SCIENCE NEWS

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APPARENT CLIMATIC SHIFTS

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APPARENT climatic shifts, such as the current one that has brought a warm winter to the whole Pacific Coast while the entire country east of the Rockies has had to shovel snow, are to be regarded as fluctuations in a longer or shorter cycle rather than as permanent changes. Such is the consensus of opinions independently expressed by members of the U. S. Weather Bureau, the U. S. Coast and Geodetic Survey and the Hydrographic Office of the U. S. Navy. And whatever causes them, a supposed shift in the Japan Current must not be held responsible.

There is a slow, wide swing in air temperatures, not only for the Pacific Coast but for the whole world, that takes about a century to go through, according to J. B. Kincer, of the U. S. Weather Bureau. There was a succession of warm years about a hundred years ago, and we seem to be having another one now. In between, shortly after the middle of the nineteenth century, there was a group of low-temperature years, with cool summers and severe winters. Rainfall cycles (if they can properly be called that) are of considerably shorter duration than this long temperature swing.

Crediting recent warm Pacific Coast winters to a southward shift in direction to the Japan Current was scouted as unfounded guesswork by both H. A. Marmer, of the U. S. Coast and Geodetic Survey, and Commander H. Hartley, of the Hydrographic Office. It is a case of reasoning backward: A shift in the Japan Current could cause a change in climate; the climate on the coast seems to be changing; therefore the Japan Current has shifted. The only trouble with that proposition is that nobody knows whether the famous current has shifted or not. It would be possible to go and find out, but that would take ships, men and money, none of which is available now—or likely to be, with Congress cutting deep even into existing research appropriations.

Until valid evidence to the contrary is brought forth by a well-supported, well-planned, long-continued research program, there is no justification for supposing that the Japan Current has shifted or is shifting. If revolutionary changes had taken place in the ocean bottom recently, with tremendous, world-shaking earthquakes, we might be justified in assuming a shift in the current, but such cataclysmic events have not taken place. So we must let the "Kuro Siwo" flow in peace.

From the Pacific Coast, Professor George E. McEwen, of the Scripps Institution of Oceanography, at La Jolla, Calif., offers support to his scientific colleagues in Washington. "Although it may seem as though the climate is changing," says Professor McEwen, "there is no evidence that the trend will continue in the same direction."—FRANK THONE.

SICKNESS AMONG CHILDREN

THE complacency Americans are apt to feel over the health of the nation's children, based on low child mortality rates, is dealt a severe blow by figures on child sickness which the U. S. Public Health Service has released.

According to figures compiled by Miss Dorothy F. Holland, one of the federal health service statisticians, children under 10 years of age are sick oftener than any other group in the population except the aged.

The figures refer to frequency of illness lasting from one week or more as found in a survey of 500,000 children in 83 cities of varying sizes in 18 states during one year. The very highest frequency rate for disabling sickness among white children was found at the ages five to nine years. This rate was 305 per 1,000. For Negro children the highest disabling illness rate occurs in the ages under five years.

Acute communicable diseases of childhood and the respiratory diseases caused eight out of ten disabling illnesses among children under fifteen years of age. Among these eight cases, five were acute communicable diseases of childhood and three were cases of acute respiratory diseases. Measles showed a higher frequency than any of the other childhood diseases, though the marked excess of measles shown in the survey reflects the unusually high incidence of measles during the survey year (1935). Mumps, whooping cough and chicken pox also were frequent causes of disabling illness. Among the respiratory diseases, tonsillitis, influenza, colds, pneumonia and bronchitis led in frequency.

Infantile paralysis caused 56 per cent. of all orthopedic impairments due to disease among children under 15 years.

VITAMINS AND NERVOUS BREAKDOWN

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NERVOUS breakdowns which transform strong, courageous men into weak, frightened creatures and drive overtired women into constant, jittery activity are sometimes due to lack of the B vitamins, according to Drs. J. P. Frostig, of the University of California, and T. D. Spies, of the University of Cincinnati and Hillman Hospital, Birmingham, Ala.

Discovery of the nerve-shattering effect of a diet lacking in these vitamins indicates that faulty diet wide-spread in a population may affect not only its health and strength but may break down its morale. It also provides a chemical approach to at least one group of nervous breakdowns.

Drs. Frostig and Spies state in a report to the *American Journal of Medical Sciences* that the nervous symptoms which appear when the B vitamins are lacking in the diet give doctors the first signs by which they may diagnose pellagra. The nervous signs appear in patients who have no other symptoms of pellagra and who might therefore be labeled neurotic or neurasthenic.

Physicians have long known that pellagra affects the nerves. Many pellagra patients in the past ended their days in insane asylums. The nervous symptoms which foretell an impending attack of pellagra, however, and which link vitamin lack with breakdown of morale, have never before been noted as a sign of vitamin deficiency.

Regardless of what type of personality the patients normally have, when they begin to get pellagra, they all develop the same characteristics. They are restless, excitable and easily frightened. Noises make them jump, odors bother them more than usual. They are tired but can not sleep and are too "fidgety" to rest. They feel depressed and constantly expect some harm to befall them or their families. A brawny coal miner who liked to engage in prize fights said: "I'm scared to death. If I see two men fighting with their fists, it seems to me that I will pass out."

Either of three parts of the vitamin originally known as B cures the condition. Chemically, these three B vitamins are known as thiamin, cocarboxylase and nicotinic acid. They are all found in fresh meat, fresh vegetables, eggs, milk and yeast. When the nervous patients were given a dose of one of the three vitamins, they felt better within an hour, and within 24 hours neurological tests showed their nerves were reacting normally to touch, pain and the like.

While nervous symptoms had been seen in patients with pellagra, the exact relation between the B vitamins and nervous breakdown was established in a careful study of 60 pellagra patients, with the support of the Rockefeller Foundation and the William C. Hogg Memorial Fund of the University of Texas.

PITUITARY EXTRACT AND DIABETES

A NEW attack on diabetes, by way of the pituitary gland, has been launched through the researches of Professor J. B. Collip, of McGill University. Professor Collip states that a specially prepared extract of the pituitary, the small but important gland in the head, "has a profound effect upon carbohydrate metabolism."

Carbohydrate metabolism, the utilization by the body of sugars and starches from foods, is the mechanism that goes wrong in diabetes. Failure of the Islands of Langerhans in the pancreas to produce sufficient insulin has been considered the cause of the condition, and insulin in proper dosage keeps diabetics healthy. Other glands besides the pancreas, however, have been shown to play a part in carbohydrate metabolism. In fact, it is known that the glands of internal secretion, such as pancreas, pituitary, thyroid and adrenals, are closely related and influence each other in various ways.

Now that a pituitary gland extract which affects the body's utilization of sugar and starch has been discovered, the next step will be to learn how it achieves this effect. The work is still in an early stage and is purely of academic interest as yet. But it has already raised a number of questions which, when solved, may show the whole problem of carbohydrate metabolism and of diabetes in a clearer light. Among the questions to be answered are whether the pituitary extract achieves its effect on sugar utilization directly, whether it acts through the adrenal glands, whether it acts by stimulating the pancreas to produce more insulin, and whether it reenforces the action of insulin by the process of synergy.

SYNTHETIC GLYCERINE

SYNTHETIC glycerine, a product long sought in vain by chemical industry, is now available from petroleum. Recent technical reports to the American Chemical Society by Dr. Evan C. Williams, Dr. H. P. A. Groll and G. Hearne, of the Shell Development Company, at Emeryville, Calif., show how unlimited quantities of the compound can be made from cracked gasoline.

Glycerol, as the chemist prefers to call glycerine to show its family relation to alcohol, has ever been the victim of fickle market conditions, since it is a by-product of rather fixed quantity from the soap industry. A change in demand, as occasioned by war conditions or peace treaty, does not affect supply and thus prices skyrocket and dive most inconveniently. Figures from 9 to 70 cents per pound have been quoted since the World War. During the one year, 1938, the price dropped nearly 60 per cent.

Although glycerol is a simple organic compound, its molecular structure, with one atom of oxygen attached to each carbon atom, has baffled the synthetic manufacturer who must use processes of low cost. By allowing chlorine to react upon propylene, a gaseous component of cracked petroleum, it has been possible to produce at low cost the substance allyl chloride. From allyl chloride the compound trichloropropane is then readily prepared. The molecule of trichloropropane is similar in structural design to that of glycerol, and the product is readily convertible into glycerol with the aid of cheap alkali.

The new synthetic glycerol has been tested in gross quantities in the stomach, with effects even less unpleasant than those from the pharmaceutical grade of natural glycerol. Being identical in composition, the preparation needs attention only to purity standards, and this question is easily solved.

It is suspected that much more of interest is in view than a mere stabilization of price and strategic war supply for time of siege. By combination of glycerol with acids, a remarkable array of valuable oils is possible. These compounds are analogous chemically to olive, cotton and linseed oils, but without the narrow restrictions in quality and quantity imposed by nature in plant growth.

From petroleum it is likely that entirely new acids, perhaps those with molecules in bunch-like form instead of the chain form normally followed by plants and animals, may be available for this field of research. From such syntheses it is possible that lubricants superior to castor oil, and paint vehicles ahead of linseed oil, might be discovered. The castor and linseed products are glycerol-acid compounds of the type in question. Furthermore, the resin industry is interested in the prospect of cheap glycerol, which with complex acids forms very complex derivatives suitable for use as plastic resins.

THE SOCIAL SECURITY ACT

THE number of retired men and women who receive their first old-age Social Security checks during 1940 is only a small fraction of those who will become eligible for such benefits in the next 45 years. Even if the Act is not broadened in future, probably more than 7,000,000 would be included in the plan as compared with something like 300,000 this year.

Those who earned wage credits in 1937, the first year of the Social Security Act, are relatively few in the older age

groups. If you should draw a bar diagram in which the length of each bar represents the percentage of men with 1937 wage credits at a certain age level, you would find it looking like the under side of a stairway with the longest bars at the ages of 20 to 34 and with steadily decreasing steps from there down to the 60 to 64 group where only 27 per cent. earned credits. A much smaller percentage of women in the older age groups earned wage credits in that year.

This means that although 1940 will see relatively few persons with wage credits at the retirement age, by forty or forty-five years from now the large group of present young men workers representing from 61 per cent. to nearly 64 per cent. of the total population at those ages will have reached sixty-five years, the time to apply for old-age benefits. However, all who had 1937 wage credits will not necessarily be eligible for monthly benefits.

No one can estimate exactly just how many will be at the old-age benefit age in 1985, because the actuarial tables on which such predictions are based vary widely. The insurance statisticians who figure such tables like to lean over backwards so as to avoid expensive errors in estimates. Thus, those figuring on survivors to collect annuities conservatively figure on a much smaller future death rate than do those who estimate what must be paid in death benefits.

Robert J. Myers, actuarial mathematician for the Social Security Board, recommends in the "Social Security Bulletin" that the conservative person in calculating the costs of such a benefit plan use more than one estimate and plan for costs in a rather wide range. Using the survival table known to statisticians as the "U. S. White Table," based on experience among the total U. S. population during 1920–29, he estimates that 7,338,000 of those earning 1937 wage credits will be 65 or over in 1985. Using the "Standard Annuity Tables," the number is estimated at 10,417,000. With either table as the basis of calculation, the million mark will be passed by 1950.—MARJORIE VAN DE WATER.

ITEMS

THE reopening on May 11 of the popular medical and public health exhibits of the New York World's Fair has been announced by Dr. Louis I. Dublin, acting chairman of the American Museum of Health. In a letter to Dr. Dublin, Surgeon-General Thomas Parran, U. S. Public Health Service, stated that the exhibit last year "gave to several million people from the United States, Canada and elsewhere valuable, life-saving knowledge." The federal health service cooperated with the American Museum of Health in a visitor reaction study which showed that visitors to the medical and health exhibits gained from them vitally useful knowledge of health and medical matters. New exhibits, to be announced later, will be added to the Carrel-Lindbergh "heart," the Transparent Man and other dramatic exhibits which last year vied in popularity with such industrial features as the General Motors Futurama and the American Telephone and Telegraph Company's Voder. The medical and public health exhibits last year drew a record-breaking attendance of 7,500,000 visitors, approximately one out of every three World's Fair visitors, and more by 2,000,000 than the total attendance of any previous public exhibit of medicine and public health anywhere in the world.

A 2,000,000-VOLT artificial "lightning" machine has been constructed at the Ryan High Voltage Laboratory at Stanford University. By sending its crashing shocks into power lines, insulators and other electrical equipment it is expected to use the "tame" lightning to test equipment and learn more about how to protect transmission lines and accessory electrical apparatus from shocks to natural lightning. Financed by electrical companies on the west coast, the new apparatus is the most modern of its kind, although its peak voltage of 2,000,000 is less than that of apparatus previously developed. In tests at Pittsfield, Mass., 10,000,000 volts have been used.

THE exact amounts of calcium needed for normal, strong teeth and bones and the speed with which calcium eaten in food travels through the body are being determined in experiments with tagged atoms of radioactive calcium at the University of California. Results of this first biological study with radioactive calcium have been announced. No clinical experiments, however, have as yet been attempted. The radioactive calcium of sufficient long life for this type of experiment was discovered with the University of California's famous atom-smashing cyclotron by the late Dr. Harold Walke, of the University of Liverpool, who was accidentally electrocuted in his laboratory when he fell on an exposed wire.

A CHEMICAL compound that may prove as good a remedy against infectious diseases as sulfanilamide, with less toxic effects, is announced by the U. S. Public Health Service. The compound, prepared by Drs. Hugo Bauer and Sanford M. Rosenthal, of the National Institute of Health, contains phosphorus instead of sulfur and is different in other ways from sulfanilamide. Three such compounds have been prepared, of which one, bis (4-dimethylaminophenyl) phosphinous acid, checked streptococcus infections in mice and had a low toxicity. No human trials of these chemicals have been made yet, nor will they be, Dr. Rosenthal said, before more extensive laboratory investigations. The object of the research, in which compounds with arsenic substituting for the sulfur of sulfanilamide were also made, is to find chemicals which either are better than sulfanilamide or are effective against germ infection which sulfanilamide does not check.

FOSSIL leaf prints that look like poplar leaves, but are not, which have been riddles to scientists for many years, have been traced to a family of trees now known only in Japan and China, by Dr. Roland W. Brown, of the U. S. Geological Survey and the Smithsonian Institution. The fossils have been found in rocks all the way from Greenland to Tennessee, and have been assigned to poplar, fig and other plant families; but Dr. Brown was not satisfied. For many years he carried on patient scientific investigation, and finally was able to prove their true relationship by means of their association with fossil pods and seeds of the type of tree now known by its Japanese name, katsura. In Washington, there is now one imported katsura tree, a young specimen growing on the grounds of the National Academy of Sciences. The last native katsura-relatives in this country died 70 or 80 million years ago, while dinosaurs still roamed the earth.