SCIENCE NEWS

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FAMINE AND EPIDEMICS IN CHINA

THE worst famine in China's many centuries of periodic mass hunger and one of the worst epidemics of disease in the annals of mankind seem now to be inescapable as a result of the flood of China's Sorrow, the mighty Yellow River.

The flood of the great Hwang Ho, whether man-made or brought on by natural causes or both, is not going to recede soon. It is going to get worse. Pouring into the great plain of the provinces of Honan and Shantung on the heels of the torrential rains of the past few days will be the "spring melt" from the mountains of Tibet, the source of the Yellow River. This peak may be expected about mid-July. Two factors, flood and war, make the situation more serious than ever before. Cutting wide swaths through fertile farmlands as much as thirty feet below the bed of the river, the Hwang Ho is adding indescribable destruction to crops to the extreme dislocation caused by the war.

To the millions already made homeless by the war are being added the millions now homeless as a result of the flood. When the defeated, but not conquered, Chinese armies retreated westward, with them came uncounted millions of civilians fleeing the Japanese. Their care and, particularly, their feeding became a burden thrust upon Honan and Shantung, already burdened by having to support upwards of a million men under arms. To this already acute food problem is added the problem of feeding those who can look forward to nothing but a harvest of muddy water from their rice paddies and grain fields. And, it must be remembered, even in the best times, food is scanty enough in China.

It is on these facts that the expectation of a devastating famine is based. That famine will strike a population enormous portions of which are already weakened in their resistance to disease through China's semi-permanent state of mass malnutrition and as a result of the protracted war. The epidemic of disease, which may be cholera or typhus or both with dietary diseases as a trimming, is predicted upon the basis of the regularity with which disease follows flood and famine, particularly in a land where sanitary conditions are poor.

Reports from China during the past few months have persistently reported that Chinese refugees and soldiers alike are badly infected with typhus-carrying lice. An epidemic of typhus of major proportions is already regarded as long over-due. That such an epidemic will not take hold and spread with terrible rapidity in the severe conditions attending the flood—hunger and overcrowding among refugees of both the war and the waters—appears to be something not even the world's most enthusiastic optimist could hope.

A complicating factor appears in the report that the course of the Yellow River, which has changed several times during past centuries, is again changing, heading this time toward the Yangtze Kiang, China's mightiest river and one of the greatest streams in the world. Should the two rivers actually unite and should Chinese breach the dykes at Hankow in the event their temporary capital city falls to the Japanese, the resulting flood of the enlarged Yangtze would be the most disastrous flood in the history of the world. A major flood of the Yangtze would still occur, even if the Yellow River adheres to its course, and only the Yangtze went on a man-made rampage. The half of China's granary left untouched by the Yellow River would be ruined by an overflowing Yangtze.—LEONARD H. ENGEL.

ICEBERGS IN THE NORTH ATLANTIC

GIANT icebergs are still pouring down from Arctic waters into the steamer lanes of the North Atlantic, according to reports of the Hydrographic Office of the U. S. Navy. Already the year 1938 has seen over 700 bergs reported by the International Ice Patrol Service. This is nearly 50 per cent. more than the average number, per year, since 1900. This average is 421. Originally the number of bergs forecast for 1938 was 530 but this number was exceeded before the first of June. Since then they have kept coming down from the north and are "still very heavy."

The current influx of ice menace means that European-bound steamers to northern ports must still, for some weeks, take the more southerly path which takes them off the "tail" of the Grand Banks of Newfoundland, rather than the quicker great circle path which penetrates the center of the iceberg danger area.

Many bergs, this year, are reported within a few miles of the spot at latitude 41 degrees, 46 minutes north, and longitude 50 degrees, 14 minutes west, where the *Titanic* sank on the night of April 14, 1912. It was this disaster which spurred international cooperation that has since made the Ice Patrol possible. Four times each day the tiny ships of this patrol send, by wireless, the positions of icebergs sighted.

There have been only three years since 1900 in which more than 1,000 icebergs have been sighted. In 1909 and 1912 some 1,020 bergs were reported and in 1929 the figure reached the peak of about 1,350 bergs. Nearly 900 bergs were reported in 1935 and the totals for 1938 may approach this magnitude before the coming of summer causes their retreat late in June and early in July.

WEATHER BUREAU RESEARCH

DR. WILLIS RAY GREGG, chief of the U. S. Weather Bureau, reported to the meeting of the American Institute of Electrical Engineers, that the Jones-Bankhead Act for research in the Department of Agriculture has made possible a study of the origin of winter's icy polar blasts. These polar air masses, Dr. Gregg pointed out, move southward and turn into the cold waves that invade and spread over large sections of the country. Upper air soundings by airplane and radiometeorographs have been made at Fairbanks, Alaska, Fort Smith, Canada, and

along the nation's northern border, which help trace the origins and movements of these polar air masses.

Through funds now available studies are also being undertaken to improve greatly the summer forecasts of thunderstorms and precipitation through the farm areas of the nation. The results thus far "give a substantial basis for optimism that forecasting of summer rainfall, including thunderstorms, will be materially improved and that the period of the forecasts can be extended to something like five days, possibly longer."

Studies are also being made of the ozone content of the air in its relation to atmospheric circulation. Measurements indicate that ozone is greatest in amount a short distance to the rear of low pressure areas and least in the corresponding part of high pressure areas. Dr. Gregg pointed out "It would seem then to be a valid assumption that the variations in the amount of ozone are related not to the barometric pressure itself, but rather to the sources of different air masses, the ozone being most abundant in polar and least in tropical air. There is thus the possibility of utilizing the measurements of ozone and its variations in forecasting the development and movement of different types of weather that are associated with fronts, anticyclones, cyclones, etc."—ROBERT D. POTTER.

A PREHISTORIC BREWERY

WHAT is believed to be a prehistoric brewery has been discovered in the Big Bend region of Texas by Frank M. Setzler, anthropologist of the Smithsonian Institution. Mr. Setzler, who has just returned to Washington, reports that he was seeking dwelling sites of a mysterious ancient Indian people whom he first detected in Texas caves seven years ago, when he came upon this extraordinary cave.

Clues which he and his cowboy assistants unearthed at the cave that suggest the theory that this was once a prehistoric ceremonial brewery include: (1) A great accumulation of fire-cracked stones inside and outside the cave, indicating a lot of cookery. (2) Although the débris was nine feet thick, it contains few animal bones left by diners, but a great deal of the débris consists of ashes of sotol. This sotol is a desert lily abundant in the region, from which Indians are known to make a potent alcoholic drink. It might be argued, Mr. Setzler says, that the sotol was used merely as firewood, and yet, what was cooked in such quantity at the cave, if not this plant? (3) Numerous stone implements in the cave trash include few that suggest housekeeping. The inference is that many Indians worked at the place, but that it was no popular dwelling. (4) A boulder with a big hollow fully a foot deep ground into it was found at the cave, and near-by was a large roller pestle. Such a combination of stones might suggest a big mortar and pestle. However, this hollowed boulder may have been the chief brewing kettle, in which roasted sotol was crushed and covered with water.

The Indian process of brewing the desert lily is to heat it, increasing the sugar content. Then they press the juice and let it ferment. This brewing method was used by the Indians, when white explorers came to this country, and it may well have been known far back in Indian prehistory.

Aside from being fairly certain that these Indians of the Big Bend caves were prehistoric, since they had no trace of European goods, Mr. Setzler says that he can not yet determine their antiquity. His hard digging into their dusty old cave shelters reveals the Texas cave dwellers as Indians who did little, if any farming. They had not acquired the useful art of making pottery. Their skulls are so long, compared to width, that they have the distinction of being the world's longest-headed people.

MARINE TELEPHONES FOR COASTAL VESSELS

BECAUSE modern aviation has demanded a superior radio telephone, commercial coastal vessels and yachts off the Atlantic seaboard can now install equipment which will permit persons at sea to talk with any telephone subscriber in the United States.

In a symposium at the meeting of the Institute of Radio Engineers, investigators from the Bell Telephone Laboratories, New York City, described the details of the new radio telephone which is designed for the contingencies of maritime use, and was developed from airplane radio telephone. Simplification of tuning makes it possible for relatively amateur operators to use the system. Speech is by a conventional handset type of mouth piece and ear-phone. Two dial switches, marked with station identification, enable the phone to be tuned into any of nine shore station channels in the short wave band of radio frequencies.

New features, not previously available in a mobile type of transmitter, include a special voice-controlled switch instead of the "press-to-talk" switch. The transmitter is put on the air a few thousandths of a second after talking begins, a time short enough to avoid objectionable clipping of the initial speech sounds. The carrier wave is maintained for a short period after talking ceases to prevent the transmitter from going off the air between syllables or words. A switch, mounted on the telephone stand in place of the ordinary dial, permits the radio telephone to be transferred to ship-to-ship radio frequencies or to the special Coast Guard emergency band. Part of the system of receiving the ship's telephone calls consists of on-shore, remotely-controlled radio receivers that pick up the marine telephone traffic.

Those participating in the symposium included: C. N. Anderson, H. M. Pruden, S. B. Wright, S. Doba, A. C. Dickieson, R. S. Bair, H. B. Fischer, all of the Bell Telephone Laboratories; W. M. Swingle, the Chesapeake and Potomac Telephone Company, Norfolk, Va., and A. Bailey, American Telephone and Telegraph Company, New York.

THINKING AND THE FRONTAL LOBES OF THE BRAIN

DR. RICHARD M. BRICKNER, of New York City, in reporting to the Americal Medical Association at the San Francisco meeting, suggested that his patient who had the whole front part of his brain removed gives a clue to the kind of thinking done not only by apes and monkeys, but presumably by man's earliest human ancestors.

More important to human medicine is the fact that Dr. Brickner's researches give new information on the anatomy of thinking. While thinking goes on in the back as well as the front of the brain, for complicated thought, such as combining two thoughts into a third, the front part of the brain is required. The patient without forebrain was not able to accumulate memories and then store them in the back of the brain. If he had been without speech, Dr. Brickner believes, his situation "would not be very different from that of a human ancestor."

The "slight glimmer of the action of the simian mind" was obtained from the patient's restlessness, his use of jargon mingled in his conversation, his boastfulness, his somewhat too good appreciation of the funny aspects of things and his own comical sallies.

This research involved the study and comparison of two patients who had parts of their brains removed. One patient had both frontal lobes removed. It was this patient's thought processes that gave the clue to simian thinking. His judgment about simple things is satisfactory, but he "is lost in evaluating matters which require putting many factors together," Dr. Brickner reported.

The second patient, who had only one frontal lobe removed, had this same difficulty in what Dr. Brickner called synthesizing thoughts, but was conscious of this defect in his thinking processes. He explained it to Dr. Brickner in the following way: He knew the initials E. A. and Q. were those of his name and he could think of E, and A, as composing the unit E. A. But although he knew the initial Q, and knew it belonged after the E. A. he could not think it so as to make the unit E. A. Q. This defect confused the patient and made him lose confidence in himself. His consciousness of this thinking defect gave the clue to the function of the frontal lobe.

This patient was able, two months after his operation, to return to his old job and perform it satisfactorily, according to his employer. The other patient, who lost both frontal lobes, often talked about having to get back to work, but eight years after his operation he had done nothing about this. He had lost initiative.

The differences in the two patients show, Dr. Brickner believes, that the intellectual function of the frontal lobes is bilateral, somewhat as the function of the eyes and the kidneys are bilateral. If one kidney becomes diseased and is removed, the other is able to carry on for both, and similarly if one eye is removed, the other can carry on to a large extent, though the patient has to turn his head to see from the side of the missing eye. The same thing apparently happens when one frontal lobe is removed. The patient can go on thinking with very little difficulty and is apparently unchanged, as all doctors have observed in this type of case. But with both lobes removed there are profound changes in the patient's thinking. These changes are quantitative and not qualitative, Dr. Brickner believes. The newer units in the back part of the brain which do a certain amount of thinking are apparently connected with units in the front of the brain on each side. A certain number of these frontal units are necessary for higher intellectual processes.

ITEMS

DR. HARLOW SHAPLEY, director of Harvard College Observatory, at the recent meeting of the American Association of Variable Star Observers, held at the Ladd Observatory at Brown University, stated that the galaxy of stars containing the earth and the sun, often thought of as a flat disk in space, is not as thin as it may seem. It would take light at least 100,000 years to cross the galaxy at its thickest part even though light travels at approximately 186,000 miles a second. A survey of 2,300 Cepheid variable stars of the cluster type, having periods of less than a day, made possible the new estimate of the shape of the galaxy. Our galaxy actually is surrounded by a thinly-populated spherical aura or halo of stars. In this it resembles the Andromeda nebula, one of the nearest of the spiral nebulae. The isolated star most remote from the plane of the Milky Way, known as BE Virginis, is distant 130,000 light years.

IT was reported to the meetings of the American Physical Society by Dorothy W. Weeks, of Wilson College, and Professor George R. Harrison, of the Massachusetts Institute of Technology, that a new and superior tool for identifying chemical elements by the characteristic lines which they emit when excited by an electric arc, or other means, is an improved spectrum of the positions of the very complex lines in the spectrum of iron. The spacing of these lines through the colors of the visible, and invisible, spectrum differs from one element to another and gives a rapid means of identification, even in very minute samples. The number of identified lines in the iron spectrum—which already number in the thousands—has now been trebled. The basic method in locating the position of a line in the spectrum of an unknown element, is to photograph the unknown spectrum and then, immediately adjacent to it, the spectrum of iron. The complex iron spectrum, with each of its line positions known, serves as a reference standard to help locate the lines of the unknown spectrum. By trebling the number of lines positively identified in the iron spectrum, scientists now have smaller gaps in their reference positions and the errors of measuring between reference points are lessened.

A NEW copper alloy, consisting of nearly pure copper and having the strength and hardness of steel, is announced by the Westinghouse Electric and Manufacturing Company. Containing small amounts of silver and chromium, "Cupaloy," as it is called, has been laboratory-tested to determine its hardness. An engraved insignia on a sample of the metal made a deep impression in a block of steel against which it was pressed by a hydraulic press; the copper alloy was scarcely marked. P. H. Brace, consulting metallurgist of the Westinghouse research laboratories, five years ago initiated the experiments which have culminated in the practical application of the alloy as welding electrodes, slip rings for generator rotors, cylinder heads in internal combustion engines and for other uses. Special heat treatments which make the atoms in the alloy re-assort themselves are the key to the manufacture of the substance. The alloy has a high electrical conductivity.