1.4 Kilograms Of Hamburger and A Liter Of Milk Please

by *Dr. S. A. Lindstedt*

Canada is adopting the Metric system of measurement. Mr. S.M. Gossage, chairman of the Metric Commission, has stated that he thinks we will be a "predominantly" metric country by 1980. In so doing we will join over 95 percent of the countries of the world; this will help our international trade and facilitate world-wide understanding in the fields of commerce, industry and communications.

But, of course, international trade and communication is not the only reason for "going metric." There are other fundamental reasons for the adoption of this system of measurement.

A. The metric system is easier. Yes, it is. The units and subunits are all based on a decimal system and this means that conversion from one unit to another is just a matter of shifting the decimal point. For example, the length of a Canadian football field is 100.584 meters. The following chart shows how easy it is to change this measurement using other units of length.

Length of Football Field

1 0 0 5 8 4	millimeters	(mm)
1 0 0 5 8.4	centimeters	(cm)
1 0 0 5.8 4	decimeters	(dm)
1 0 0.5 8 4	meters	(m)
1 0.0 5 8 4	decameters	(dam)
1.0 0 5 8 4	hectometers	(hm)
0.1 0 0 5 8 4	kilometers	(km)

It is also easier to complete calculations. For example, if your granary is 20 ft. 6 in. long, 15 ft. 4 in. wide and 10 ft. 2 in. high, you need to perform the following calculations to find out the number of bushels it will hold:

20-1/2 x 15-1/3 X 10-1/6 X 6-1/4 X 1/8 bushels.

That's a pretty awkward computation - even an electric calculator would have some difficulty with it.

The corresponding metric units to the same degree of precision would be: length 6.25 meters, width 4.67 meters, height 3.10 meters. To find the capacity of the granary you would complete this calculation:

6.25 X 4.67 X 3.10 X 1 kiloliters

Not difficult at all.

B. The metric system will simplify package sizes and make price comparisons much easier. For example, washing detergent is sold in a great variety of sizes at various prices. In a recent survey I counted 28 different sizes on one shelf in a supermarket - here are the sizes and prices of eight which I selected -

5 lbs. - $2.43
75 oz. - $2.39
42 oz. - $1.35
40 oz. - $1.91
32 oz. - $0.89
28 oz. - $1.21
23 oz. - $1.09
16 oz. - $0.75

Quick now, which is the best buy?

Toothpaste, on the other hand, is now sold only in "metric" sizes. I noted the following on display:

150 *mℓ* - $1.43
100 *mℓ* - $1.03
50 *mℓ* - $0.66

(*mℓ* is the symbol for milliliter)

You see, you have a much better chance to compare prices.

Well, what <u>is</u> this marvelous, elegant system of measurement?

What are the basics?

Because we have been taught and have used Imperial units such as the inch, quart and pound, we may think that metric units are very numerous and very disorganized. Not so. There are <u>three</u> new basic units to learn for most of the everyday uses of measurement. They are:

1. The meter, (symbol m), a unit of length. It is about half the height of an ordinary door.

2. The liter, (symbol ℓ), a unit of capacity. It is just a bit smaller than the Canadian quart - and, as it happens, just a bit larger than the American quart. (At least the use of the liter will eliminate <u>that</u> confusion.)

3. The gram (symbol g), a unit of mass (or "weight," as it is commonly called). It is a very small unit - less than the weight of a paper clip. For that reason the kilogram (symbol kg) which is 1 000 grams will be in common use.

Now for each of the above three units, we derive larger and smaller units indicated by the following six prefixes:

for the bigger units

-kilo-, meaning "1 000 times"
-hecto-, meaning "100 times"
-deca-, meaning "10 times"

for the smaller units

-deci-, meaning "1/10 of"
-centi-, meaning "1/100 of"
-milli-, meaning "1/1000 of"

For different units of length we combine the above prefixes with the meter -

a kilometer (symbol km) is 1000 meters
a hectometer (symbol hm) is 100 meters
a decameter (symbol dam) is 10 meters
a meter (symbol m) is 1 meter
a decimeter (symbol dm) is 1/10 of a meter
a centimeter (symbol cm) is 1/100 of a meter
a millimeter (symbol mm) is 1/1000 of a meter.

(Go back and review the example of the length of a football field.)

For different units of capacity we have a similar arrangement - we combine the same prefixes (and they keep their own meanings) with the liter to get a kiloliter (kℓ), a hectoliter (hℓ), a decaliter (daℓ), for the bigger units, and a deciliter (dℓ), a centiliter (cℓ), and a milliliter (mℓ) for smaller units. Although these units do exist, we will probably not use all of them in everyday practice. We will use the big one - the kiloliter - for measuring the capacity of storage tanks, granaries, oil tankers, reservoirs, etc. We will use the very small one - the milliliter - for measuring the capacity of toothpaste tubes, medicine drops, shampoo bottles, etc., and we will use the liter itself for milk, paint, gasoline, oil, antifreeze, etc.

Similarly we combine the same prefixes with "gram" to get units of mass. The kilogram will be used in buying meat, vegetables, fruit, sugar, flour, fertilizer, lawn seed, cement. First class passengers on air lines will be allowed 30 kg of luggage; economy class must get along with 20 kg.

Even the kilogram (1 000 grams) is a fairly small unit. Therefore a larger metric unit - the tonne (symbol t), sometimes called the "metric ton," will be used for larger quantities. The tonne is equal to 1 000 kilograms; it is about 10 percent bigger than the ordinary ton of 2,000 pounds. It will be used to measure loads of wheat, gravel, sand, bricks. The milligram (mg) is a tiny, tiny unit of mass. It will be used to measure pharmaceutical quantities.

We will not become metric overnight, nor by a certain date. We will move into the system at various places at different times. Because the students in our schools of today will undoubtedly graduate into a metric world of tomorrow, we should begin as soon as possible to include the metric system of measurement in school programs. All weather forecasts will be using metric units of measurement during the year 1975 - snowfall will be measured in centimeters, rainfall in millimeters, wind velocity in kilometers per hour and temperature in degrees Celsius. During the year 1976 we can expect the metrication of highway signs - distances in kilometers, speeds in kilometers per hour, the heights of mountains in meters. In 1977 all grain will be measured, for local sales, in metric tons. Even at the present time, we sell our wheat overseas in metric tons. Many household products will start to appear in "metric packages." As already mentioned, toothpaste tubes have been metricated. Heavy industries will take the first opportunity to replace worn-out or obsolete machines and tools with metric calibrated equipment. Many have already made the change - the Pinto Ford is a metric car

manufactured in the States; International Harvester, I.B.M., Stelco Steel are going metric. General Motors has announced similar intentions. In sports we are already accustomed to the 100 meter dash, the 50 meter swim, the high dive from the 10 m board; the new racetrack at Stampede Park in Calgary is one kilometer in length.

Some things will not change. We often use units of measure just as a manner of speaking rather than as an application of serious measurement. We sing the song "I love you a bushel and a peck" without really thinking of measuring out the love. But I hope we won't destroy the charm of these little expressions by insisting on the metric translation, "I love you 36.369 liters and an additional 90.922 deciliters."

Metric Conference

Last March, the Ontario Ministry of Education and York University's Centre for Continuing Education co-ordinated the first Metrication Conference. It was an instantaneous success. Accordingly, the Centre has responded to the needs of mathematics teachers across the country and organized a more extensive conference - MATH '75, to be held at York University in Toronto, May 28/30, 1975.

Its format will be similar to York's well-established Reading Conference with educators from across the continent being invited to share their knowledge and gather new expertise. "In-service up-dating for educators at all levels" will be the focus of MATH '75. The three-day program will offer -

- Pre-conference seminars on fractions, geometry, shapes, metrication, and Piaget and mathematics
- Four distinguished conference speakers