SCIENCE NEWS

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DAYLIGHT SAVING

IF the exigencies of power shortages for defense work force the United States again to adopt daylight saving time on a national scale, it will represent another in a long series of steps aimed to make our clocks suit the convenience of man.

If the earth were flat, as the ancients thought it to be, time would be much simpler. But it is a ball, turning on its axis, which gives us a natural unit from which others are derived. It is this turning, from west to east, that carries us with it, and makes the sun, moon, stars and other heavenly bodies seem to rise in the east, go across the sky and set in the west. The time of this turning is the principal natural time unit—the day—but even this is complicated because there are two principal kinds of day, differing in length by nearly four minutes.

If you watch a certain star rise, and wait until that same star rises again, you have counted one turn of the earth. This is the "sidereal," or star, day, and is used by astronomers. They do not watch the rising of a star, but the time that it crosses the meridian, when it passes from the eastern to the western half of the sky. But now, suppose you watch the sun cross the meridian, and wait until its next crossing. Then also you have a "day," but this kind, the "solar" day, is, on the average, 3 minutes 56 seconds longer than the sidereal day.

The moment the sun crosses the meridian is noon, but obviously the meridian of Washington is not that of Chicago. No two places on earth have the same meridian unless one is exactly north or south of the other. A century ago each community used its own solar time, based on its own meridian, but even this was not sundial time.

Though the sun lags behind the stars on the average of 3 minutes 56 seconds daily, this is not constant. It ranges nearly half a minute either side of this mean. At some times of year sundials run faster, at other times they are slower. So astronomers imagine there is a sun—they call it the "mean" sun—which does advance uniformly through the starry sky, and "mean solar time," based on this imaginary orb, is the kind that used to be employed.

With the coming of the railroads and the telegraph, it was most inconvenient to have the time changing every time one moved east or west. So in 1883 Standard Time was adopted, first in the United States, then throughout most of the civilized world.

This system divides the United States into four zones, roughly centered at 75 degrees, 105 degrees, 120 degrees and 135 degrees west longitude. Any zone uses throughout the mean solar time of its central meridian, each of which differs exactly one hour from the next. With this system, you only change your watch when you pass from one zone to the next. The alteration is just an hour, and not some odd numbers of minutes and seconds.—JAMES STOKLEY.

A NEW TYPE OF WEATHER MAP

A NEW type of daily weather map, simpler and more graphic than the old familiar one, is being put into service by the U. S. Weather Bureau. It is being issued only for Washington, D. C., at present, but will be extended to other cities as printing facilities become available. It will eventually become the standard weather map for the entire country, but the change-over will take several years, according to Commander F. W. Reichelderfer, chief of the Weather Bureau. This is largely because of time and expense involved in installing new printing facilities to handle the modernized map.

The most striking change in the new map is the substitution of symbols indicating position and movements of air masses for the old familiar concentric ellipses of isobars and isotherms of weather maps in use until now. Isobars are still present, but more widely distributed, so that the map is much less striped-up with these curving lines.

Clustered around each principal observatory, as marked on the map, are a number of symbols that at first glance look somewhat like shorthand, somewhat like old-time Indian sign writing. These tell at a glance the state of the weather, as observed at ground level. The Weather Bureau supplies a code which in 148 symbols and combinations states all possible types of weather, from a summer hot calm to a raging winter blizzard.

Some of the symbols are practically self-explanatory. Thus, a white circle means a clear sky, a black circle signifies a completely clouded sky, while intermediate amounts of blacking-in tell of skies clouded from one tenth or less to nine tenths or more. A zigzag line with an arrow at the lower end means a thunderstorm. An asterisk or printer's star means snow.

A round, black dot, like a big period, is the symbol for a raindrop. One of them means slight rain. Two, one above the other like a colon, means slight, intermittent rain. Two dots side by side mean continuous light rain; three dots, arranged like a pawnbroker's sign, moderate rain; four dots in a diamond-shaped pattern, continuous heavy rain. A comma-shaped symbol indicates drizzle; combinations as indicated for raindrops tell of heavy or light, continuous or intermittent drizzle. The same combinations are used with the star-shaped snowflake sign. Other combinations are more complex, but all appear to be easy to learn.

Two of the symbols are bound to become popular in Nazi-occupied countries. An inverted V-shaped sign means squally weather. Two inverted V's, one within the other, indicate heavy squalls.—FRANK THONE.

DROWNED MINES IN COLORADO

A GEOPHYSICAL crew headed by Dr. Stephen Capps, of the U. S. Geological Survey, is working in the valley of the Arkansas River, surrounding the old mining camp at Leadville, Colo., in order to determine the best route for

a possible deep-drainage tunnel to unwater Leadville's drowned mines and release the store of rich complex ores that may lie under the water.

Also, they will endeavor to determine the routes of primordial streams, long since buried under hundreds of feet of overburden. It is hoped that the gravels of these streams will prove rich in gold, opening up the prospect of underground placering.

The proposed deep-drainage tunnel, toward which government agencies have been cold because of the lack of proved deep-down metal resources, would be 39,000 feet long, the longest in the history of the metal-mining industry, and 7,000 feet longer than the Carlton tunnel at Cripple Creek, now being completed. It would also be shallower—about 1,100 feet underground, as compared with 3,300 for the Carlton.

Leadville experts insist that the ores are there, and that a combination of uncertain and faulted underground conditions, water, and the many small diverse interests which mined the field and could not get together on a thorough plan of underground exploration, are responsible for the lack of thorough knowledge of the field's deeper resources, rather than the lack of ore. At one time the 10,200-foot-high field, below Mt. Elbert, Colorado's tallest peak (14,431 feet), produced torrents of metal, founded many great fortunes, including that of the Guggenheims. It has produced about $450,000,000 worth of metals—about $60,000,000 in gold, nearly $200,000,000 in silver, more than $90,000,000 each of lead and zinc, and $14,000,000 in copper.

It was first discovered as a gold camp, but it languished until a prospector sent some of the heavy black gravel that clogged up the sluices to an assayer. He found it was lead-silver carbonate worth more than $400 a ton. Then the town really boomed. Some of its gulches, including the famous California gulch, have been washed three times for gold, by more and more efficient machinery. But production last year was only $489,000.

It is the copper, lead and zinc upon which hopes are based, as much as on the more precious metals. Also there are some 4,000,000 tons of manganese in sight, but of too low a grade to rouse governmental or commercial interest until this metal becomes scarcer. A few miles away is Bartlett Mountain, largest store of molybdenum in the world, owned by the Climax Molybdenum Company.

A big mining company, the Resurrection, has bought the present deep-drainage tunnel, the Yak, about 23,000 feet long, and much of the underground territory surrounding it. This tunnel drains only the higher reaches of the east part of the field, under the Mosquito range.

OCEAN STUDIES AT THE UNIVERSITY OF CALIFORNIA

THERE has been much unverified conjecture on the effect of waves and ocean floor topography on shorelines and harbors. Some of these theories are being scientifically settled by Prof. Morrough P. O'Brien, chairman of the department of mechanical engineering, and his associates at the University of California at Berkeley.

Two water tanks have been constructed, one a long, narrow channel 60 feet in length and only one foot wide; the other 58 feet long and 38 feet wide. The floor of the larger tank is formed into mountains and valleys, resembling the bottom of the ocean. A mechanical wave machine moves plank-like steel plates back and forth through the water producing six-inch-high breakers that crash on an imitation beach of real sand.

One of the first results of experiments with the small ocean was a definite decision between two theories of wave motion. One group of investigators maintained that while waves advanced toward shore the water moves in elliptical orbits. This is called the trochoidal theory. Others have subscribed to the irrotational theory which proposed that the wave motion produced a slow motion of the water in the direction of wave travel. The pigmy waves in the laboratory "sea" proved the irrotational theory correct.

Frank Milner, a graduate engineering student, made another discovery by studies of the model ocean. Many harbors have submarine valleys just off-shore, and Mr. Milner found that these valleys influence the action of waves against the shore. A small valley, duplicating one at Moss Landing in Monterey Bay, Calif., was built into the floor of the tank. Breakers set in motion by the mechanical wave machine were weakened in force and height by sides of the valley which sloped up to the shoreline, so that waves finally broke on shore with much less force. A rip tide formed in the center of this valley. By placing a dye solution in this current, they could follow the direction of the rip tide and found that it ran oceanward instead of toward shore.

The object of these laboratory ocean studies is to set up duplicate coastline conditions and to analyze the movement and force of waves and currents, and the modifying effect of undersea floor formations. A better understanding of these conditions will make it possible to plan better protective means for beaches and to build more effective breakwaters for harbors. These studies should be of practical aid in the designing of large ships, also; particularly large navy vessels.

HAYFEVER

HAYFEVER is expected to be bad this year, as ragweeds all over the eastern half of the country prepare to shed their pollen. This growing season has been exceptionally favorable for the development of ragweed, and there is every reason to believe that these ill weeds have exercised their proverbial propensity for growing apace.

To begin with, last year was a "good" ragweed year, too, so that a huge crop of seeds was produced. Although the past spring was rather dry over wide areas, abundant rains have blotted out all memory of the spring drought, and the combination of moisture and warm weather has boomed weed growth.

While no official census is taken of weeds, the U. S. Weather Bureau does maintain a weekly check-up on the state of crops in relation to the weather. Corn and cotton are reported as growing fast (cotton too fast, in fact), and since ragweeds thrive on the same kind of weather that favors these crops they may be taken as indicator plants for the general state of the producers of the pollen.

Another factor that favors ragweeds, at least around

urban areas, is the reduction in the ranks of CCC and WPA workers. One of the regular jobs assigned to groups of these men has been the scything down of ragweed patches. How much actual good such mowings have done is debatable, except in such communities as insisted on having all ragweed cleaned out, on the city dumps and on the wrong side of the railroad tracks as well as in comfortable residence districts. Air-borne pollen flies for miles, so that anti-ragweed campaigns do little good unless they are carried to the point of total extermination.

In some places (perhaps where the Mayor is himself a hayfever sufferer) the ragweed extermination campaign has taken the mistakenly vindictive form of pulling the weeds up by the roots instead of merely mowing them down. This does more harm than good; for ragweeds are annual plants, hence are as effectively killed by mowing as by uprooting. Uprooting even favors the next year's growth, for it loosens the soil and gives better chances of growth to last season's seeds lying dormant for a year or two.

Although ragweeds cause probably nine tenths of all hayfever sneezes, they are not the only shedders of troublesome pollen. Cocklebur, wild hemp, narrow-leaved plantain, several grass species both wild and cultivated, and a number of kinds of trees, all contribute their quota of sneezes and itching eyes at appropriate seasons.

One plant is widely but falsely accused: goldenrod. Its pollen is sticky and heavy, and can travel for only the shortest distances on the wind. It is the misfortune of this fine wayside plant that it breaks into bright bloom just when the green, unnoticed spikes of ragweed are shedding their pollen. So, like many another innocent bystander, it gets the blame while the real culprit is permitted to escape.—FRANK THONE.

CADMIUM-PLATED FOOD UTENSILS

WARNING against war-increased danger of acute poisoning from cadmium-plated food utensils, such as metal pitchers and refrigerator ice trays, appears in a report to the *Journal* of the American Medical Association by Dr. Samuel Frant and Irving Kleeman, of the New York City Health Department.

They report several outbreaks, involving about fifty people, of acute poisoning from small amounts of cadmium that got into iced drinks and frozen desserts from ice cube trays and a metal pitcher that had been replaced with cadmium. Fortunately, no one died, although all those who ate or drank the contaminated foods became violently ill within fifteen minutes after taking it.

The ice cube trays had not had any cadmium on them originally, according to the reports of the refrigerator manufacturers, but had apparently been coated with cadmium during reconditioning. In one outbreak, ice cubes for cooling punch had been made shortly after a leak of the refrigerant sulfur dioxide had been repaired. The sulfur dioxide dissolved in the water to give sulfurous acid which reacted with the cadmium to give cadmium sulfite. In other cases the cadmium got into the food from the action of acids in flavored crystals for making fruit drinks or in gelatin powders for frozen desserts.

Because of defense preparations, the plating industry is seeking substitutes for tin and other war-needed materials. Cadmium is not a suitable substitute in plating food utensils and the New York City sanitary code has already been amended to prohibit the use of cadmium in articles used in the preparation of food and drink.

ITEMS

FOR the first time, cases of endemic typhus fever have been reported in Ohio. Dr. George W. Stober, health officer of East Cleveland, will report one case in the forthcoming issue of *The Ohio State Medical Journal,* and the U. S. Public Health Service, which sent a representative from Washington to investigate, states that two other cases have been reported elsewhere in the state. Endemic typhus fever, which is spread by rat fleas, has been creeping slowly and steadily northward. Cases have previously been reported in central Tennessee. It is believed the Cleveland patient was bitten by a flea from a rat that had come from the South on a food truck or railroad car. European typhus fever, which occurs in epidemics, is transmitted by the human body louse.

A CHEMICAL from spoiled sweet clover may replace heparin, anti-blood clotting agent which has itself only been available for practical uses within the last two or three years, is reported by Dr. H. R. Butt, Dr. E. V. Allen and Dr. J. L. Bollman, of the Mayo Clinic at Rochester, Minn., as a result of first trials of the new chemical. The new anti-blood clotting substance is the chemical responsible for an often fatal bleeding disease of cattle that have eaten spoiled sweet clover. It is a coumarin compound which was isolated and prepared synthetically by Professor Karl Paul Link and associates at the University of Wisconsin. Advantages of the new remedy are its effectiveness when given by mouth, its prolonged action in lengthening the clotting time of the blood and its cheapness.

IMPORTANT hand-written documents blackened in fires started by the Nazi "Blitz" in London and other British cities are being deciphered by means of a photographic method described in *Nature,* proofsheets of which have been received. The method, which takes advantage of differences in reflecting power between the blank spaces and the lines of writing, was worked out by G. A. Jones, of the research laboratories of Kodak, Ltd., at Wealdstone in Middlesex. As seen by the human eye, the sheets are uniformly black. However, under intense lighting with a narrow beam from a small arc lamp, the once-white surfaces become mirrors, photographing white, while the traces of the ink lines have little reflecting power and photograph black. It is necessary to press the blackened documents absolutely flat. Plates used in the camera had a special blue-sensitive emulsion, because of the high proportion of blue rays in the light from the arc. Mr. Jones's method is of particular value in England, where many documents of legal importance, such as title deeds, wills, ledger sheets, etc., are still hand-written.