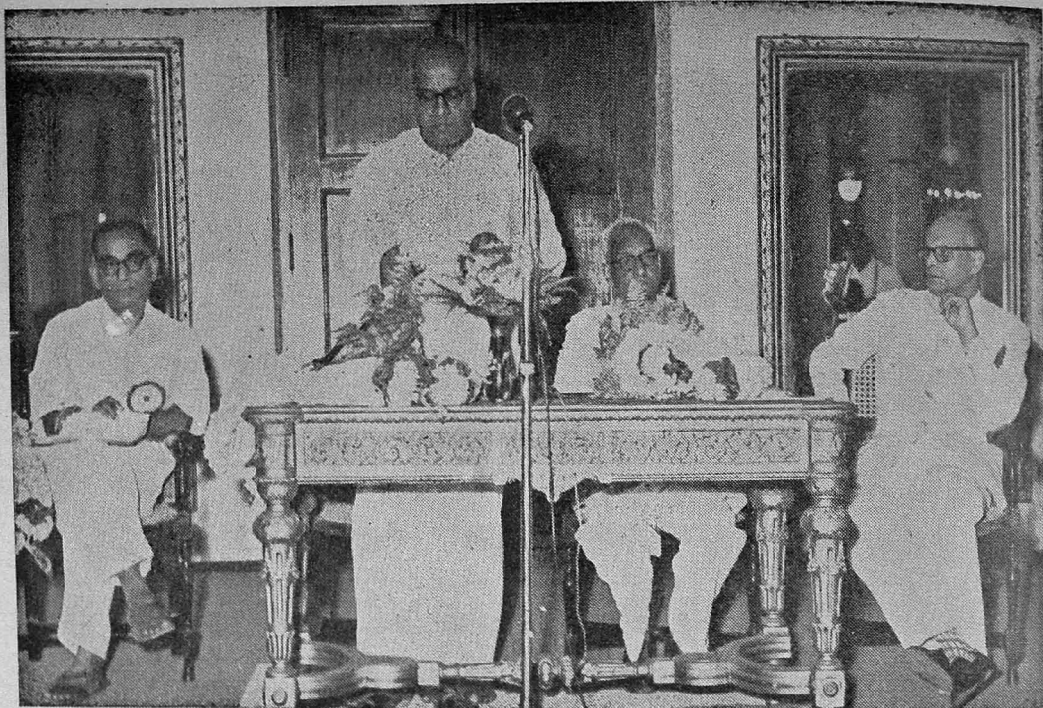
Controllers and Inspectors of Weights and Measures should not be saddled with duties or responsibilities not connected with weights and measures enforcement.

The recommendation is accepted in principle.

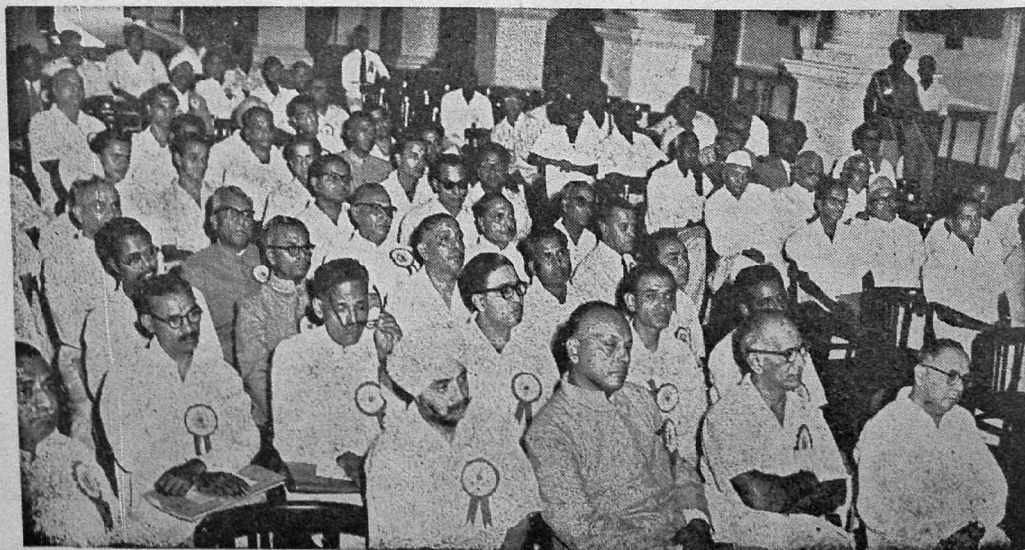
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The Sixth Conference of Controllers was inaugurated by Shri V. Ramaiah, Minister for Public Works and Revenue Madras, on 7 August 1962 at Rajaji Hall, Madras. The photograph above shows the Minister inaugurating the Conference. Others in the Picture are (L to R) Shri P. N. Nayer Secretary, Standing Metric Committee, Shri K. V. Venkatachalam Joint Secretary, Union Ministry of Commerce and Industry Shri S. Moni Controller Weights and Measures Madras.



Controllers of Weights and Measures in the States and Union Territories and representatives of some of the Central Ministries attended the Conference. The inaugural session was also attended by prominent citizens of Madras connected with weights and measures. The above picture shows a section of the gathering at the inaugural function.

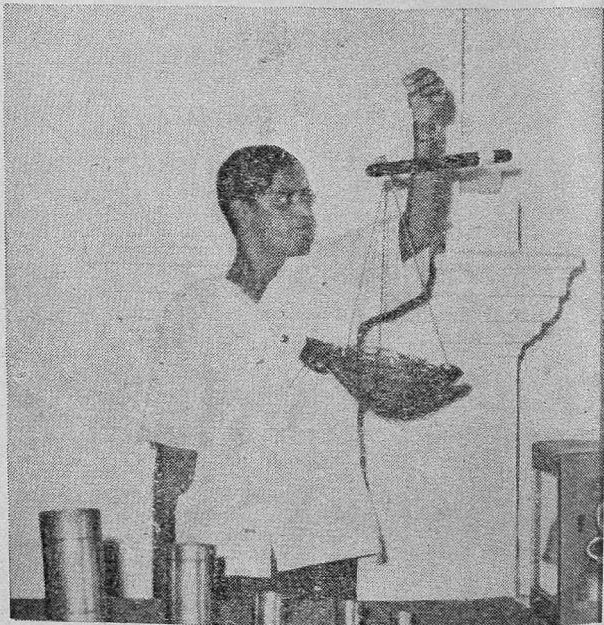
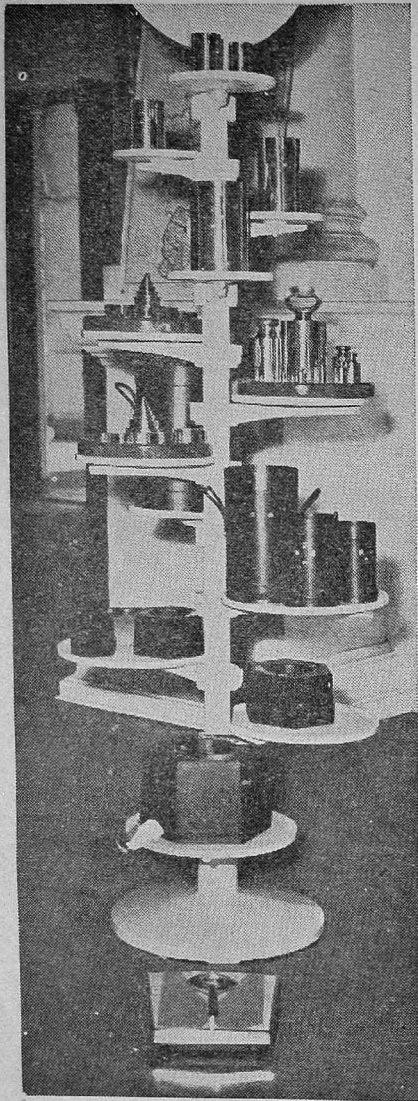


After the inauguration the Conference took up the discussion of the various points on the agenda. This picture shows the Conference session on 7 August 1961.



An exhibition of weights and measures, old and new, was held in Rajaji Hall at the same time as the Conference. Picture shows various types of old weights and measures which were in use in the Madras area prior to the introduction of metric system. Large stone weights are seen in the foreground. In the glass case are kept old-me working standard weights.

A section of the exhibition displayed some of the new metric commercial weights and measures manufactured in Madras State. These are shown in the picture above.



In the exhibition was also shown a crude but interesting type of steelyard used in village bazaars. It consists of a wooden rod, to one end of which is attached a pan. Grooves are made on the rod and each groove indicates a certain weight. When the steelyard is balanced as shown above the weight of the material is read off from the grooves.

Amending Weights & Measures Laws

THE weights and measures laws passed by the Centre and States are now being enforced all over the country in many fields of trade and industry. Within a few years the metric system would cover every sphere of activity where weights and measures are used. After centuries of chaos in the domain of weights and measures, India is now practising a single system all over the land. This has been possible because uniform laws are being enforced throughout the country by the States and the Union Territories.

When the Enforcement laws were originally drafted the field covered was comparatively narrow because of lack of experience. Since then Weights and Measures Organizations have been set up in States and Union Territories. Four years of active enforcement have shown that the laws require amendments if they are to fulfil their purpose adequately.

The Constitution of India lays down in its Seventh Schedule, Union List, Entry 50, that 'establishment of standards of weights and measures' shall be a Union subject, while Entry 29 of the State List prescribes 'weights and measures except establishment of standards' as State subject. These provisions are interpreted to mean that the Centre should lay down the standards of weights and measures, while the States should enforce them. To give effect to this provision, the Centre enacted the Standards of Weights and Measures Act, 1956, and

issued Rules under it. The Act recognised the metric system as the basis and defined the standard metric units as recommended internationally by the various General Conferences of Weights and Measures.

In order to achieve unity of enforcement it was necessary that States should enact uniform legislation. In consultation with the States, therefore, were evolved Model Weights and Measures (Enforcement) Bill and the (Enforcement) Rules under it. The States adopted these with minor modifications.

The Central law has now been in active use for the last 6 years. During this time there have been changes in the international definition of the metre and the second. In the field of enforcement also new experiences have been gained and a number of changes have become necessary in the State (Enforcement) Acts and Rules. The amendments required were discussed thoroughly in the last three Conferences of Controllers. The more important amendments are discussed here.

The Central Act

The Eleventh General Conference of Weights and Measures adopted in October 1960 a new definition of the metre and slightly changed the definition of the second.* In order to keep the Standards of Weights and Measures Act, 1956, in step with international developments, it is necessary that

*See *Metric Measures*, September 1961, pp. 22-23.

the definitions prescribed for these two units should also follow the international trend.

One more unit, the nautical mile, equal to 1852 metres, is used and recognised internationally as the unit of distance for navigation by sea and air. It is proposed to be introduced in the Act so as to permit its use.

Amendments to introduce these changes will be placed before Parliament shortly.

State (Enforcement) Acts

In the State (Enforcement) Acts, a provision is being made to define 'commercial transactions'. Such a definition was not previously included in the State Acts. The necessity for it arose because in implementing the Act, it was found that there were many transactions which would have to come under the purview of the (Enforcement) Act. A few examples are transactions involving the collection of tolls and duties, payment of wages on the basis of weight or measure, as for instance, the wage paid to a tea worker on the basis of weight of leaves plucked, or hire charges of various types like cold storage and so on. A suitable definition to cover all such transactions is likely to be introduced shortly.

By another amendment the provision relating to a special set of working standard weights for the verification of bullion and carat weights has been deleted; on experience it was found practicable to compare bullion and carat weights with the ordinary working standard weights which have now been provided to the Inspectors of Weights and Measures.

A third amendment refers to the provision that no person can manufacture, repair or sell any commercial weight or measure or any weighing or measuring instrument without a licence from the State Government. Past experience has shown that it is difficult

to enforce the use of standard weights and measures for commercial purposes unless the manufacture and sale of non-commercial weights is also brought under control. The amendment will, therefore, prohibit the manufacture or sale of non-commercial weights without a licence from the State Government.

The Weights and Measures (Enforcement) Acts do not provide sufficient powers to ban the use or possession of non-standard weights etc. or to seize them when found in the possession of traders. The Act is proposed to be amended to make this an offence and to give powers to Inspectors to seize such non-standards weights, measures and instruments found in trading premises and to prosecute persons possessing or using them.

State (Enforcement) Rules

So far as the Rules are concerned, the amendments are far more extensive and some new rules have been devised and the schedules changed considerably.

The amendments were necessitated by a number of practical reasons. The applicability of the (Enforcement) Rules was being tested every day all over the country in the bazars, industries and markets. The experience gathered over 4 years has established the necessity to amend the Rules so as to make them more effective for enforcement.

Secondly, the schedules for various types of weights and measures and weighing and measuring instruments were based on Indian Standards that were available at that time. During the last two years, the Indian Standards Institution have published in the sphere of legal metrology, a number of standards, amended some and revised a few. All these changes had to be reflected in the Rules, and the schedules had to be extensively changed. Among the new subjects covered mention may be made of woven

AMENDING WEIGHTS & MEASURES LAWS

metallic tapes, steel tapes, surveying chains, person weighing machines, self-and-semi-self indicating counter type weighing machines, petrol dispensing pumps and calibration of tank lorries.

Among the amendments to the Rules the following are the more important :

- (1) It is now proposed that
 - (a) all bullion and carat weights, and beam scales used with them,
 - (b) all measuring instruments and
 - (c) weights, measures and weighing instruments used in factories should be stamped once in a period of every 12 months. All others should be stamped at least once in a period of 24 months. A weighing or measuring instrument which has been verified and stamped *in situ*, would have to be re-stamped if it is removed and re-erected before the expiry of the verification period.
- (2) Specifications for metric weights, measures and weighing and measuring instruments have been substantially altered. It is, therefore necessary to safeguard those that are already in use and which conform to the original Rules passed in 1958-59 i.e. before amendment. The following amendment gives protection to the users of such metric weights etc.

Notwithstanding anything contained in rule—, any weight, measure or weighing or measuring instrument which has been once verified and stamped in accordance with the rule then in force may, where the State Government has by notification in the official Gazette specified a period in this behalf within that period, be reverified and stamped in accordance with the rules which were in force at the time of the first verification and stamping ;

Provided that the period so specified shall in no case exceed ten years and may be different for different classes of weights, measures or weighing or measuring instruments.

- (3) It is proposed to empower the Inspectors to seize unstamped weighing instruments of all types.

- (4) The limits of error which may be tolerated in the net weight or measure of an article sold or offered for sale in sealed packages or containers will be laid down in a new schedule. Examples are :

Commodity	Permissible error
<i>(i) Raw Cotton</i>	
Packed in standard bales of 180 kg	±5 kg
<i>(ii) Cotton yarn</i>	
Full bale of 180 kg	±5 kg
$\frac{3}{4}$ bale of 135 kg	±3.75 kg
$\frac{1}{2}$ bale of 90 kg	±2.50 kg
$\frac{1}{4}$ bale of 45 kg	±1.25 kg
<i>(iii) Cement</i>	
at factory	±2 percent
in retail trade	±3 percent
<i>(iv) Tea</i>	
Retail packages of 500 g, 250 g & 100 g	±1 percent at the place of packing.
Chest packed at places other than tea gardens	±1 percent at the place of packing.
The net weight of packages or chests of tea shall be verified only at the place of packing.	
<i>(v) Jute Cloth</i>	
Length of jute cloth	±0.5 percent
<i>(vi) Paint</i>	
	±1 percent

Among the important amendments to the Schedules the following may be mentioned :

- (1) It is now proposed to provide adjusting holes in secondary standard weights from 10 kg upto 100 grams.

- (2) Specifications for working and secondary standard length measures have been incorporated.

- (3) The specification for carat weights has been replaced by a new specification wherein the dimensions of the carat weights have been given after due experiments.

- (4) Cylindrical type of measures can now be fitted with a suitable handle, so that it can be used in the hot and boiled milk trade. The use of rivets for securing the handle to the measure has been banned because of the possible danger to health

on account of dirt accumulation in the crevices.

(5) Wooden commercial length measures of 1 metre and 0·5 metre have been recognised. If so, desired, it is permitted to mark the one metre and 0·5 metre rods of metal or wood at every centimetre. Folding rules will also be brought under the law.

(6) Specifications for woven metallic tape measures used by engineers and for steel tape measures have been included. Similarly a specification for surveying chains also now forms part of the schedules.

(7) Substantial revision of the various types of commercial weighing machines have been made by the Indian Standards Institution. These relate mostly to permissible errors and sensitiveness. Dimensions of the various classes of beams will be laid down. As a result, the following specifications will be replaced by new ones :

- (i) General Requirements for Weighing Instruments
- (ii) Beam Scales
- (iii) Counter Machines

- (iv) Steelyards
- (v) Platform Weighing Machines
- (vi) Spring Balances
- (vii) Weighbridges
- (viii) Crane Weighing Machines.

The specification for automatic weighing machine remains unaltered for the time being. Two new specifications, one for various types of person weighing machines and another for self-indicating and semi-self-indicating counter type weighing machines have now been added.

(8) A new Schedule is being added to cover various types of measuring instruments. It will cover :

- (i) General Requirements for Commercial Measuring Instruments.
- (ii) Dispensing Pumps.

The amendments to the State Weights and Measures (Enforcement) Acts and Rules, it is hoped, would be carried out shortly. It is also expected that the amendments would make the law more effective and ensure a fair deal to everybody in the vast field of commercial transactions.

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Training Students in France

(This article is reproduced from *Monthly Review* (July 1962, pp. 161-162). It is a report by J. Norris, Esq. F.I. W.M.A., Secretary to Educational Services Committee of the Institute of Weights and Measures Administration in Britain.

Recently a Committee has been established under the Chairmanship of Shri Triguna Sen, Jadavpur University to consider the various requirements for the training of Inspectors of Weights and Measures in India. It is hoped that this comparative assessment of training of Inspectors in Britain and France would be of interest to many in India.—*Editor*)

A report recently published in the French Journal, *Bulletin de L'Organisation Internationale de Metrologie Legale* sets out in some detail the organisation and functions of the College of Metrology established by the French Government.

The purpose of the college is to provide for the professional training of three grades in the weights and measures service, technical assistants, inspectors, and engineers and the various courses laid down appear to be most comprehensive.

A Governing Council consisting of members nominated by the Minister of Industry is responsible for the general direction of the college and is concerned with the funds necessary for its maintenance, the syllabus, the appointment of staff, the equipping of and work to be carried out at the college and in general any matters referred to it by the Minister of Industry or the Director of the College. This Council meets at least once a year and may appoint a permanent sub-committee to deal with day to day matters of administration,

The personnel in charge of the actual running of the College are, a Director, a Deputy Director, Professors in charge of courses, Tutors, and Demonstrators in charge, under the supervision of the professors, of practical and experimental work. These consist of both full time and part time employees and are appointed by the Minister of Industry.

Instruction at the College covers three stages corresponding to three classes of official:

- First stage— trainee technical assistants
- Second stage— trainee inspectors
- Third stage — pupil engineers

and the length of the courses fixed for each stage is six months, one year and two years respectively.

The College accepts students for each of the three grades mentioned above and also, under certain conditions, outside and foreign students but these latter receive no grant from public funds nor can they acquire the status of public official. Students are admitted to the College by competitive examination and all studies are terminated by a statutory examination. Whilst undergoing training students receive a salary and, where necessary, a grant. This does not apply however to outside and foreign students. Students attend lectures, do practical work and visit scientific and industrial establishments and the standard reached is estimated on the basis of classwork and the result of the examination at the end of the course.

The teaching staff of the College is made up as follows:

In the section 'Engineers'—University lecturers, engineers from nationalised or private industry, members of the engineering side of the weights and measures service;

In the section 'Inspectors'—engineers from the weights and measures service;

In the section 'Technical Assistants'—engineers and divisional inspectors from the weights and measures service.

The College is directed by a Chief Engineer from the weights and measures service assisted by an Engineer and the Governing Council.

Trainee Technical Assistants

Candidates for admission must be between 18 and 27 years of age (those who are already officials may be upto 35 years of age).

The entrance examination comprises: Dictation, French Grammar, Arithmetic, Algebra, Geometry, Trigonometry, Mechanics, Physics, Technical Drawing.

The length of training is 18 months; 6 months in the College and 12 months in a testing office.

The College syllabus covers:—

Measurement in general	units of measure; terminology; errors; numerical calculations.
Measurement of length	measures; metric apparatus.
Surface measurement	mechanical measurement of surfaces.
Measurement of Volume	Solids—measurement of capacity; apparatus of measurement; Liquids—measurement of capacity, measuring apparatus; measuring containers—(gauging reservoirs, simple operations). Gas—gasometers (outlines).
Measurement of mass	weight; weighing machines (Simple and complex).
Measurement of Electrical energy	Energy meters (outlines).
Technology	Metals and alloys used in the making of measuring instruments.
Technical Drawing	
Public and Penal Law	

Ordinances relating to units of measure and the control of measuring instruments.

Trainee Inspectors

Candidates must be at least 22 and not more than 30 years old, (if they are already officials the limit may be extended to 35 years). They must hold a degree in Science (General Mathematics, or Mathematics, Physics and Chemistry) or an Engineering Diploma or have been eligible for the entrance examination to one of the National Colleges.

The entrance examination comprises:—

Written: French Grammar; Mathematics (Geometry, Trigonometry, Algebra and Analysis); Integral and Differential Calculus, Analytic Geometry, Mechanics; Physics (Weight, Hydrostatics, Gas Pressures, Heat, Thermodynamics, Optics, Magnetism, Electrostatics, Electrodynamics, Electromagnetism, Electrotechnics);

Oral: Geometry, Trigonometry, Algebra Analysis, Integral Calculus, Mechanics, Physics, Electricity, Technology, Machine Drawing.

The length of the course is 18 months; 12 months at the College and 6 in a testing office.

The syllabus can be summarised as follows:—

Mathematics	Numerical Calculus, Outlines of probable Calculus.
Physics	Liquid mechanics; Thermodynamics; Theory of electricity; Electrotechnics; Electronics.
Normalisation	Terminology
Measurement in General	Units of measurement, errors.
Measurement of Length	Length measures, metric apparatus.
Measurement of Angles	
Surface measurement.	Mechanical measurement of surfaces

TRAINING STUDENTS IN FRANCE

Measurement of Volume	Solids-measurement of capacity; apparatus of measurement. —Liquids-measurement of capacity; volumetric apparatus; measuring containers (gauging tanks and reservoirs). —Gas-Gasometers.	in the Weights and Measures Service (not over 40 years of age.) The examination comprises: Written: French Grammar, General Mathematics, Rational Mechanics, General Physics, Electricity, Machine Drawing; Oral: General mathematics, Rational Mechanics, General Physics, Electricity, Technology.
Measurement of Masses	Weight; Weighing apparatus non-automatic apparatus, automatic or semi-automatic apparatus, apparatus weighing by constants, totalling apparatus, apparatus for measuring amounts of alcohol, apparatus for measuring density.	The level is approximately that of the various parts of the degree of Science.
Measurement of Time	Outlines of chronometry.	The course lasts two years and the College syllabus may be summarised as follows:
Measurement of Gas Pressures	Apparatus for measuring gas pressures, Systems of releasing pressure.	Mathematics .. Imaginary, Complex Interruption, Tensile Calculus, Symbolic Calculus, Calculus of Probability, Statistical Control, Rational Mechanics;
Measurement of Electrical Energy	Apparatus of measurement.	Physics Fluid Mechanics, Thermodynamics, Optics, photometry, Acoustics, Electrotechnics, Electronics, Modern Physics, Nuclear Physics.
Measurement of Temperature and Heat	(Outlines)	Normalisation .. Terminology.
Optical measurement	(Outlines)	Measurement in General .. Units of measurement; Properties of measuring apparatus; preparation and execution of measurements; Errors.
Resistance of Matter	General Principles, Flexibility, Friction, compression; Application of weighing apparatus of leverage; Outlines of calculation on heterogeneous constructions (e.g., arms of reinforced concrete for suspension bridges).	Various measurements .. More detailed study of the subjects indicated previously for inspectors.
Technology	Metals and alloys used in the fabrication of measuring instruments, wood.	Precision measurements .. Resistance of matter .. Metal and alloy .. Assaying of metals. technology .. Machine Drawing .. Public and Penal Law .. Ordinances relating to units of measure and to the control of measuring instruments.
Machine Drawing		
Public and Penal Law		
Ordinances relating to units of measurement and to the control of measuring instruments.		
Pupil Engineers		
Pupil Engineers are recruited:		
In the proportion of one-third from amongst the students at the Polytechnic College;		
In the proportion of one-third, by competitive examination open to former students of the Engineering College and to holders of a degree in Science (not over 30 years of age);		
In the proportion of one-third by competitive examination open to Inspectors		

parts of the country and some students have greater opportunities than others.

Whilst much has been done by the Institute in various ways such as *Conference* and *Branch papers*, week-end schools, and contributions to *The Monthly Review*, it seems fair to say that the French system should produce a more highly trained official at least from a technical point of view, than his opposite number in the United Kingdom. The French College is Government sponsored and government adminis-

tered however, designed to train men for a government service, and the position is different where administration is in the hands of local authorities.

One praiseworthy feature of the scheme is that, other than those students recruited directly from the Polytechnic College, entry to the College is by competitive examination and it should therefore be possible for a person of ability to rise to the top of his profession.

Length Measures Compulsory from October 1962

(The use of length measures for various purposes has become compulsory from 1 October 1961. Cloth and other commodities which used to be sold by the yard and its subunits will now be sold by the metre and the centimetre. Metric Measures has been publishing many tables. In the May 1962 issue we published a comprehensive table indicating the requirements of cloth for various purposes. In this issue, three useful tables relating to length measures are being published

—Editor)

CONVERSION TABLE FOR PRICES

YARD TO METRE

(Conversion Factor used : 1m = 1.09361 yard)

nP/yard	nP/m	nP/yard	nP/m	nP/yard	nP/m	nP/yard	nP/m	nP/yard	nP/m
1	1	21	23	41	45	61	67	81	89
2	2	22	24	42	46	62	68	82	90
3	3	23	25	43	47	63	69	83	91
4	4	24	26	44	48	64	70	84	92
5	5	25	27	45	49	65	71	85	93
6	7	26	28	46	50	66	72	86	94
7	8	27	30	47	51	67	73	87	95
8	9	28	31	48	52	68	74	88	96
9	10	29	32	49	54	69	75	89	97
10	11	30	33	50	55	70	77	90	98
11	12	31	34	51	56	71	78	91	100
12	13	32	35	52	57	72	79	92	101
13	14	33	36	53	58	73	80	93	102
14	15	34	37	54	59	74	81	94	103
15	16	35	38	55	60	75	82	95	104
16	17	36	39	56	61	76	83	96	105
17	19	37	40	57	62	77	84	97	106
18	20	38	42	58	63	78	85	98	107
19	21	39	43	59	65	79	86	99	108
20	22	40	44	60	66	80	87	100	109

LENGTH MEASURES COMPULSORY FROM OCTOBER 1962

Rs/Yard	Rs/m	Rs/Yard	Rs/m	Rs/Yard	Rs/m	Rs/Yard	Rs/m	Rs/Yard	Rs/m
1	1.09	11	12.03	21	22.97	31	33.90	41	44.84
2	2.19	12	13.12	22	24.06	32	35.00	42	45.93
3	3.28	13	14.22	23	25.15	33	36.09	43	47.03
4	4.37	14	15.31	24	26.25	34	37.18	44	48.12
5	5.47	15	16.40	25	27.34	35	38.28	45	49.21
6	6.56	16	17.50	26	28.43	36	39.37	46	50.31
7	7.66	17	18.59	27	29.53	37	40.46	47	51.40
8	8.75	18	19.68	28	30.62	38	41.56	48	52.49
9	9.84	19	20.78	29	31.71	39	42.65	49	53.59
10	10.94	20	21.87	30	32.81	40	43.74	50	54.68

**CONVERSION TABLE FOR LENGTH MEASURES
GIRAH TO CENTIMETRE YARD TO METRE**

Conversion Factor : 1 inch=2.54 centimetres m=metre (s) cm=centimetre (s)

Girah	Cm	Girah	Cm	Yards	m	cm	Yards	m	cm
1	6	11	63	1	—	91	20	18	29
2	11	12($\frac{1}{2}$ yd)	69	2	1	83	30	27	43
3	17	13	74	3	2	74	40	36	58
4($\frac{1}{2}$ yd)	23	14	80	4	3	66	50	45	72
5	29	15	86	5	4	57	60	54	86
6	34	16(yd)}	91	6	5	49	70	64	01
7	40			7	6	40	80	73	15
8($\frac{1}{2}$ yd)	46			8	7	32	90	82	30
9	51			9	8	23	100	91	44
10	57			10	9	14			

16 Girah=1 yard

One Metre=100 Centimetres=17 $\frac{1}{2}$ Girah=39.37 inches.

NOTE:- This table indicates only equivalents of girah and yard. For actual requirements of cloth for apparel, see the next table

CLOTH REQUIREMENTS IN METRIC TERMS

Sl. No.	Items	Measurements in yards (width in inches)	Recommended Metric Measurements m/cm
<i>Men's Apparel</i>			
(1)	Coat (cotton)	3 (24"-36")	2.75 (60-90 cm)
(2)	Suit (woollen)	3 $\frac{1}{2}$ (54-56")	3.20 (135-145 cm)
(3)	Trousers (Cotton and silk)	3 (24"-36")	2.75 (60-90 cm)
	Silk suit	6 (24"-36")	5.50 (60-90 cm)
(4)	Trousers (cotton)	3 (24"-36")	2.75 (60-90 cm)
(5)	Achkan (cotton)	5 $\frac{1}{2}$ (30")	5.00 (75-76 cm)
(6)	Sherwani (woollen)	2 $\frac{1}{2}$ (54"-56")	2.30 (135-142 cm)
	(cotton)	5 (30")	4.60 (75 cm)
(7)	Bushshirts, Manila etc	2 $\frac{1}{2}$ (36")	2.30 (90-91 cm)
(8)	Turban	5 (22")	4.50 (55-56 cm)
		6 (22")	5.50 (55-56 cm)
		7 (22")	6.50 (55-56 cm)
(9)	Dhoti	4 (45")	3.75 (130-132 cm)
		4 $\frac{1}{2}$ (52")	4.10 (130-132 cm)
		5 (45")	4.50 (114-115 cm)
(10)	Shirt (cotton)	2 $\frac{1}{2}$ (36")	2.30 (90-91 cm)
	Half Sleeve	2.75 (90-91 cm)
	Full Sleeve	3 (36")	
<i>Women's Apparel</i>			
(1)	Salwar	3 (45")	2.75 (114-115 cm)
(2)	Kameej	2 (45")	1.85 (115 cm)
		2 $\frac{1}{2}$ (45")	2.05 (115 cm)
(3)	Sarees	5 (45"-48")	4.50 (115-125 cm)
		5 $\frac{1}{2}$ (45"-48")	5.00 (115-125 cm)
		6 (45"-48")	5.50 (115-125 cm)
		7 (45"-48")	6.50 (115-125 cm)
		8 (45"-48")	7.25 (115-125 cm)
		9 (45"-48")	8.25 (115-125 cm)
(4)	Blouses	1 (36")	0.90 (90 cm)
(5)	Petticoat	12 $\frac{1}{2}$ (36")	2.30 (90-91 cm)

Recent Notifications

(1) Area

S.O.No. 2940 dated 24th September 1962.

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), as in force in India and as applied to the State of Pondicherry, the Central Government hereby appoints the 1st day of October 1962 as the date on which the provisions of the said Act, in so far as they relate to units of area, shall come into force in the whole of India except the State of Jammu and Kashmir and in the State of Pondicherry, except in relation to transactions of those classes of undertakings or those Government departments in respect of which the said provisions have already come into force.

S.O. No. 2941 dated 24th September 1962.

In exercise of the powers conferred by section 14 of the Standards of Weights and Measures Act, 1956 (89 of 1956), as in force in India and as applied to the State of Pondicherry, 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. 2940 dated the 24th September 1962 the continuance of the use—

- (a) in the case of transactions relating to and involving the area of land, for a period of three years,
 - (b) in the case of any other transaction, for a period of six months,
- from the first day of October 1962 of any

unit of area which immediately before that date was in use in respect of similar transactions in the said areas.

(2) Volume

S.O.No. 2942 dated the 24th September 1962

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), as in force in India and as applied to the State of Pondicherry, the Central Government hereby appoints the 1st day of June, 1962 as the date on which the provisions of the said Act, in so far as they relate to units of volume, shall come into force in the whole of India except the State of Jammu and Kashmir and in the State of Pondicherry, except in those classes of undertakings or those Government Departments in respect of which the said provisions have already come into force.

S.O.No. 2943 dated 24th September 1962

In exercise of the powers conferred by section 14 of the Standards of Weights and Measures Act, 1956 (89 of 1956), as in force in India and as applied to the State of Pondicherry, 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. 2942 dated the 24th September 1962 continuance of the use for a period of six months from the 1st of October, 1962, of any unit of volume which immediately before that date was in use in respect of the said areas.

(3) *Prices of Various Varieties of Paper & Paper Board*
No. Ch. (1)-17 (130)/60 dated the 21st June 1962.

In their Resolution No. Ch. (1)-41 (79)/59, dated the 27th November, 1959, the Government of India had *inter alia* announced fair ex-works ceiling prices of various varieties of paper and paper board to take effect from 1st January, 1960.

The manufacturers of paper have represented that these prices should be increased on account of various factors leading to a higher cost of production. After considering all relevant aspects it has been decided to give an *ad hoc* increase of 6 (Six) nP. per kilogram for all the varieties of paper. On this basis the prices for the various varieties of paper have now been fixed as under:

	Fair Ex-works price nP. per kilogram	Civil selling price nP. per kilogram*
1. White printing .. .	132	155
2. Ubleached Printing .. .	125	147
3. Offset/Cartridge .. .	132	155
4. Antique-Laid/Wove .. .	132	155
5. Cream-Laid/Wove .. .	137	161
6. Imitation Art .. .	132	155
7. Art Paper .. .	201	230
8. Chromo Paper .. .	176	203
9. Ledger Paper— Account Book .. .	132	155
Azurelaid .. .	139	162
10. Banks & Bonds .. .	150	174
11. Typewriting .. .	157	183
12. Manifold/Airmail .. .	195	223
13. Duplicating .. .	132	155
14. Poster Paper .. .	132	155
15. Kraft .. .	120	142
16. Wrappers .. .	117	139
17. Cover Paper .. .	132	155
18. Match Paper .. .	126	149
19. Blotting Paper .. .	145	169
20. Pulp Board .. .	132	155
21. Duplex Board .. .	132	155
22. Ticket Board and Triplax Board .. .	130	153
23. Art Board .. .	189	217
24. Chromo Board .. .	164	189

(Exclusive of excise duty, State Govt. or Local Levies).
It has also been decided that the rebate on reels hitherto allowed by the Paper Industry be discontinued.

The prices and discontinuance of rebate mentioned above will come into force with immediate effect.

High Finish for Laboratory Weights

The National Bureau of Standards is working out a method for achieving a smooth hard finish on stainless steel, a material which is now becoming popular for laboratory weights. It is based on the diamond burnishing technique evolved by Hull. Specimens of stainless steel cylindrical bars, when subjected to this technique, gave surface finishes which met the requirements for laboratory weights. They had a hard surface finish with an average smoothness to within 3 micro inches (0.75 microns). Long-term tests are now under way to investigate the suitability of the diamond burnishing method for fabricating scientific reference mass standards. (*NBS Technical News Bulletin*, June 1962, pp. 70-71)

Metric System for UPSC Examinations

It is understood that the Union Public Service Commission will use both the foot-pound-system and the metric system for the examinations to be held during the period 1965-70. From 1970 onwards, only the metric system would be used.

Metric System in Building Industry

In compliance with the recommendation of the Conference on Adoption of Metric System in Building, Architecture and Town Planning held in September 1960, the Central P.W.D. has undertaken the preparation of various types of Specifications in metric system. So far, the Central P.W.D. has brought out two documents: the first one relating to Specifications in Metric System for Works at Delhi sub-head 'Brick Work', and the second one deals with Delhi Schedule of Rates 1955 in Metric Units. These books are available at Rs. 2.50 and Rs. 5 respectively, from the Financial Adviser to the Chief Engineer, Central P. W. D., L-Block, New Delhi.

METRIC CONVERSION TABLES FOR EVERYDAY USE, (English) published by Publications Division, Ministry of Information and Broadcasting, Old Secretariat, Delhi, 6; August 1962; Price Re. 0·60; pp. 52.

The use of the various metric weights and measures is gradually becoming compulsory in India. The use of metric weights has become compulsory from 1 April 1962, that of metric length measures from 1 October 1962 while only metric capacity measures will be used on an India-wide scale from 1 April 1963. In the wake of these changes it is necessary that people should become familiar with the conversion of weights to assess their requirements in the new units and that of prices to judge the fairness of the conversion of prices. There have been cases where traders have charged higher prices for commodities sold in metric units than warranted by straight conversion. This book that Publications Division has brought out on behalf of the Ministry of Commerce and Industry is, therefore, timely.

There are 40 tables in this book, divided into 4 sections. The first section relates to the pricing units for wholesale and retail transactions and the correct abbreviations to be used for metric units. These tables are important because trade all over India should use rational metric units for transactions. The units prescribed for wholesale and retail trade should find use in the trade carried out in every village, town and city. Abbreviations indicated here should also be rigorously followed if confusion about meaning is to be avoided.

The second section tabulates the conversion of weights and measures of one type to another. It comprises 19 tables and covers the whole range of the normal day-to-day requirements of conversion of weights and measures. A long table of requirements of cloth for various types of apparel as also recommended sizes for ready-to-wear dresses has also been included.

The Third section consisting of 15 tables is devoted to the conversion of prices from non-metric units to metric units. This section will be found useful not only by the average consumer but also by the retail and wholesale traders.

The fourth section deals with tables of the international paper sizes which have been recommended for use in future as also the sizes to be used for various types of publications.

The book has been very well printed and the tables are easy to read. The tables are bound to prove useful to all who have to enter into commercial transactions, which means 'everybody above the age of 10 years: For the price, the book is cheap.

OUR MODEL ARITHMETIC: BOOK—I

(English) K. Suryanarayanan, Principal and T. Rajagopalan, Vice-Principal of the M.E.A. Higher Secondary School, New Delhi; published by Cambridge Publishing House, Kasturi Niwas, Rehgarhpura, New Delhi-5; 1962; pp. 208; price Rs. 2·75.

The success of the adoption of metric system is directly proportional to the extent to which we are quickly able to train the

younger generation in the proper use of metric system for daily requirements as also in subjects they learn in schools and colleges. It is, therefore, necessary that students should start on the correct approach to the metric system as early in their life as possible, if we have to derive the maximum benefits from the new system. The use of the correct units in commercial transactions, their relation to currency and their applicability in daily life are all a part of arithmetic. It is, therefore, necessary to start the students as early as possible in their life on the study of the metric system in their school career.

The present book, which is intended for class VI or its equivalent standard, is, therefore, welcome. The authors who are themselves experienced teachers, have taken great care to use only the metric system of units and that too rationally, in this book. The introduction of the various metric units has been done in a very easy manner and correct abbreviations have been used. The subject has been introduced logically and precisely.

This book represents a laudable effort in the introduction of the metric system in school textbooks and is, therefore a step in the right direction. The book has been printed well, the important points being given in bold letters to catch the eye. It is sure to prove useful.

It is hoped that in the very near future,

the authors will undertake the task of writing textbooks for higher classes as well.

BHAGIRATH—EIGHTH ANNIVERSARY NUMBER

Bhagirath, a magazine sponsored by the Central Water and Power Commission, Ministry of Irrigation and Power, has brought out its July 1962 issue as its Anniversary Number. With this issue the monthly enters the ninth year of its publication. This issue contains well illustrated articles of national and international importance by eminent people in the field.

Bhagirath has been in the forefront in using metric units in the articles published in its pages. The FPS units are also given by it for information. *Bhagirath* is thus doing an excellent job of taking the metric system to the engineers and others working in the field of irrigation and power.

DESIGN OF PRESTRESSED CONCRETE STRUCTURES

M/s. Sahu Cement Service has published a booklet called *Design of Prestressed Concrete Structures*. The book is meant for a Post Graduate Course and is very brief and simple. It gives formulas and methods for practical calculations for design engineers.

It is gratifying to see that throughout this booklet only the metric system has been used for all calculations. It is hoped that M/s. Sahu Cement Service will bring out their future publications using only the metric system.

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

Indian Standard Protractors for Use of Drawing Offices (IS: 1563-1962)

The Indian Standards Institution has published an Indian Standard Specification for Protractors for Use of Drawing Offices (IS: 1563-1962), which covers requirements for three types, namely, circular, semi-circular, and rectangular protractors, commonly used by cartographers, surveyors and engineers for measuring angles or laying out angles of given values and checking angular works.

Metric system has been adopted in India and all the values in this standard have been given in this system.

Price: Rs. 2.50

Revised Indian Standard for Glass Liquor Bottles (IS: 1662-1962)

The Indian Standards Institution has published a revision of Indian Standard Specification for Glass Liquor Bottles (IS : 1662-1962), which prescribes the requirements and the methods of test for glass liquor bottles.

This standard was originally published in 1960 prescribing three sizes of liquor bottles in rationalized metric units, and was intended to cover the needs of all types of liquor and beer. However, the requirements for liquor bottles and beer bottles being different, it was decided to cover them in separate standards. A few more additional sizes in the range have been

included in order to meet the needs of industry in respect of liquors and beers of every type used both for internal and export markets.

With a view to enabling the packers of the liquor to retain the individuality of the shapes and dimensions of the bottles used by them, the same have not been specified in this standard.

Price: Rs. 2.00

Indian Standard for Schedule of Unit Weights of Building Materials (IS: 1911-1961)

The Indian Standards Institution has published an Indian Standard Schedule of Unit Weights of Building Materials (IS: 1911-1961), which lays down unit weights of materials and parts or components used in building construction. The unit weights of other materials that are likely to be stored in a building are also specified in this standard for the purpose of load calculations.

Structural calculations for any building involve a knowledge of the weights of various building materials and weights of materials that are likely to be housed or stored in the building. This standard aims to guide the designer in regard to the weights of building materials, building components and stored materials that are encountered during the course of normal building design.

Metric system has been adopted in India and all quantities and dimensions in this standard have been given in this system.

Price : Rs. 6.00

Indian Standard for Equivalent Metric Units for Quantities in Mechanical Engineering (IS: 1926-1961)

The Indian Standards Institution has published

shed Indian Standard Equivalent Metric Units for Quantities in Mechanical Engineering (IS : 1926-1961). The standard lays down the equivalent metric units for various dimensions and quantities met with in the mechanical engineering field and hitherto expressed in fps units.

Pursuant to the decision of the Government of India to introduce a uniform system of weights and measures based on the metric system, different Government departments, major industries and trade interests are proceeding to change over to the metric system in their respective spheres of operation. The Indian Standards Institution has already published a series of Indian Standards for metric weights and measures and for interconversion of inch and metric units. This Indian Standard prescribes the equivalent metric units for various quantities in mechanical engineering which have hitherto been expressed in the fps system. In the choice of these units, two important considerations have been kept in mind, namely, the new unit chosen should be rational and it should have a direct understandable relationship with the basic unit.

Price : Rs. 4-00

Indian Standard for Steel Rivet and Stay Bars for Boilers (IS 1990-1962)

The Indian Standards Institution has published an Indian Standard Specification for Steel Rivet and Stay Bars for Boilers (IS : 1990-1962).

Metric system has been adopted in India and all quantities and dimensions appearing in this standard have been given in this system. Corresponding non-metric values have also been given, wherever necessary, for the sake of smooth changeover by December 1966.

Price : Rs. 1-50

Indian Standard for Dimensions for shaft Height for Driving and Driven Machines (IS:2031-1962)

The Indian Standards Institution has published (IS: 2031-1962) Indian Standard

Dimensions for Shaft Height for Driving and Driven Machines, which cover the heights (from 25 to 1 600 mm), tolerances on height and parallelism for shafts of driving and driven machines.

Manufacture of prime movers as diesel engines, electric motors, etc. has been established in the country and these machines are coupled to other driven machines, such as generators, pumps, agricultural implements, etc. To ensure that the designs are worked out making interchangeability possible amongst different makes of machines the need for formulating an Indian Standard on the heights of shaft for driving and driven machines was felt necessary.

Price: Re. 1-00

Indian Standard for Butter Tins (IS:2034—1961)

The Indian Standards Institution has published an Indian Standard Specification for Butter Tins (IS: 2034-1961), which prescribes the requirements of round open top containers manufactured from tinplate for packing 200 g and 400 g of butter.

With the development of dairy industry in the country the production and distribution of butter is expected to increase considerably with possibilities of export also. At present, butter is being packed and marketed in a large variety of tinplate containers in non-metric capacities, in addition to the paper packages. Rationalization of the sizes of these tins and their dimensions in metric units will assist standardization work in connected industries and will result in an overall economy. It is also considered necessary to prescribe other requirements so as to ensure the delivery of the product in good condition to the consumers. The Union Ministry of Food & Agriculture, therefore, desired the formulation of an Indian Standard giving preferred sizes and dimensions in metric units of the butter tins and prescribing other essential requirements.

Metric system has been adopted in India and all quantities and dimensions in this standard are given in this system. However, non-metric values to which the industry has been accustomed have also been given in brackets, wherever necessary.

Price: Re 1.50

Indian Standard for Square Tins for General Purposes (IS : 2087-1962)

The Indian Standards Institution has published an Indian standard Specification for Square Tins for General Purposes (IS : 2087-1962) which prescribes the requirements of square built up tins manufactured from tinplate.

Square built up tins are used for packing vanaspati confectionery and a variety of other products. With the introduction of the metric system of weights and measures in India, it has become necessary to recommend a rationalized series of square tinplate containers in the metric system for packing these products. In formulating this standard, the technical committee responsible for its preparation has kept in view the current trade practices followed in the country in this field.

Each tin in this standard is designated with a tin-reference number for ease of reference. Containers of three classes are prescribed in this standard depending on the use they will be put to and suitable tests for the three classes are also given.

Metric system has been adopted in India and all units and dimensions appearing in this standard are given in this system. Non-metric equivalents to which the industry is used are also given in brackets for facilitating smooth changeover by December 1966.

Price: Rs. 2 00

Indian Standard for Glass Beer Bottles (IS : 2091-1962)

The Indian Standards Institution has published an Indian Standard Specification for Glass Beer Bottles (IS : 2091-1962), which

prescribes the requirements and the methods of test for glass beer bottles.

An Indian Standard Specification for Glass Liquor Bottles (IS : 1662) was originally published in 1960 to cover liquor bottles as well as beer bottles and to provide a rationalized range of nominal capacities in the metric system common to both. Subsequently, it was decided to formulate a separate specification for glass beer bottles and hence, this standard has been issued.

With a view to enabling the packers of liquor to retain the individuality of the shapes and dimensions of the bottles used by them the same have not been specified in this standard. Due consideration has also been given to the current trade practices in prescribing the sizes and tests for glass bottles.

Price : Rs. 2.50

Indian Standard for Steel Billets, Bars and Sections for Boilers (IS : 2100-1962)

The Indian Standards Institution has published an Indian Standard Specification for Steel Billets, Bars and Sections for Boilers (IS : 2100-1962) which covers the requirements for two grades of plain carbon steel billets, bars (other than rivet and stay) and section for boilers.

Metric system has been adopted in India and all quantities and dimensions in this standard have been given in this system. Corresponding non-metric values are also given wherever necessary, for the sake of smooth changeover by December 1966.

Price: Rs. 2.00

Draft Indian Standard for Recommendations for Modular Co-ordination Applied to R.C.C. Framed Structures (Doc: BDC 10 (564))

The Indian Standards Institution has prepared a draft Indian Standard Recommendations for Modular Co-ordination Applied to R.C.C. Framed Structures Doc : BDC 10 (564), which provides guidance for using the system of modular planning; it deals

with the layout and preferred dimensions of R.C.C. structural members like Columns, Beams, Slabs, etc. which may be laid at site in such a way that standard modular components will go into spaces, recesses and openings provided in the structure, with minimum cutting and wastage.

Building industry until now has been employing methods which involve a lot of site cutting of building materials and components resulting in waste and increased building costs. This draft standard is an attempt to rationalize dimensions of R.C.C. structural members with a view to achieving economy in building.

The draft standard will be circulated shortly to all interests concerned for eliciting technical comments.

Draft Indian Standard for Parallel Keys and Keyways for Machine Tools

With a view to ensuring interchangeability of the keys used on machine tools, the Indian Standards Institution has prepared a draft Standard Specification for Parallel Keys and Keyways for Machine Tools. Parallel key is a commonly used component required for positive transmission of power.

The draft standard prescribes the dimensions and tolerances for parallel keys for machine tools suitable for shaft diameter range 10 to 170 mm and the material for key bars.

This draft standard will be circulated shortly to interested producers, consumers and technologists for eliciting technical comments.

Draft Indian Standard for Boundary Dimensions for

Ball and Roller Bearing for General Engineering purposes (Doc: EDC 39 (574))

Standardization of bearings in the past been mainly the result of the demand for dimensional interchangeability among the bearings manufactured by different manufacturers. However, it has been realized that for satisfactory performance the bearings should also satisfy, in addition to dimensional interchangeability, the basic minimum running accuracies.

To ensure the interchangeability and running accuracies, the Indian Standards Institution has prepared a draft Indian Standard Boundary Dimensions for Ball and Roller Bearings for General Engineering Purposes, Doc : EDC 39 (574), which prescribes boundary dimensions, tolerances and running errors of ball and roller bearings,

The draft standard will shortly be put into wide circulation to manufacturers, consumers, technologists and other interested for their critical comments and suggestions for improvements.

Draft Indian Standard for Baby Weighing Machines (Doc: EDC 41(679))

The Indian Standards Institution has prepared draft Indian Standard Specification for Baby Weighing Machines Doc : EDC 41 (679), which covers the requirements for baby weighing machines.

The draft standard will shortly be issued into wide circulation to the interested producers, consumers, technologists and others concerned for eliciting technical comment.

CORRECTION

Shri V. P. Gokhale, Principal, Government College of Agriculture, Parbhani has pointed out an error which may be corrected as follows :

On p. 20 of July 1962 issue of *Metric Measures*, read '1/16 seer or chhatak (equivalent to 58 grams) 50 grams' for the present entry.

Licensed Manufacturers, Dealers and Repairers of Weights and Measures (22)

Metric Measures has been publishing a series of lists of manufacturers, dealers and repairers and weights and measures, weighing and measuring instruments licensed by the Governments in the various States and Union Territories under the Weights and Measures (Enforcement) Act in their respective jurisdiction. This is the twenty-second 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 States or Union Territory. The issues of the *Metric Measures* in which previous lists appear are shown suitably.

An analysis of the licensees, including the present list, shows that the total number of licensees in 14 States and 5 Union Territories is 1,190 manufacturers, 4,680 dealers, and 1,100 repairers. The details of published information area as follows:

Sl. No.	State/Union Territory	Licensees		
		Manufacturers	Dealers	Repairers
(1)	Andhra Pradesh	101	194	54
(2)	Assam	16	97	28
(3)	Bihar	20	69	34
(4)	Delhi	28	93	20
(5)	Gujarat	115	625	139
(6)	Himachal Pradesh	1	28	1
(7)	Kerala	52	415	123
(8)	Madhya Pradesh	115	496	9
(9)	Madras	7	828	126
(10)	Maharashtra	101	163	185
(11)	Manipur	14	85	5
(12)	Mysore	104	471	165
(13)	Orissa	87	17	3
(14)	Pondicherry	2	12	2
(15)	Punjab	39	157	29
(16)	Rajasthan	43	206	44
(17)	Tripura	1	9	0
(18)	Uttar Pradesh	207	515	8
(19)	West Bengal	65	200	55
		1,190	4,680	1,110

GUJERAT (5)

In the March, September and November 1961 and May 1962 issues of Metric Measures lists of manufacturers, dealers and repairers in Gujerat were published. The following is a list of manufacturers, dealers and repairers subsequently licensed under the Bombay weights and Measures (Enforcement) Act, 1958:

Manufacturers

Sl. No.	Name / Address of the Manufacturers	Details of Articles Manufactured
(1)	Abbasbhai Taherali Ahmedabadwala, 4/871, Chevli Sheri-Naka, Station Road, Surat.	Conical Capacity Measures.
(2)	Dhanji Mavji Luhar, Zinzuda Gate, Savarkundla	Beam Scales Class C.
(3)	Dodia Iron Works, Opp. Padshah Pole, Relief Road, Ahmedabad.	Non-Flexible Metre Measures.
(4)	Khodidas Zinabhai Luhar, Near Rajpipala Sub-Jail, Rajpipla, Dist. Broach.	Beam Scales Class C. & D.
(5)	Manji Pole Luhar, Zinzuda Gate, Savarkundla	Beam Scales Class C.
(6)	S. V. Pathak, Jamadarpada, Savarkundla	Beam Scales Class C.

Dealers

Sl. No.	Name/Address of the Dealers	Details of the Articles Sold.
(1)	Akbarali Rasulji, Opp. Gandhiji's Statue, Bulsar, Dist. Surat.	Metric Commercial Weights, Measures, Weighing & Measuring Instruments.
(2)	Anilkumar & Co. Madhavpur (Ghed) P.O. Keshod	Weights, Measures, Weighing & Measuring Instruments.
(3)	Bahadarji Fakiraji Khatri, Near Post Office, Bodeli, Dist. Baroda.	Weights, Measures, Weighing & Measuring Instruments.
(4)	Bhagwanbhai Bhudarbhai Thakkar, Bazar, Harij, Dist. Mehsana.	Do.
(5)	Chotalal Dalsukhbhai Panchal, Station Road, Waghodia, Dist. Baroda.	Do.
(6)	Chandulal Laxmichand Doshi, Bazar, Vadali, D.S K. ..	Do.
(7)	Chunrilal Jeshaji, Bazar Vyara, Dist Surat	Do.
(8)	Dhansukhlal Pitamberdas Modi, Unai, Dist. Surat ..	Do.
(9)	Dahyalal Manilal Shah, Nava Bazar, Idar, Dist. Sabarkantha.	Do.
(10)	Dahyalal Joitaram Panchal, Mator, Vadnagar, Dt. Mehsana.	Do.
(11)	Dineshchandra Chhotalal Modi, Kala Vasudev Chachare, Vadnagar, Dist. Mehsana.	Do.
(12)	Fulchandras Pursottamdas Mehta, Bazar Kalol, D.P. Mahals	Do.
(13)	Ghanchi Hasam Umat & Bros., Near Old Bus Stand, Mandvi (Kutch).	Weights, Measures & Weighing Instruments
(14)	Gokaldas Sunderji, Bazar, Manavadar	Do.
(15)	Gunvantrai & Bros., Tana (Via Sihor)	Weights, Measures, Weighing & Measuring Instruments.
(16)	Haidarali Tayyabli, Nava Bazar, Miyagam-Karjan, Dist. Baroda.	Weights, Measures & Measuring Instruments.
(17)	Hajimulla Abdul Husseini Haji Salemanji & Sons, Outside Murila Gate, Kalavad. (Sitla).	Weights, Measures, Weighing & Measuring Instruments
(18)	Jadav Electric Repairing Works, Thondaly Compound, Bachubhai's Street, Junagadh.	Weights, Measures, Weighing & Measuring Instruments.

Dealers (Contd.)

(1)	(2)	(3)
(19)	Janta Hardware Stores, Malpur, Dist. Sabarkantha.	Weights, Measures, Weighing & Measuring Instruments.
(20)	Jethalal, Keshavlal Panchal Bazar, Mehmedabad, Dist. Kaira.	Do.
(21)	Jivabhai Bhijubhai, Gandhi Bazar, Mehmedabad Dist. Kaira.	Do.
(22)	Kadarbhai Haji Amibhai Meman, Ghee-Kanta Bazar, Radhanpur, Dist. Banaskantha.	Do.
(23)	Kanaiyalal Nagindas Shah, Kacheri Road, Pavi Jetpur, Dist. Baroda.	Do.
(24)	Kanchanlal Mahasukhlal Shah, Timba-Road, D.P. Mahals.	Do.
(25)	Kasturbhai Narsinghbhai Soni, Bhavsarwad, Nadiad, Dist. Kaira.	Do.
(26)	Luhar Dhanj Mavji, Zinzuda Gate, Savarkundla . . .	Weights, Measures & Weighing Instruments.
(27)	Luhar Mulji Naran, Manibhai Road, Savarkundla . . .	Weights, Measures, Weighing & Measuring Instruments.
(28)	Lalubhai Mithabhai & Co. Lokhandwala, Bodeli, Dist. Baroda.	Weights, Measures, Weighing & Measuring Instruments
(29)	Lallubhai Maganlal & Sons, Sadar Bazar, New Deesa, Dist. Banaskantha.	Do.
(30)	Madhusudan Morarji & Co., Bazar, Mahia Hatina . . .	Weights, Measures, Weighing & Measuring Instruments.
(31)	Makwana Iron Works, Oad Wada, Savarkundla . . .	Weights, Measures, Weighing & Measuring Instruments.
(32)	Mistry Karsan Jeram & Co., Nadi Kantha, Savarkundla.	Weights, Measures & Weighing Instruments.
(33)	Mullah Amarbhai Noorbhai & Sons., Moti Bazar, Gondal	Weights, Measures, Weighing & Measuring Instruments.
(34)	Narottamdas Madhavji Oil Mill, Station Road, Unjha, Dist. Mehsana.	Weights, Measures, Weighing & Measuring Instruments.
(35)	Prafulchandra Narbheram & Co, Station Road, Bagasara.	Weights, Measures, Weighing & Measuring Instruments.
(36)	Ramdas M. Nathadwarawala, Bank Road, Baroda . .	Weights, Measures, Weighing & Measuring Instruments.
(37)	Rameshchandra & Bros., Bazar, Mansa, Dist. Mehsana .	Do.
(38)	Ranchhoddas Vithaldas Kansara, Bazar, Umbargam, Dist. Surat	Do.
(39)	Rasiklal & Co., Nehru Road, Jamjodhpur . . .	Weights, Measures, Weighing & Measuring Instruments.
(40)	Shah Amratlal Panachand & Co, Opp. Court, Mahia Hatina	Weights, Measures & Weighing Instruments.
(41)	Shankarlal Mohanlal Choksi, Kapad Bazar, Sidhpur, Dist. Mehsana.	Weights, Measures, Weighing & Measuring Instruments.
(42)	Vajlal Premji & Bros, Jamandorana . . .	Weights, Measures, Weighing & Measuring Instruments
(43)	S. J. Shrimankad & Co., Para Bazar, Rajkot	Do.
(44)	Sutar Devshi Bhimji, Vanda (Via-Savarkundla) . .	Weights, Measures & Weighing Instruments.
(45)	Vadilal Ambalal Shah, Bazar, Haldharvas, Dist Kaira	Weights, Measures, Weighing & Measuring Instruments.
(46)	Vyas Chhotalal Kalyanji, Old Vegetable Market, Dharangdhra.	Weights, Measures, Weighing & Measuring Instruments.
(47)	Vithaldas Pitambardas Kansara, Sardar Vallabhbhai Patel Road, Vapi, Dist. Surat.	Weights, Measures, Weighing & Measuring Instruments.

LICENSED MANUFACTURERS, DEALERS & REPAIRERS OF WEIGHTS & MEASURES

Repairers

Sl. No.	Name/Address of the Repairer	Details of The Articles Repaired
(1)	Chhabildas Zinabhai Mistry, Sonifaha, Abrama, Dist. Surat.	Weights, Measures, Weighing & Measuring Instruments.
(2)	Dahyalal Jotiram, Panchal Mator, Vadnagar, Dist. Mehsana.	Do.
(3)	Kansara Ramji Byanji, Kansara, Bazar, Anjar	Weights
(4)	Luhar Dhanji Mavji, Zinzuda Gate, Savarkundla.	Measuring Instruments.
(5)	Luhar Vallabhdas Raghavji, Shroff Bazar, Saredi Pith Dela, Bhavnagar.	Do.
(6)	Mistry Hira Rana, Near Ahir Bhuvan, Janata Chowk, Junagadh.	Do.
(7)	Mistry Jadav Naran, Amratvel Gate, Savarkundla ..	Do.

KERALA (9)

In the November 1959, March and November 1960 and January and September 1961 and May 1962 issues of Metric Measures lists of licensed manufacturers, dealers and repairers of weights and measures in Kerala State were published. The following is a list of manufacturers, dealers and repairers subsequent licensed by the Government of Kerala under Kerala Weights and Measures (Enforcement) Act, 1958:

Manufacturers

Sl. No.	Name and Address of Manufacturer	Details of Article Manufactured
(1)	M. Aboobacker, Thamaravelli House, Danapady Haripad Kathigapally Taluk.	Dry Measures (2 litres and below)
(2)	Balaram & Co., Popully P. O , Palghat	Half Metre Length Measure only.
(3)	S. Chellppan Pillai, National Metal Industries, Mundakkal Middle Ward, Quilon.	Conical & Dry Measures.
(4)	Eavi Industries, Ankamaly, Ernakulam.	Dry Measures
(5)	K. R. Karthikeyan, Agricultural Implements, Market Road, Ernakulam.	Dry Measures
(6)	K. P. Kani Rowther, Tin Manufacturing Co., Athirampuzha	Dry Measures.
(7)	M. V. Kunjippaly, High Road, Trichur	Dry Measures.
(8)	P. B. Nadarajan Chettiar, Selva Industries, Shethalai ..	Dry Measures (2 litres and below)
(9)	Prasanna Metal Industries, South Paravoor, Quilon ..	Conical & Dry Measures.
(10)	Southern Metal Industries, Mannar, Chengannur, Alleppey, District.	Dry, Pouring and Dipping Type Measures.
(11)	A. Subramonian Asari, Muthupurayidam, Thiruvampady, Alleppey.	Beam Scales (C & D (Classes) only.
(12)	Venus Metal Industries, Cloth Bazaar Road, Ernakulam ..	Conical Measures.

Dealer

Sl. No.	Name and Address of Dealer	Details of Articles Sold
(1)	Abraham Varghese, Hardware Merchant, Ponkunnam P.O., Kottayam.	Weights, Measures, Weighing & Measuring Instruments.
(2)	P.H. Abdul Kader, Hardware Merchant, Baliapatanam, Cannanore.	Weights, Measures, Weighing & Measuring Instruments.
(3)	Associated Engineering Corporation Ltd., Kozhikode ..	Weights, Measures, Weighing & Measuring Instruments.

Dealers (Concl'd.)

(1)	(2)	(3)
(4)	Aspinwall & Co., Ltd., Post Box No. 2, Cochin-2	Weights, Measures, Weighing & Instruments.
(5)	P. R. Gangadhara Panicker, Hardware & Paint Stores, Perookkada, Trivandrum-5.	Weights, Measures, Weighing & Measuring Instruments.
(6)	General Stores, Kattoor, Trichur	Weights, Measures, Weighing & Measuring Instruments.
(7)	E. M. Haneefa, Iyla Gunny Store, Chinnakada, Quilon ..	Weighing Instruments.
(8)	Kerala State Co-operative Marketing Federation Ltd., P.B. No. 80, Beach Road, Calicut.	Weighing Instruments.
(9)	K. C. Mathew, Kadasseril Stores, Erumely, Kottayam .	Weights, Measures, Weighing & Measuring Instruments.
(10)	Marikar & Co., Ltd, No. 21, Bazaar Munnar P.O., High Range, Kottayam.	Weights, Weighing and Measuring Instruments.
(11)	N T. Paul, Hardware Merchant, Njattathuvayilli Stores, Kanjirapally.	Weights, Measures, Weighing & Measuring Instruments.
(12)	Punnen Kurien Mudamthadathil House, Mannanam, Arpookara P.O., Kottayam.	Measures
(13)	G. R. Prabhu & Sons, Paper & Office Stationers, K K. Road, Kottayam.	Weights, Measures, Weighing & Measuring Instruments.
(14)	Thomas & Chandy, Stationery Merchants, T. B. Road, Kottayam.	Weights & Weighing Instruments.
(15)	Secretary, T.C.D.S. Ltd, No. 4, Puthenohanthai, Trivandrum	Weights, Measures, Weighing & Measuring Instruments.
(16)	Western Medical Stores, Musalar Buildings, Quilon ..	Weights & Measuring Instruments.

Repairers

Sl. No.	Name and Address of the Repairers	Details of Articles Repaired
(1)	Jeevan Industries, Kottayam	Platform Machines and Beam Scales
(2)	Metric Scale Industries, Mukundapuram Taluk, Irinjalakuda.	Platform Machines.
(3)	A. Moosa, Arimbrathodiyil House, Jubili Road, Parinthalmanna P.O.	Beam Scales C & D Classes.
(4)	A. K. Rahem, Pazhayasala Street, T. C. 32/817, Aryasala, Trivandrum.	Beam Scales & Platform Machines.
(5)	K Ramakrishnan Kartha, Painter, C1-172, Perinthalmanna Town, Palghat.	Beam Scales C & D Classes.
(6)	M. K. Rabindranath, Empire Hotel Building, Volkart Lane, Tellicherry.	Platform Machines only.
(7)	On J. Thomas, Nedumpunchayil, Vadavatoor, Vijayapuram, Village, Kottayam Taluk.	Beam Scales C & D Classes.

The following licences of Dealers granted under Kerala Weights & Measures (Enforcement) Act, 1958 are cancelled as the licensees have not applied or the renewal for the year 1962-63:

- | | |
|---|---|
| (1) K. J. Jacob, Jacob's Engineering Works, Thampanoor, Trivandrum. | (5) Chavara Block Artisans Industrial Co-operative Society Ltd., Thevalakara, Quilon. |
| (2) Jayaraj Foundry & Engineering Works, Maller Road, Tellicherry. | (6) Bharat Repairing & Sales Corporation Panchayat, Court Road, Cannanore. |
| (3) Saint Jos Casting Industries, Palarivattom P.O., Ernakulam. | (7) C.T. Joseph, Cheevali House, Bolghaty, Ernakulam. |
| (4) Joseph Rodrigues & Sons, Metal Merchants, Jalloor Road, Kasargod. | (8) R. Bhaskaran Nair, Radhakrishna Motor Works, Quilon. |

- (9) M. S. Damodaran, Manjummel House, Palluruthy P.O., Ernakulam.
- (10) N. A. Lonappan Sons, Hardware Merchant, High Road, Trichur.
- (11) C. K. George, Cheriakottakkal House, Kalloupara, Thiruvalla Taluk.
- (12) Jayaraj Foundry & Engineering Works, Maller, Tellicherry.
- (13) Scales & Services, Ramanarayana Buildings, Logan's Road, Tellicherry.
- (14) Bharath Repairing & Sales Corporation, Cannanore.
- (15) M. K. Mohammed Naina, Bharkath Metal Industries, Chalai, Trivandrum.
- (16) Mather Stores, P B. No. 2, Trivandrum.
- (17) K. Kesavan Achari, Gold, Silver & Jewellers' Association, Chalai, Trivandrum.
- (18) S. Shahul Hameed, Hardware Merchant, Main Road, Attingal.
- (19) Hilal Traders, Main Road, Tellicherry
- (20) A. B. Cheekutty, Proprietor, Binny Engineering Industries, Cochin-5.
- (21) P. K. Raghunathan, Parathumveedu, Cochin-5.
- (22) P. N. Moorthy, Swamynath Industries, Vadatukotta, Quilon.
- (23) Mighty Scale Co., T. C. 92/1410 A, Uma Buildings, Chalai, Trivandrum
- (24) A. S. Mony, Mony, Industries, Virakupura Street, Fort, Trivandrum.
- (25) Avery Co. Ltd., Thamarakulam Road, Quilon
- (26) C. K. Mukundan, Mukunda Agricultural Implements & Steel Truck Works, Badagara.
- (27) M. N. Raghavan, S. N. Oil Mills, Chungom, Alleppey.
- (28) V. Chellappan, Vizhayil Vilagom Veedu, Karamana, Trivandrum-2.
- (29) K. Narayana Pillai, Allunkal Puthen Veedu, Nedumangad.
- (30) P. Viswanathan Chettiar, Baby Mandiram, Venjaramoodu.
- (31) K. A. Chami Achari, Majestic Industries, Karamanai, Trivandrum.
- (32) K. C. Kesavan, Kelezhath Parambu, Trikannarvattom, Ernakulam.
- (33) M. V. Kunji Palu, High Road, Trichur.
- (34) P. M. Imbichi Koya, Hardware Merchant, Neat Railway Gate, Kozhikode-1.
- (35) Y. N. Shenoy, Hardware Merchant, Andoor.
- (36) M. Maithen Kunju, Churkasseri & Co. Karunagapally.
- (37) T. P. Lonappan, Industrial Training Corporation, Chittoor, Palghat.
- (38) K.P.G. Menon, Construction House, Ottapalam
- (39) Syed Mohammed, Hammeed Sons, General Merchants, Alleppey.
- (40) M. V. Urumese, Kerala Hardware Stores, Market Road, Alwaye.
- (41) Irikkandiyur Producers'-cum-Consumers' Co-operative Society, No. F. 1254, Tirur.
- (42) Sulaiman, C/o V. M. Ibrahim, Cycle Shop, Ernakulam.
- (43) A. Krishna Bhat, Hardware Merchant, Cloth Bazaar, Ernakulam.
- (44) A. Balakrishna Iyer & Co., Iron Merchant, Ernakulam.
- (45) S. S. Sheriff, Sheriff Building, Punalur, Quilon Dt.
- (46) K. Chandrasekhara Pillai, General Merchant, Market Jn., Kottarakara P.O.
- (47) P. Alikutty, Hardware Merchant, Quilandy, Kozhikode Dt.,
- (48) Kamath & Co., Hardware Merchant, Swamimadam Road, Cannanore.
- (49) M. P. Kunhi Kannan, General Merchant, Court Road, Badagara.
- (50) Venkiteswara Stores, Hardware Stores, Tripunithura.
- (51) Mulanthuruthy Iron & Steel Industrial Co-operative Society, Tippunithura.
- (52) M. S. Pailo, Proprietor, Cochin Stores, Alwaye.
- (53) Mookan Devassy Ouseph & Sons, Mattancherry, Cochin.
- (54) A. P. Balan, Chirakkara, Tellicherry.
- (55) K. K. Varghese, Hardware Merchant, Malappally West Alleppey.
- (56) Krishna Kini, N., Logan's Road, Tellicherry, Cannanore.
- (57) C. V. Murugesan Mahalakshmi, G. S. Tools Store, Mullakkal, Alleppey.
- (58) K. A. Abraham & Co., Hardware Merchant, Ponkunnam P.O., Kottayam
- (59) K. Bava, National Stores, Court Road, Tirur.
- (60) C. A. Galiakotwal & Co., (P) Ltd., Cloth Bazaar, Ernakulam.
- (61) T. C. Koshy (Thoppil), Merchant, Puramattom.
- (62) P. K. Brothers, Huzur Road, Calicut
- (63) K. K. Kunjammarakkar & Son, Hardware Merchant, Ernakulam-1.
- (64) K. S. Balakrishnan Nair, Kudukal House, Chemmanathukara, Vaikom.
- (65) P. Mammoo, Stationery Merchant, Villiapaly, Badagara.
- (66) Bharat Repairing & Scales Corporation, Cannanore.
- (67) K. A. S. Jainudeen & Co., General Merchants, Chowghat.
- (68) M. Abdul Salam, Salam General Store, Nedumangad P.O.
- (69) Kovoov Bros, Hardware Merchants, Thiruvalla.
- (70) K. V. Chandy, Hardware Merchant, Thiruvalla.
- (71) C. H. Mammu, General Merchant, P.O. Cannanore.
- (72) V. Shiva Shenoy, Hardware Merchant, Tellicherry.
- (73) Hilal Traders, Main Road, Tellicherry.
- (74) A. P. Packer, Hardware Merchant, Taliparambu.
- (75) M. M. Chacko, Jewellers, Changanacherry.
- (76) S. Damodara Pai, Hardware Merchant, Alleppey.

- (77) T. M. Mohammed Abdul Kadir, Chalai, Trivandrum.
- (78) M. Ismail Kunju, Ismail Stores, Nedumangad P.O.
- (79) Ahmed & Bros., Camp Bazaar, Cannanore.
- (80) M. A. Mohammed, Brass Vessel Merchant, Chalai, Trivandrum.
- (81) S. K. Abubaker Haje, Universal Stores, Camp Bazaar, Cannanore.
- (82) P. K. Kesava Pillai, Usha Metals, Mavelikara.
- (83) C. P. Moideen, Metal Merchant, Robinson Road, Kozhikode. P.O.
- (84) Gemini Metal Co., Quilon.
- (85) U. B. Sivadasan, Proprietor, Weights & Measures, Calicut.
- (86) P. Kunji Koya, Minikketagem, Ediagara, Kozhikode.
- (87) M. Mohammed Ismail, Hardware & Tobacco Merchant, Kottakada.
- (88) K. Velayudhan Pillai, Hardware Merchant, Attingal.
- (89) S. Damodara Pai & Sons, Hardware Merchant, Kovilvattom Road, Ernakulam.
- (90) Shashi Mehta, 11/247, Mattancherry, Cochin.



DEAL *Only* IN METRIC LENGTHS

With the compulsory use of metric linear measure throughout the country from 1st October, 1962, transactions are now in terms of the metre.

Here are some equivalents of standard garment lengths. Familiarity with the new unit will help you to give up thinking in terms of yards.



SHIRT : 2 metres and 75 centimetres
(2.75 metres) instead of 3 yards



COAT : 2.75 metres } instead of
TROUSERS : 2.75 metres } 3 yards each

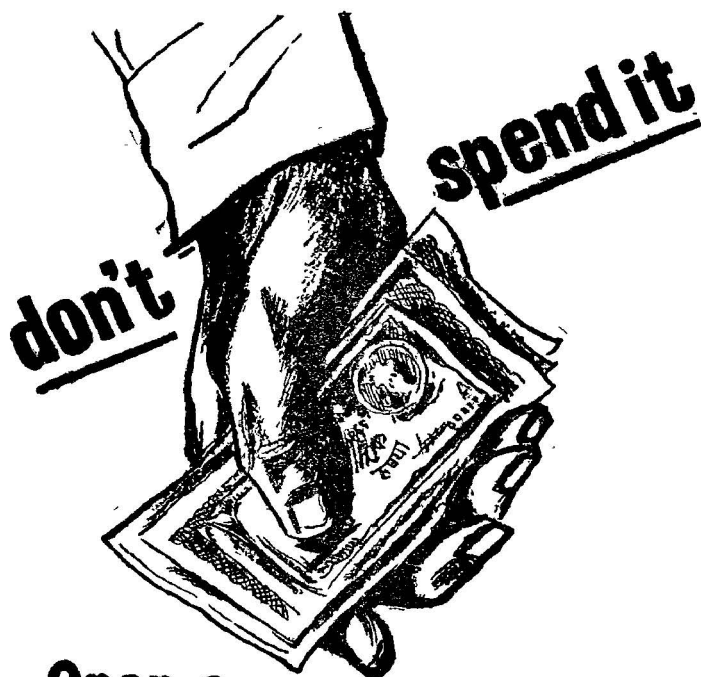


BLOUSE : 0.90 metre instead of 1 yard

A Sari of 6 yds. will be 5½ metres in length.

1 Metre = 1 yd.
and 3½ inches
If a yard of cloth
cost Re. 1.00 nP.,
a metre of the
same cloth
will cost Re. 1.09
nP.

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