SCIENCE NEWS

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THE COOLING PLANET

SNOWSTORMS of silica once showered down on our cooling planet, and primitive life probably originated in the polar regions, according to Dr. Perley G. Nutting, of the U. S. Geological Survey, writing in the *Journal* of the Washington Academy of Sciences. A planet, starting as a mass of vapor torn from the sun and finally evolving into the present condition of the earth, passes through a number of interesting epochs as its temperature falls.

The dense vapors of a planet at 5,000 degrees Centigrade, which is a reasonable temperature for a planet just drawn from the sun by a passing star, would be subject to rapid cooling by radiation from its outer layers, Dr. Nutting suggests. The body would be violently agitated, as slight cooling would permit combinations of the elements. Such compounds would condense to liquids and fall back as rain to where the temperature was sufficient to vaporize and dissociate them.

When the planet had cooled a thousand degrees, the first liquid core would be formed of liquid iron and iron alloys. At this temperature the atmospheric pressure above the liquid surface was estimated by Dr. Nutting to be as much as 32 tons per square inch, as compared with our present atmospheric pressure of 14.7 pounds per square inch.

The first solids, occurring at 3,000 to 2,500 degrees Centigrade, would probably appear as floating on the liquid sphere. Dr. Nutting suggests that the earth's atmosphere at lower levels consisted mainly of heavy metallic vapors and the vapors of a few stable compounds of high density which would condense at higher levels, rain down, and revaporize. At intermediate and higher levels large quantities of water vapor (as much as 1.85 tons per square inch) would condense and rain downwards, but never reach the surface. At the outer limits of the planet would be cool, free gases.

Silica and silicates in various forms would have been created by the time the planet had cooled to 1,500 to 1,200 degrees. Miles deep, they would cover the old core of the earth and suppress all but a few metallic vapors.

THE DECREASED DEATH RATE IN THE ARMY FROM WOUNDS

AMERICAN physicians are saving from five to nine times as many soldiers from dying of battle wounds in this war as was possible in World War I, it appears from casualty figures reported by Brigadier General Norman T. Kirk, the new Surgeon General of the U. S. Army, at the Chicago meeting of the American Medical Association.

The figures he gave covered the period during the phases of the North African campaign before the Army moved up into northern Tunisia. The death rate at that time in the evacuation hospitals was from 2½ per cent to 3½ per cent, compared to a death rate of 15 per cent. to 18 per cent. in evacuation hospitals in the last war. This remarkably low mortality was achieved in spite of great difficulties in evacuation. In some places eight-mile litter carries were necessary to get the wounded from the field to the ambulances. The ambulances had to travel 20 to 30 miles over mountain roads to evacuation hospitals.

For the future, the Army Medical Department hopes to have exclusive airplanes and possibly even helicopters for the evacuation of the wounded. So far in Africa, 13,000 sick and wounded have been evacuated by plane. But these evacuations were in planes used to take supplies forward. Helicopters are being experimented with but so far none is in actual service for evacuation of wounded.

Plasma, surgery and sulfa drugs were credited in that order for the great saving in lives. Sulfa drugs will always come second to surgery and third to plasma in saving the wounded, he said. This is because shock and hemorrhage and bomb or shell fragments are the biggest threats to the life of the wounded.

Plasma is given at the clearing stations and sometimes at the collecting stations. At the evacuation hospitals, the surgeons clean the wounds, remove shell or bomb fragments and institute drainage. From 80 per cent. to 85 per cent. of the casualties, he said, are due to shell and bomb fragments, which carry more clothing and infection in the body than rifle bullets. In some places, because of evacuation difficulties, auxiliary groups of surgeons were sent into the forward area to perform operations.

An astoundingly small number of wounded have had the serious bone infection, osteomyelitis, which occurred in 75 per cent. of compound fractures in the last war. In all the base hospitals in Africa, up to April 30, there were only 70 cases of this condition. In one group of 373 compound fractures, there were only five or six cases of osteomyelitis, instead of the 279 which the last war's 75 per cent. rate would have given.

The percentage of survivals in cases of head wounds is much greater than in the last war, as is the survival in cases of abdominal wounds, with even those coming to operation late largely surviving. Of great help for these cases, General Kirk said, is the Levine tube, which goes into the stomach through the nose and by suction keeps the stomach empty and prevents distention. Most fracture cases are transported to the rear in plaster casts, but the casts must be padded. For fractures of long bones, General Kirk is opposed to the method widely used in the Spanish Civil War, of keeping the leg or arm in a plaster cast until the bone sets. Traction is essential in these cases, he said. Only 12 cases of gas gangrene, with one death, occurred, while the Army was still in the South.

The Army has medical installations in every country in the world not held by the Axis, and as soon as it moves into Axis territory, it expects to set up medical units to care for the civilian population. This will be done in order to protect the Army from infectious diseases prevalent among civilians.

The general health of the Army in Africa has been excellent, better than was expected and better even than at home. Venereal diseases are the biggest problem.

"We are going to need more doctors," General Kirk declared. "We must have enough to win this war, and we haven't started fighting yet. Tunisia and Guadalcanal were only side plays."

He added that he appreciated fully the need for leaving enough doctors at home to care for the civilian population. He quoted General Eisenhower as saying that the outstanding service of the whole A.E.F. was that rendered by the medical department.—JANE STAFFORD.

METHODS OF RECOVERY OF SECONDARY OIL

NEARLY two thirds of the nation's oil is left underground by ordinary methods of recovery, representing an estimated seventy billion barrel reserve which challenges the ingenuity of petroleum engineers, according to a report by D. R. Knowlton, director of production for the Petroleum Administration for War, to the New York meeting of the American Institute of Mining and Metallurgical Engineers.

"The most economical and consequently the best source of additional oil for our war program, aside from exploratory drilling, lies in secondary recovery," he maintains. "It is the engineers' problem to get as much of that oil as economically as possible."

At least three billion barrels of the residue left after the easily obtainable oil is pumped can be recovered even by present methods, Mr. Knowlton believes, at present or slightly increased price.

Efforts to find new fields at a cost of millions of dollars per year have met with only moderate success. Unless our record of discoveries is substantially better during the next few years than it has been during the last few, our domestically produced oil will be insufficient to meet our demands, Mr. Knowlton warns.

New knowledge about how to keep up pressure in oil reservoirs as pumping continues and how to control the rate of flow enables engineers to recover much of the so-called secondary oil while still producing the primary oil. Mr. Knowlton urges that new research projects be undertaken to study these methods under varying reservoir conditions.

A NEW SMELTING PROCESS

COAL strikes need mean nothing to the steel industry if a smelting process newly patented by Thomas V. Moore, of Houston, Texas, comes into general use, and the supply of natural gas holds out; for the new method substitutes natural gas and hydrogen (which can be made from some types of natural gas) for the coke on which present-day smelting depends.

Instead of charging a blast furnace with alternating layers of coke, iron ore and limestone, as in present practice, Mr. Moore sifts finely-ground iron ore down through a hopper at the top of a tall tower. Part-way down, the ore particles are met by an upsweeping blast of flaming gas, which heats them to the incandescent state at which they are ready for chemical reaction.

Settling slowly through the turbulent blast, the particles next pass into a zone where hydrogen at a high temperature (above 1300 degrees Centigrade) removes the oxygen from the oxide ore, releasing the iron in molten condition. If the ore is sufficiently impure to require a flux, bits of limestone, fed in through the same hopper, here take up the impurities and form a slag.

Next, the iron particles pass downward through a third zone of hot gases, this time one in which there is an excess of uncombined carbon. The iron takes up some of this, to form the iron-carbon alloy commonly known as pig iron.

Molten iron and liquid slag are drained off through separate openings at the bottom of the furnace, so that the process can be made continuous.

U. S. patent 2,321,310, issued on the method, has been assigned to the Standard Oil Development Company.—FRANK THONE.

ITEMS

A DIVERGENT beam has successfully been used in taking x-ray photographs of crystals. This method promises to be extremely useful in studying the arrangement of atoms in the crystal. As a short exposure is required, it will aid particularly in research with short-lived crystals. This new development in x-ray photography, reported by the British Council, was made at the Royal Institution, London, by Dr. Kathleen Lonsdale with a tube designed by Dr. A. Muller. When the planes of atoms in a single crystal reflect a fine x-ray beam, the reflected beams photograph as sharp black spots on a light background. Substituting a divergent beam for the usual cylindrical pencil, the background becomes darker and the former spots open out into curves. Besides the reflection curves, which are black, the photograph shows "deficiency" curves. These lines are lighter than the general background because radiation in certain directions has been removed from the original beam.

BETTER beer and ale can be expected from recent crosses of European and American species of hops, accomplished for the first time at South-Eastern Agriculture College at Wye, Kent. Reports of success in developing five promising new varieties has been received in Washington from the British Council; the hops were planted in this country and Canada, as well as in England. Acceptance for commercial propagation of the new varieties, which are disease-resistant as well as superior in flavor, represents the culmination of more than a third of a century of patient improvement breeding initiated by Professor E. S. Salmon, and continued under the leadership of Dr. R. G. Hatton, Jesse Amos and F. H. Beard.

DARK green is not always dark in color to the eye of the camera. A new dark green camouflage paint reflects infra-red rays along with ultraviolet rays, and shows up light in aerial infra-red photographs. The new paint is a development of the du Pont laboratories at Wilmington. Infra-red photography is based on the fact that common objects reflect visible light and infra-red rays in a different manner. Most green vegetation reflects infra-red rays. In the infra-red camera used in aircraft, vegetation appears light. An object surrounded by vegetation and camouflaged with ordinary paint the color of the vegetation stands out black against white in the photograph. With the new dark green paint it is concealed.