the uncertainty of future requirements, it is clear that a warning is being sounded that we should be investing more in forests of the future.

Canada is still a resource dependent country. The place of renewable resources in the future cannot fail but become even more significant. Their value economically and their less measurable but real contribution to a quality environment must be recognized as worthy of increasing investment of public funds.

For too long, government support to renewable resources has been related to immediate returns from them. This is changing, but not fast enough. Better, more emphasis should be given to ensuring the renewability of resources which can be perpetuated and this investment should be related to long-term needs and to total government expenditures. Various social expenditures should likewise, where possible, aim to correct or improve our future use of the land and its bounties. / **CFA News**

1972 forest fires in B.C.

Last year was a "good" one for fires, comparatively speaking. There were only 1,903 forest fires in the province — compared with nearly 3,000 in 1971, and the record number of more than 4,000 in 1970. The 1972 firefighting costs (to the B.C. Forest Service) were approximately \$2,288,000. And direct firefighting costs to industry and other agencies totalled \$1.7 million. Fires in 1972 covered an estimated 64,413 acres, a relatively small area considering the 10-year average of nearly 230,000 acres.

Lightning, as usual, headed the list of causes with 583 blazes (30.7%). All the others, in one form or another, were what the Forest Service labels "people fires" — started by machinery and other equipment, or by pure human carelessness. Smokers, for instance, carelessly discarded cigarettes and cigars which started at least 267 forest fires, accounting for some 14% of the total.

Forest fertilization bibliography

Forest Fertilization, an annotated bibliography, has recently been issued by The Institute of Paper Chemistry. It contains 941 references in 261 pages. The main criterion for including references was the reporting of studies on the use of fertilizer or nutrient-containing materials such as organic residues, humus, and compost, in improving the growth of trees. Most of the references are studies on forest stands and plantations. Also included is the use of fertilizers in forest nursery management. In addition, studies on the nutrition of forest trees in the greenhouse, pot culture and hydroponics experiments are included. The price is \$25.00 from the Business Office, The Institute of Paper Chemistry, P.O. Box 1048, Appleton, Wis. 54911.

Handbook explains mass media

A Usually Reliable Resource is the name of a 33-page, pocket-sized handbook put out by the Canadian Science Writers' Association. It provides information on how to handle items such as exclusive

stories, news releases, TV and radio reporters; it tells how to approach the different media about an anticipated meeting or news story; it lists what should be provided in a press room. It is worth the 50 cents required to purchase it from the CSWA, Box 1406, Station B, Ottawa, Ont. K1P 5R4.

Forest regions of Canada

At last, the revised edition of *Forest Regions of Canada*, by J. S. Rowe and published by the Canadian Forestry Service is available for the grand sum of \$2.50. If you purchase a copy, you are entitled to receive **!FREE!** "a beautiful 23 x 35-inch black and white wall poster featuring a landscape from *either* the Coast or the Great Lakes — St. Lawrence Region, with the compliments of the Canadian Forestry Service".

A review of the book, which is now illustrated with photographs and maps throughout, should appear in the August issue of the Chronicle.

Recreational wilderness

A forty-two page, illustrated brief prepared by the Alberta Wilderness Association outlines the need for and the possibility of establishing a recreational wilderness in an area that is easily accessible from urban areas in Southern Alberta. The report is entitled *Elbow Sheep Wilderness* and is available at \$2.00 from the above Association at Box 6398, Station D, Calgary, Alberta, T2P 2E1. The brief, on this one land use option, was used as a basis for one of the hearings on land use on the east slope of the Rocky Mountains.

Tree breeding and improvement meetings

The 14th meeting of the Committee on Forest Tree Breeding in Canada will be held in conjunction with the 21st meeting of the Northeastern Tree Improvement Conference on the campus of the University of New Brunswick, Fredericton, New Brunswick on August 28 to 30, 1973.

The meeting will consist of a symposium on interspecific and interprovenance hybridization, technical papers, a business meeting, and a field trip. Further information can be obtained from D. P. Fowler, Canadian Forestry Service, P.O. Box 4000, Fredericton, N.B.

The metric system

R. F. LEGGET provides a review of what the metric system of measurement is all about and how it came into being. Since Canada will be adopting the system sooner or later we should become familiar with the basic units. The article first appeared in *Canadian Building Digest*, Division of Building Research, National Research Council, April 1968.

The metric system of measurement is now in mandatory legal use in countries in which almost 90 per cent of the total population of the world resides. It is legally authorized for use, although not yet mandatory, in the other countries of the world where foot-pound units, or the British system of

measurement, still remain in official use. Canada is one of these few remaining "foot-pound countries," even though the use of metric measurement has been legal here since 1873; corresponding legal action was taken in the USA in 1866.

The fact that Great Britain, following a decision to adopt decimal coinage by 1971, has decided to convert completely to the metric system by 1975 is bound to have a profound effect upon Canada's position. When the time for the change to metric does come in this country, the Canadian construction industry will inevitably be involved. It is desirable, therefore, that the industry should have available in convenient form the essential facts about the metric system of measurement. It is the purpose of this Digest to provide such a summary statement.

It is not inappropriate that this should be the hundredth issue of the Canadian Building Digests, since the essence of the metric system is dependence upon multiples of ten for all its subdivisions. Although ten is, to some extent, a "natural" number it is not as convenient in some respects as the number twelve. It cannot be divided, for example, by three or four. But the natural advantages of the number ten, the fact that the whole number system is based upon ten and, above all, the almost universal use of the metric system throughout the world, exclusive of North America, combine to make it clearly desirable as the universal international system of measurement.

History

The basic idea of a decimal system of units is generally attributed to Simon Stevin (1548-1620) to whom the world is even more indebted for the concept of decimal fractions. In 1670, Gabriel Monton, Vicar of St. Paul's Church in Lyons, France, first proposed a comprehensive decimal system of measurement and suggested that this be based on the length of an arc of one minute of a great circle of the earth. The Academie des Sciences of France gave consideration to the use of decimal units from the time of its establishment in 1666.

It was, however, the intellectual ferment associated with the French Revolution that finally — and after a long interval — led to action. Advised by leading scientists of the day, Talleyrand, the great foreign minister of France at the turn into the nineteenth century, attempted to establish an international decimal system of weights and measures "à tous les temps, à tous les peuples." The proposal, first introduced in 1791, was based on the metre as a unit of length, defined as one ten-millionth part of the meridional quadrant of the earth. Checks upon this distance led to some of the earliest accurate geodetic survey work.

Acceptance of the new system in France, despite its distinguished scientific support, developed only very slowly. The Government of France was forced to pass a law as late as 1837 forbidding the use of the older system of measurement. Gradually, however, the metric system won approval not only in France but in a steadily increasing number of other countries.

In view of its recent adoption in Great Britain, it is of some interest to note that its use was permitted in the United Kingdom between 1864 and 1878. The British Weights and Measures (Metric System) Act of 1897 legalized its use in trade, but it was not until 1965 that the British Government, at the request of industry, announced the decision to convert all measurement to the metric system by 1975.

International control

As the number of "metric countries" increased in the second half of the last century, the need for co-ordination of national systems of measurement became evident. The first basic international agreement regarding the metric system was the "Convention du Mètre." This treaty was signed by the plenipotentiaries of eighteen states in Paris in 1875. It was revised in 1921. Other states have joined in its support so that there are now over 40 adhering states. Any other state may join by simply notifying the French Government, with whom the treaty is deposited. The adherence is made final when the French Government informs the President of the International Committee (see below).

The Bureau International des Poids et Mesures was established under the terms of the original treaty. The Bureau provides the necessary technical and research supporting services to the international measurement system. Located in the Pavillon de Breteuil within the Parc de Saint-Cloud, about 10 kilometres southwest of the centre of Paris on land that has been deeded as international territory, the well-equipped laboratories of the Bureau now employ a staff of about 40, about two-thirds of whom are engaged on scientific work.

The work of the Bureau is under the general direction of the Comité International des Poids et Mesures (the International Committee on Weights and Measures). This important group consists of eighteen members from eighteen countries and is the key organization in the metric field. (Canada has played a notable role in this Committee, Dr. L. E. Howlett, Director of the Division of Applied Physics, NRC, having been elected President in 1964.)

Not only does this Committee nominate the Director and senior staff members of the Bureau, but it also has the privilege of calling the governments that adhere to the Convention du Mètre to meet in a Conférence Générale des Poids et Mesures. This Conference must be convened at least once every six years. It is the medium through which adhering governments agree on the exact details of the physical constants they will use, on the recommendation of the Committee. Seven Advisory Committees (Comités Consultatifs) composed of leading international authorities in metrology assist the main Committee with the detailed scientific aspects of its work.

Système International d'Unités (SI)

Six of these Advisory Committees deal respectively, with the scientific aspects of the definitions

of the metre, the second, thermometry, electricity, photometry, and standards of ionizing radiations. The seventh Advisory Committee, established in 1964, is responsible for the coordination of the basic units in the International System of Units, more commonly known by the initials of the name in French. SI units are becoming well recognized as the desirable units for legal adoptions; and Britain's conversion is, officially, to SI units.

As early as 1913 the General Conference on Weights and Measures requested the International Committee to investigate the possibility of an integrated system of units. In the years following the Second World War an inquiry on the subject was addressed to all countries. Following discussion and study of the replies received by the International Committee, and following decisions of the General Conference in 1954 and 1960, the *Système International* was adopted. It is steadily coming into world-wide use not only on a national basis but also by such bodies as the International Organization for Standardization (ISO).

The *Système International* consists of six basic units and the coherent units derived from them. The basic units are for length (metre), mass (kilogram), time (second), electric current (ampere), absolute temperature (degree Kelvin), and luminous intensity (candela). A number of other important units — such as those for force and electrical resistance — can be derived from the basic units and are coherent with them. The *Système* is "coherent" in that the product or the quotient of any two unit quantities in the system is the unit of the resultant quantity. In other words, all derived units are directly interrelated with two or more of the six basic units.

The *Système International* also provides for uniformity in terminology and mathematical symbols. Typical items from the official list of fourteen multiples and sub-multiples of SI units are:

Multiplication factor		Prefix	Symbol
1,000.....	10^3	kilo	k
100.....	10^2	hecto	h
10.....	10^1	deca	da
0.1.....	10^{-1}	deci	d
0.01.....	10^{-2}	centi	c
0.001.....	10^{-3}	milli	m

The value of international agreement on such designations will be obvious.

Somewhat naturally, the scientific definitions for the basic units are, in general, very much more sophisticated than earlier metric descriptions. With the exception of the kilogram, all the basic units now depend fundamentally upon most accurate physical measurements such as can be carried out in a relatively few modern metrological laboratories. The kilogram, on the other hand, is still the weight of the polished cylinder of platinum-iridium alloy entrusted to the custody of the Bureau International des Poids et Mesures. It has a diameter of 39 mm, and its height is identical so that it roughly approximates a sphere.

SI units

For convenient reference the current definitions of the six basic SI units are as follows, the numbers in parenthesis being the years in which the latest revisions of the definitions were approved:

Metre (m): The metre is the length equal to 1 650 763.73 wavelengths in vacuum of the radiation corresponding to the transition between the levels $2p_{10}$ and $5d_5$ of the krypton-86 atom (1960).

Kilogram (kg): The kilogram is the unit of mass; it is equal to the mass of the international prototype of the kilogram (1901).

Second (s): The second is the duration of 9 192 631 770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium-133 atom (1967).

Ampere (A): The ampere is that constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular cross-section, and placed 1 metre apart in vacuum, would produce between these conductors a force equal to 2×10^{-7} newton* per metre of length (1948).

Kelvin ($^{\circ}K$): The kelvin, unit of thermodynamic temperature, is the fraction $1/273.16$ of the thermodynamic temperature of the triple point of water (1967).

Candela (cd): The candela is the luminous intensity in the perpendicular direction of a surface of $1/600\,000$ square metre of a full radiator at the temperature of freezing platinum under a pressure of 101 325 newtons per square metre (1967).

These definitions will appear to some to be very rigorous and possibly far removed from the practice of everyday. It may be helpful, therefore, to note that Canada already uses three of the basic SI units — the second, the ampere, and the candela — and may soon be expected to use degree Celsius instead of degree Fahrenheit, which would be equivalent to using a fourth. There will then remain just the metre and the kilogram.

The metric system

Although SI units will be those now universally adopted for legal official use, the "man in the street" may for some time think and talk of the more commonly appreciated metric units. But as the definitions of the standard foot and the standard pound are rarely thought about by those who use the British foot-pound system of measurement in everyday practice, so will SI units gradually come into use without consideration for the scientific definitions just cited. It is clearly desirable, however, that the scientific background of the more common SI units should be generally appreciated if only because it constitutes one of the reasons why the ultimate universal use of the *Système International* can be confidently predicted.

*Newton (N): SI unit for force, derived from the basic units and defined as that force which, applied to a mass of 1 kg, gives it an acceleration of 1m/sec^2 .