

Do You Know?

At least 10 types of *nylon* are fabricated, each with different properties.

Water vapor may condense as clouds, fog, rain, snow, sleet, hail, dew, or frost.

Paint making has increased in Mexico, which has now 22 paint-manufacturing plants of considerable size.

The smallest *monkeys* in the world are South American marmosets; a fully grown pair can sit in the palm of a person's hand without crowding.

The *orange blossom oil* in fine perfumes is from the oil of the bitter orange blossom called neroli, grown principally in Europe.

Ethyl alcohol, a basic organic raw material, is used in larger quantities in making synthetic rubber than in all other uses added together.

Additional *carbon tetrachloride* is now available for dry cleaning purposes, as military needs no longer require the entire output.

Paper made from bamboo may become common because of a new process discovered in the United States; bamboo grows in tropical America as much as 18 feet a year and matures in four years, so an unlimited supply may be produced.

Gardeners may now buy walnut-sized cases of *mantis eggs* which they hang on bushes near the garden to hatch; the mantis destroys large numbers of other insects, harmful varieties, as they constitute the sole food of this beneficial insect.

MATHEMATICS DICTIONARY

Invaluable in reading any book that uses mathematics.

The James Mathematics Dictionary

the only such book now published, provides standard definitions of the terms and phrases from arithmetic through elementary differential equations, the technical terms ordinarily used in the applications of these subjects, and more advanced basic terms. Easy examples, many illustrations and all sorts of formulas are included. The appendix contains tables of weights and measures, a list of mathematical symbols and tables ordinarily used in handbooks.

This dictionary is a great deal more than a collection of definitions. It explains, illustrates and correlates, stressing especially those operations that are hardest to understand. One reader has called it "Ten texts in one." Second printing of Revised Edition, just off the press. Blue fabricoid binding, for \$3.00, from the Digest Press, Van Nuys, California, or Science News Letter.

PHYSIOLOGY

Third Nervous System

Pilots have to develop new physiology to include instruments and controls; redesign of cockpits urged for greater safety.

► REDESIGN of airplane cockpits, which in effect constitute a third nervous system for the pilot, was called for by Dr. Eugene F. DuBois, professor of physiology in Cornell Medical College, at the meeting of the National Academy of Sciences, held in Washington.

Modern flying, he pointed out, has made it necessary for the pilot to develop a new physiology. In addition to the central nervous system, of which the brain is a part, and the peripheral nervous system which conducts pain or other sensations to the brain or spinal cord, the pilot has developed an outside nervous system consisting of the instruments and controls.

"In the haste of development, the cockpit has been assembled with relatively little regard for the principles of human anatomy, physiology and psychology," Dr. DuBois declared. "Although the engineers and manufacturers have done a surprisingly good job, the time has come for a redesign, simplification and standardization of the cockpit. Instruments and controls can be improved and coordinated.

"The plane can be made much safer by better placement or elimination of sharp structural members or instruments that may be struck by the head in crashes even at moderate speeds.

"The most important aspect is standardization of the positions and actions of the instruments and controls so that a pilot is not confused when flying a new plane. What would happen to a pianist if there were 20 different sizes and arrangements of the piano keyboard?"

Science News Letter, November 25, 1944

Body's Vitamin Factories

► NEW STANDARDS for the amounts of vitamins required in the daily diet and for the amounts of foods needed to supply them may come from discoveries of vitamin factories in the body, it appears from the report of Prof. C. A. Elvehjem of the University of Wisconsin.

These internal vitamin factories are operated by bacteria inhabiting the intestinal tract. Scientists a generation or more ago saw the possibility of the intestinal bacteria being related to health and length of life but the discoveries of their

role in synthesizing certain vitamins have been made within recent years.

Vitamin synthesis by intestinal bacteria apparently varies in different species of animals. It is impossible, Prof. Elvehjem said, to predict from studies with one species of animal, such as rats or dogs, that other species, such as chickens, monkeys or man, will be found to have the same kind of synthesis.

Bacterial vitamin synthesis also varies, at least in some animal species studied, according to the type of diet exclusive of its vitamin content. In rats, for example, synthesis of riboflavin, one of the B vitamins, is decreased by the presence of fat in the diet. Even the type of fat affects production of the vitamin by intestinal bacteria. The discovery that both thiamin (vitamin B₁) and riboflavin are produced in the intestinal tract of man was made in experiments in which the diet was high in rather pure carbohydrate, Prof. Elvehjem pointed out.

"The effect may be quite different in the human living on a typical mixed diet," he said. "In fact, we now have preliminary results which indicate that this is true."

Science News Letter, November 25, 1944

CHEMISTRY

Toluene May Be Nitrated Without Sulfuric Acid

► A METHOD for nitrating toluene without the use of sulfuric acid, is covered by patent 2,362,743, obtained by Willard de C. Crater of Newark, Del.

Toluene becomes trinitrotoluene in three steps or stages, passing through phases mono- and di-nitrotoluene on the way. In Mr. Crater's process, the first step is accomplished by the addition of 70% nitric acid, after which the excess acid and water are removed. Then it is converted into dinitrotoluene by treatment with 98% nitric acid. Excess acid and water are again removed in a vacuum still, the crude product further washed, and finally dissolved in alcohol. After a final distilling to remove the alcohol, the refined crystals of dinitrotoluene are ready for nitration into TNT.

Science News Letter, November 25, 1944