SCIENCE NEWS

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THE SUN'S TEMPERATURE

HITLER, in his last speech before launching his much-delayed spring drive, repeated his alibi about the chilliness of the winter in Russia. If the earth's weather were only directly dependent on the sun's heat, it would be possible to promise him even colder winters for the next four years. Data compiled by Smithsonian Institution observers in many parts of the world, and by Dr. Charles G. Abbot, secretary of the institution, together with L. B. Aldrich and W. H. Hoover, indicate that the sun will be at its lowest ebb, thermally speaking, in 1945. After that, our planetary system's central furnace will begin to warm up again.

Unfortunately, the relation between the sun's radiation and the earth's temperature is not so simple and direct as that. Cooling off of the sun might even result indirectly in warming up of certain parts of the earth, by reducing the amount of cloudiness and thereby letting the sun's rays, even though diminished, shine longer on the earth surface.

Confident prediction of long-range fluctuations in the heat radiated by the sun can be made because of the many thousands of accurate readings of solar heat, taken daily with specially designed, highly sensitive instruments, in observatories at Mt. Montezuma in Chile, Mt. Saint Katherine in the Sinai wilderness and Table Mountain in the Mojave Desert of California. These have been carefully tabulated and are published, with interpretations, in Volume 6 of the Annals of the Astrophysical Observatory of the Smithsonian Institution, just off the press.

Study of this mass of data shows that there are 14 distinguishable intensity cycles in the sun's radiation. Some of them are of only brief duration, others require years for the swing from high to low. Once every 23 years, all the lows come in together, and that combination low-point is due in 1945.

There seems to be little direct relation between solar radiation per se and the numbers of sunspots. Sunspots, however, do have their own effect on the earth's weather. They give off vast streams of electrically charged particles that shoot through space. Some of them, entering the earth's atmosphere, serve as nuclei for the condensation of water vapor in the upper atmosphere and thus lead to the increase of cloudiness and of rainfall, which may be entirely independent of heat effects.

LATEST COMET TO RETURN THIS YEAR

A COMET whose terrestrial history is more significant than its celestial record has returned to our evening skies, bringing with it an example of the results of international coordination. "Pure science knows no international barriers" is a statement made by modern scientists, but often its truth is belied by the serious facts of war.

But the heavens are still free hunting-grounds for all men, and friend and foe alike coordinate their efforts in tracking down its vagabonds, chief of which are the ever-mysterious comets. The latest wanderer into our embroiled part of the solar system is what astronomers prosaically call "periodic comet Grigg-Skjellerup."

According to Dr. Harlow Shapley, director of Harvard College Observatory, the new visitor might well be called the international salesman of the sky, for it represents first New Zealand, then Finland, then England, Belgium, the United States, Sweden, Denmark, and last, but not least, Japan. No two countries figure twice in its history, which begins with its discovery by the New Zealander, Grigg, in 1902.

The latest rediscovery of comet Grigg-Skjellerup has been made by a Japanese astronomer, S. Kanda, our information coming in the form of a cable from Lund, Sweden, where it had been received from Copenhagen, Denmark, which had received the news from Japan. (In the past year, Lund has replaced Copenhagen as a clearing house for European and Asiatic information.)

However, Kanda's observation was no news to American astronomers, as the Belgian-American, Dr. George Van Biesbroeck, at the Yerkes Observatory of the University of Chicago, had already seen the comet on April 11. Dr. Shapley stated that announcement of this failed to reach Lund, as cablegrams and radiograms can not go through, and Harvard's regular announcement cards, sent by mail, are apparently still in transit.

Finland enters this comet's history in 1922, when Skjellerup rediscovered it; after that it was seen in 1927 and at five-year intervals. Its return this year was therefore expected, and the position reported by Kanda is almost exactly at that place predicted by English astronomer Cripps (not Sir Stafford).

Amateur astronomers may want to look for comet Grigg-Skjellerup, which Kanda reported to be 10th magnitude on May 9. It is moving rapidly through the southeastern part of Gemini in a northeasterly direction. Its positions are:

May 17: right ascension 7 hours 37 minutes, declination 15 degrees 4 minutes north;

May 25: right ascension 8 hours 11 minutes, declination 19 degrees 32 minutes north;

June 2: right ascension 8 hours 53 minutes, declination 25 degrees 15 minutes north.

—CHARLES A. FEDERER, JR.

A NEW INSECTICIDE

A NEW insect-killing chemical, derived from Southern pine, promises to increase American independence of war-pinched imports. The substance, discovered by chemists of the Hercules Powder Company at Wilmington in the course of research on turpentine and pine oil, can be substituted for pyrethrum and rotenone in fly-killing sprays used in homes and dairy barns. It is stated to be effective against such domestic pests as mosquitoes, roaches, moths, ants, mites, silverfish, bedbugs, centipedes and spiders.

Pyrethrum, at present the principal ingredient of insect

sprays, was formerly practically a monopoly of Japan. Now it is produced on a large scale in the British African colony of Kenya, but lack of shipping has cut the supply. Rotenone, the other great fly-spray poison, comes from plants that grow in the East Indies and also in South America. But the Japs have the East Indies for the time being, and shipping lack again imposes restrictions on the South American supply. Promise of a large supply of home-made insecticide is therefore welcomed by spray manufacturers and users.

After trials on laboratory fly populations, the claim is made that the new material kills females as effectively as it does males. For some unknown reason, pyrethrum sprays have been chiefly effective against male flies. Obviously, a better kill of females is a great advantage.

The cost of the new insecticide is said to compare favorably with that of pyrethrum. Chemically, it is defined as the thiocyanoacetate of a secondary terpene alcohol. For convenience, it has been given the trade name Thanite.

Experimental work with the killing agent in fly sprays has been carried on by a cooperative fellowship at the University of Delaware under the direction of Dr. L. A. Stearns, and in livestock sprays by the Kansas State College of Agriculture under the joint direction of Dr. Roger C. Smith, of the Entomology Department, and Dr. F. W. Atkeson and Dr. A. O. Shaw, of the Dairy Husbandry Department.

SURGICAL OPERATION FOR DEAFNESS

DELICATE surgery which resulted in improved hearing for 88.9 per cent. of 117 patients who were hard of hearing is described by Dr. George E. Shambaugh, Jr., of Chicago, in the current issue of the *Journal* of the American Medical Association.

The patients' hearing had been damaged by an abnormal growth of sponge-like bone over the tiny "window" in the inner ear which normally admits the sound waves. Termed otosclerosis, this condition was found the cause of hearing loss in 70 per cent. of cases studied by Dr. Shambaugh in Washington.

Normally the sound waves are carried by the ear drum and the hammer, anvil and stirrup bones to the auditory nerve, and thence to the hearing centers of the brain. The sound is transmitted to the auditory nerve through a tiny oval window. In patients with advanced otosclerosis this little window is closed to sound, and the patient's hearing is impaired.

Dr. Shambaugh cuts a new window in the inner ear with a dental finishing burr. He uses a binocular dissecting microscope to help him see the very tiny inner ear structures while making the new window. During the operation, Dr. Shambaugh constantly irrigates the ear to wash away every particle of the bone dust while making the window to prevent the dust from falling into the window and leading to the formation of new bone which would close the new window. Such closing of the new-made window has been a cause of failures of the operation in the past.

Use of the microscope and the irrigation are Dr. Shambaugh's contribution to the so-called fenestration operation. He has successfully restored permanent hearing to most of his 117 patients by means of this operation over a period of more than three years.

Dr. Shambaugh considers restoration of hearing probably permanent if it remains after six months. If the operation is successful, the patient hears better than with a hearing aid.

However, Dr. Shambaugh states that the operation is not always successful and in some cases the hearing is made worse. Further, the operation is of no value if the auditory nerve does not function normally. His patients, therefore, are selected with care.

PSYCHIATRIC EXAMINATIONS OF NAVAL RECRUITS

How Navy psychiatrists are saving money and precious manpower for both the Navy and local communities by returning to suitable jobs in civilian life those men likely to break mentally under the unusually severe strains of sea warfare was disclosed by Commander Uno H. Helgesson before a joint meeting of the American Psychiatric Association and the American Psychopathological Association. Very prompt psychiatric first aid treatment for battle casualties was also urged. He suggested mobile first-aid posts which could be sent right to the scene of battle.

The Navy is not the cold, impersonal machine that military organizations are commonly thought to be, Commander Helgesson said. Consideration has been given to the effects on the individual and community morale of sending a man home after he has been sworn in.

So the Red Cross was requested to furnish psychiatric social workers who act as liaison between the Navy and the community and family. Through local Red Cross chapters, psychiatric social workers at the Navy training stations have been able to get the rejected men into their old jobs or into new ones better suited to them, or they have put them into the hands of competent clinics or welfare organizations for such assistance as they need. It is explained to the rejected man that as a civilian worker he has a function as important in this war as that of a sailor.

Those rejected include the "weak sisters," the "gripes" and those who resent authority and the "sick bay addicts" who can rarely be counted on in an emergency, as well as men with epilepsy or the early symptoms of actual mental disease. If such men were not removed from duty early in their service, it would deprive war industries of workers and at the same time be a great loss to the Navy.

"The economic loss from this kind of casualty, although it probably would run into the millions in a year's time, is not so serious as the loss in manpower and efficiency," Commander Helgesson said.

"We have no unlimited supply of commissioned officers and petty officers to train our new recruits. All the money in the world can not buy a ready-made experienced commissioned officer or petty officer. Economy of manpower is, therefore, particularly essential among officer and petty officer personnel."

Mobile psychiatric first aid posts were urged by Com-

mander Helgesson to care for psychiatric battle casualties. These acute mental conditions following combat are of quite a different nature from peace-time neuroses. They are mental breakdowns in the face of difficulties which are not the common experience of man. It is a well-known fact that the majority of these combat casualties can be returned to useful civilian occupations if treated early enough. The trouble is that naval casualties occur in widely scattered areas and a long time, sometimes weeks, may elapse before they reach a naval hospital.

Among British casualties and also American, there are some who go into a deep stupor like that in some cases of the mental disease schizophrenia. But in the case of the battle casualties, it has been found that prompt treatment results in quick and relatively complete improvement. This peculiar form of psychiatric battle casualty seems to be more common in this war than in any before.

FLUORINE AND TOOTH DECAY

HOPE of preventing tooth decay by swabbing a chemical solution on the teeth appears in a report by Dr. Virgil D. Cheyne, of the School of Dentistry of Indiana University, in the *Journal* of the American Dental Association.

The solution is potassium fluoride. Drinking water that contains fluorides causes the ugly condition of mottled enamel, but even a small amount of fluorides in the water, it has been discovered, prevents tooth decay. However, this effect, it was formerly believed, depended on the fluorides getting into the teeth *via* the drinking water at a very early age, while the teeth are being formed in the jaws. Recent experiments by others suggested that the fluorides might get into the teeth enamel after the teeth had erupted. Dr. Cheyne swabbed a potassium fluoride solution every three months or so on the "baby" teeth of 27 four- to six-year-old children from the underprivileged sections of Indianapolis. All the children had decayed teeth at the start of the experiment. One year later these children and nineteen others with the same economic and dental status were reexamined. These nineteen untreated children had developed almost twice as much new tooth decay as the 27 treated children. Further tests on more children over a longer period of time will be needed for final evaluation of the method, but the results so far point to a new method of attacking the widespread problem of tooth decay.

ITEMS

NEW earthquake shocks felt in Guayaquil, Ecuador, on Friday, May 15, were not centered at the same point as the ones that caused death and wreckage in the city on the previous day, according to the report of seismologists of the U. S. Coast and Geodetic Survey after examining wired data transmitted from three American observatories. At least one of the disturbances originated under the sea bottom about 100 miles off the coast, in latitude 1.5 degrees north, longitude 81.5 degrees west. It was a fairly strong shock, beginning at 4.38.6 A.M., E.W.T.

THAT realistic background of beautiful scenery or exotic landscape that you see in a movie may be merely another movie. Instead of going on location for all outdoor scenes, the new technique of projecting allows producing companies to work indoors with all the comforts and advantages of studio life and the results of shooting in the great outdoors. R. W. Henderson, of Paramount Pictures, told the Society of Motion Picture Engineers meeting in Hollywood that this relatively new method of photographing for background purposes other motion pictures projected on a translucent screen allows the making of some scenes that would be impossible by any other means. The projection background method is also resorted to when unforeseen difficulties delay production schedules.

THAT ready-made spare parts for repairing defects in human skulls are now available, is reported by Dr. Claude S. Beck, of the School of Medicine of Western Reserve University, in the *Journal* of the American Medical Association. They are metal plates made of the alloy, vitallium, which have been found most satisfactory for repair of skull and other bone defects. Heretofore plates used to repair skull defects, for example, to replace a piece of skull removed in case of tumor, have been specially cast from a pattern of the defect. Dr. Beck had "the idea of using plates made up in various sizes and kept in stock so that the surgeon could use them when needed." The plates might be useful in the care of war wounds, he points out. If the wound is not infected, the plates might be put in at the first operation. Almost any defect can be repaired by plates whose measurements are 6, 10 and 14 centimeters in length and 2 or 3 centimeters in width.

THE U. S. Public Health Service has published a report of what it believes is the first discovery of a live mouse on a passenger plane in quarantine. The animal was found in the galley of an airliner from San Juan, Puerto Rico, after the plane landed at the quarantine station in Miami, Fla. The Federal health service points out that mice have been found to carry the germ of lymphocytic chorio-meningitis, a dangerous but little known disease which attacks humans. More important, they state, is the possibility of plague-infected rats boarding planes unknown to passengers or crew, and contaminating food.

ONE million pounds of dehydrated apples are being bought by the Army for apple sauce, apple pie and eating with cereal. One part (by weight) of the dehydrated apple "nuggets" equals seven parts of sauce or pie filling, and is superior in flavor to the dried fruit, Army food experts say. So far the apple is the only dehydrated fruit, except the lemon, being purchased for U. S. troops, because for most fruits now bought on a quantity basis the dried form is satisfactory. The dehydrated fruit is said to have a "delicious, tart flavor."

ORGANIC changes, rather than psychological, may explain the results obtained from electric shock therapy, in the opinion of Dr. Bernard Glueck, Jr., of Stony Lodge, Ossining, N. Y., reported at the Boston meeting of the American Psychopathological Association. In five patients suffering from manic-depressive and involutional psychoses, the organic disturbances of the brain cortex and other physical results from electro-shock therapy may explain their prompt response to this treatment.