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SCIENCE NEWS LETTER

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Man-Made Snow

See Page 6

A SCIENCE SERVICE PUBLICATION

MEDICINE

Plastic Tubes Save Lives

Working against thrombosis, plastic tubes are used to determine the time it takes blood to clot. Plastic does not accelerate coagulation, as glass tubes do.

► TUBES of "lusteroid," a synthetic plastic, which may be destined for a life-saving role, were introduced to fellow scientists by Dr. Arnold Kadish of the Mayo Clinic at the meeting of the American Association for the Advancement of Science.

The tubes are used to determine coagulation time, or the time it takes blood to clot. They may be valuable for indicating a tendency to thrombosis, Dr. Kadish suggested.

Thrombosis is a condition in which a clot or plug forms in a blood vessel. When it affects an artery of the heart, it is known as coronary thrombosis and is frequently fatal. If doctors could detect a tendency to this condition, they might be able to save thousands of patients by the use of heparin or dicoumarin, two relatively new anti-clotting chemicals. Sudden death from thrombosis a few

days after apparently successful operations or childbirths might also be prevented if doctors could tell in advance that the patient had a tendency to the condition.

Coagulation time ordinarily is determined in glass tubes. The glass tubes, Dr. Kadish pointed out, accelerate coagulation thus masking any excessive clotting tendency of the blood when it is in the veins and arteries. Lusteroid tubes have less tendency than glass to accelerate coagulation of the blood.

In studies of 50 patients, he found the normal lusteroid coagulation time to be 14 to 28 minutes in the particular tubes he used. Other tubes have different normal values, so the tubes must be standardized for use.

In nine of 18 patients with arteriosclerosis obliterans, in which the thickening of the artery wall completely closes the

lumen or bore of the artery, lusteroid coagulation times were definitely shorter than normal.

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GENERAL SCIENCE

Dr. Harlow Shapley Elected 1947 President of AAAS

► DR. HARLOW SHAPLEY, director of Harvard College Observatory and president of Science Service, was elected president of the American Association for the Advancement of Science at Boston to serve during 1947 and deliver the retiring presidential address at the 119th meeting. Inaugurating a new system naming a president-elect, Dr. Edmund W. Sinnott, Sterling professor of botany at Yale University, was named president-elect to take office at the end of the Chicago meeting which will be held on Christmas holidays.

Dr. George Baitzell, Yale professor of biology and secretary of Sigma Xi and Dr. Kirtley F. Mather, professor of geology at Harvard, were elected members of the AAAS Council for four-year terms.

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BIOLOGY

Scientists Report Steps To Harness Chlorophyll

► THE FIRST successful step in harnessing the green chlorophyll of leaves to a food manufacturing process that can control may have been taken in experiments reported to the American Association for the Advancement of Science by Dr. H. C. Eyster of Antioch College, Yellow Springs, Ohio.

So far these new experiments under the Kettering photosynthesis Foundation may seem to non-chemists remote from the prime hope of scientists to beat living plant at its own exclusive profit of capturing sunlight energy and store it in the form of starch, sugar and cellulose made from water and air.

This is what Dr. Eyster has done: he has succeeded in making chlorophyll dissolved in acetone hang on to bits of This material absorbs the same energy levels of sunlight that the living plant does. If this can be translated to a considerable scale, it might be put to work in factories, making food and other materials we now get from plants. More important, it may be used to store energy from the sun and release mankind's dependence on dwindling supplies of coal and oil which are the fossilized power of past ages.

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GENERAL SCIENCE

Survival of Man Assured

► SURVIVAL of mankind for the next few thousand years is assured despite any development of superplagues, more deadly atomic weapons, fatal boredom born of knowing everything, or dope that might kill the desire to reproduce.

This is the opinion of a leading astronomer, Dr. Harlow Shapley, director of Harvard College Observatory, expressed in his address as retiring president of both the American Astronomical Society and the Society of the Sigma Xi.

Whether civilization will endure is another matter, Dr. Shapley warned.

"The potential shocks in the very near future are indeed ominous," he said. "Civilization is endangered by strong physics and weak sociology. The frightful power of the atomic bomb has suddenly awakened educated people all over the world to the necessity of heroic social action in order to prevent an unheroic physical disaster. Even without the atomic bomb our urban civilization is in great danger, if men and nations do not control themselves."

Technology and pure science can make

cultural survival irresistibly desirable, Dr. Shapley told the scientists. Science can tempt mankind to minimize localized sovereignties, control national pride when it is obstructive to the maintenance of a world civilization and emphasize the interdependence of national groups. It would be good to experience, a generation hence, a rich world that has not been decivilized by violence hatched from political pride, Dr. Shapley suggested.

"Given time enough, and good intentions," Dr. Shapley said, "the psychologists, the psychiatrists, and anthropologists should be able to explain our social and mental quirks to the world, and teach us how to understand and accept the social and mental traditions of others. Meanwhile we emphasize persistent friendship and tolerance, more correspondence across borders, more travel across the boundaries of nations, more collaboration across the national political lines, until finally the boundaries become worn dim by so much international traffic."

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GENERAL SCIENCE

Science Can Feed World

Three-quarters of the earth's chronically starved population can be fed by scientific knowledge, states Dr. C. F. Kettering, noted scientist.

WE HAVE enough scientific knowledge to allow us to nourish properly the three-quarters of the earth's population—500,000,000 people—who never get enough to eat, Dr. Charles F. Kettering, General Motors research head, told the American Association for the Advancement of Science in Boston in his retiring residential address.

"Only 500,000,000 ever get enough of the proper food," Dr. Kettering said. This is not because of natural limitations. We have the scientific knowledge to provide an adequate diet for everyone if the information were properly applied. The false barriers erected by man himself are responsible. The antiquated social systems, ignorance, stupidity, and war prevent a large percentage of the peoples of the world from enjoying even the most fundamental of the benefits of science."

Even if it turns out that we do not know enough to feed the world, Dr. Kettering believes that we can turn to the green leaf and learn the principles of how to store the energy of the sun and hold it as food.

"The green leaf is Nature's organic chemical laboratory which takes water from the ground and carbon dioxide from the air to make sugars, starches, and oils," he said. "We know little of the process now, but some day we may be able to reproduce it in the laboratory."

Soil depletion will not stand in the way of food production, Dr. Kettering contended, because "if necessity demands, we can go to our inexhaustible supply of minerals in the sea for all the plant food we will ever need to keep our farm land productive, just as we have done to the air for our nitrogen."

Where Is Greatest Need?

The war caused a loss of continuity in many fundamental fields of scientific investigation, Dr. Kettering declared. Since we have been forced out of the fields of past generations, he believes we now have the opportunity to make the future anything we wish. Dr. Kettering called upon the scientists to make a careful analysis of our past to determine

where the need for scientific advancement is greatest.

The following excerpts are from Dr. Kettering's address:

New things seemed to spring up overnight. But we know that each miracle was made possible only because of the accumulation of knowledge in the field which comes as a result of our normal, unregimented, peacetime investigations. We must not let the public or the politicians forget this. . . .

The mass-production system is to the scientist and inventor what the printing press is to the writer. . . .

We often hear people express their gratitude for America's natural endowments—its resources of coal, oil, minerals, land, and timber. The backlog of scientific knowledge, our mass-production facilities, our technical societies, and our educational system are rarely considered as resources, yet we know that without them we could never have

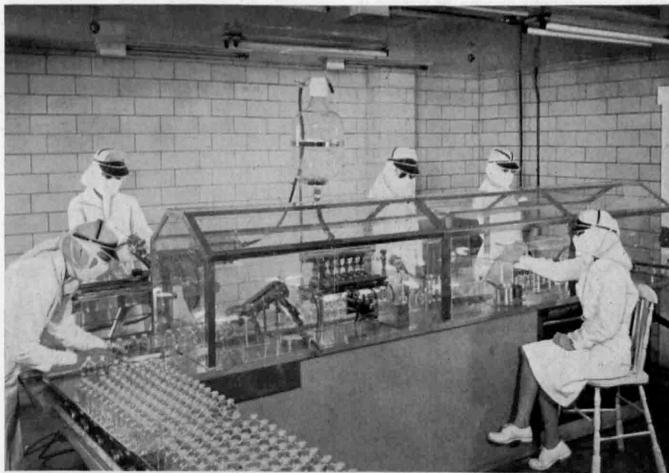
reached the position we occupy today among the nations of the world. . . .

In the enlightenment of modern times it has been accepted as a matter of course that the pursuit of science by independent research was a worthy endeavor. In our free and independent countries, scientists were encouraged to spend their lives searching for new knowledge. As representatives of this large group of scientists we should resist every attempt to curb the efforts of scientists to find new information. Science must be free. Wherever it has been controlled, it has been only partially productive. In an unsympathetic atmosphere science withers and dies, and all mankind is the loser. . . .

Every place we look in Nature we find problems to be solved. Some can be solved in a short time, while others may take generations. There is nothing in research more important than the time factor. Research must be started years before the results come into general use. Many things, started as much as 100 years ago, have just recently come into use. . . .

Few people understand the difficulties of getting a new idea started. A friend asked me once what is the first requirement of an inventor. My reply was that he must not bruise easily. . . .

The scientists should be open-minded



STERILE FILLING MACHINE—Engineers of the Frederick Stearns & Co., Division, Sterling Drug Inc., have designed and constructed this apparatus for bottling parentamine, amino acid solution, for parenteral injections. The entire filling apparatus is enclosed under plexiglass, and moving bottles are constantly subjected to bacteria-killing ultraviolet rays.

students sitting in the great classrooms of Nature, listening to her lectures, and using this information to benefit their fellow men. We are still in the kindergarten and should not let our present accomplishments prevent us from seeing how little we really do know and what great opportunities there are for advancement. . . .

Life is dependent upon the ability of Nature to use sun energy to convert soda water through the medium of chlorophyll into the foods, fibers, and farm products we need. This is one of the fundamental problems we have yet to solve, and opportunities are as great as man's imagination in this field. . . .

I would like to see some brilliant young student write a thesis on what was chemically available in prebiological time. We do not yet know the elemen-

tary principles.

We have learned how to attain salts and bromine from the sea commercially. To obtain millions of pounds of bromine annually from sea water is an important chemical development of the past 25 years. There is one pound of bromine to about eight tons of sea water. What are the chemical reserves of the sea? Each cubic mile of sea water contains 90,000,000 tons of chlorine, 53,000,000 tons of sodium, 5,700,000 tons of magnesium, 4,300,000 tons of sulfur, 3,300,000 tons of potassium, 2,400,000 tons of calcium, 310,000 tons of bromine, and lesser quantities of many other elements, including the trace elements. There are 320,000,000 cubic miles of sea water. Here is a real challenge to future generations to become chemists and engineers of the sea.

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GENERAL SCIENCE

'46 Science Well Forecast

A few slips went with the sound predictions made by Science Service at the first of the year. The following is an evaluation of this forecast.

► A YEAR AGO—when atomic energy was still a novelty and the war newly ended—you read a Science Service forecast of what would happen in science in 1946 (*See SNL*, Jan. 5, 1946).

You had advance information on many important developments. There were a few slips, of course.

For instance, a National Science Foundation was not authorized by Congress, but it was largely insistence by factions of scientists on details that blocked the legislation in Congress.

A new insect or plant pest entering by air transport was suggested as a possibility, but happily this did not happen.

The first applications of atomic energy for industrial power proved to be considerably slower in coming than was forecast—let's move that one up to 1948.

Small radio sets using some of the tricks of war developments have likewise been slow in coming.

But there were many good guesses:

The availability of radioisotopes for disease treatment and for research was accurately forecast.

So was the expansion of world air transport systems and experimentation with jets and rockets as an aid to commercial air lines.

"Predictions of radio transmission conditions would be available regularly," and

sure enough, newspapers have been carrying them.

"Better chemical treatments for tuberculosis" as foreseen have reached the point where streptomycin is being tested on a wide scale. And the larger commercial production of streptomycin foreseen a year ago allowed its release for general medical use.

"Colleges 'filled to overflowing with veterans'" was an easy guess. There are over two million students, double the previous year's total, and about half of them are veterans.

Explorations foreseen have materialized in the Antarctic expeditions and intensive study of the Pacific areas now underway.

Natural rubber and war-scarce drugs like quinine have returned to the market to a considerable extent, as it was suggested they would.

Further advances in television foreseen materialized in color electronic television and more sensitive pick-ups for working in dimmer light.

Assembled houses and new automobiles have appeared, but not so quickly or on so large a scale as was expected before the materials shortages and the work stoppages in industry developed.

Atomic energy control has been a "matter of concern," internationally and with-

in the country, and the progress made within the United Nations and in the U. S. Atomic Energy Commission begun to determine "whether the world shall have another war in 10 to 25 years."

"Significant steps toward the conquest of important diseases" were made in new chemicals for malaria announced during the year, in the use of nitro-mustard gas in treatment of leukemia, the cure of rabbit fever by streptomycin, the cure of anthrax and botulism by penicillin, a vaccine against rinderpest, the isolation of botulinus toxin in its pure form, and many other developments.

The biggest soilless gardening project in the world, covering 80 acres, is

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constructed in Japan, and this fulfilled the expectation that more hydroponics could be used by our occupation troops.

PARASITOLOGY

Worms Cause Much Woe

Trichinella worm is harbored by one-sixth of Americans. Hookworm and many others, some imported from Asia and Africa, cause serious illnesses.

ONE AMERICAN in every six harbors trichinae, the wicked little worms that may get into us if we eat undercooked pork and bore through our muscles, giving us pains like rheumatism and perhaps even killing us. Most well-cured, well-cured pork is free from these parasites, but the meat of hogs that have been fed on uncooked garbage is very likely to contain them, stated Dr. Norman R. Stoll of the Rockefeller Institute for Medical Research, in the course of his address as retiring president of the American Society of Parasitologists.

The name of the worm, *Trichinella*, is no pleasant-sounding to arouse people to combat a widespread and menacing infection, Dr. Stoll thinks. To give it a common English title that will carry some of the social stigma that ought to attach to such a pest, he proposes to call "garbage worm".

Another parasitic worm that is still causing a great deal of illness in this country, despite heroic efforts to wipe it out, is the hookworm. Due to climatic and soil factors, it is confined to certain parts of the South, and unfortunately in just those areas and among just those people where poverty and indifference make it doubly hard to combat. However, its incidence has been greatly reduced; over a 25-year period the number of cases dropped from 4,500,000 to 750,000.

There are many other worms that look upon human beings as just so many walking meal-tickets. They are all unpleasant, and some of them are deadly. Dr. Stoll rounded them all up under the general heading of "This Wormy World." Several tropical forms, hitherto of no significance in American life, have come back as stowaways in unwilling ex-service men. What they will do now remains to be seen.

While the worm situation in America is not ideal, we are nevertheless doing much better than we were. The situation is bad enough, thanks partly to our neglect of the problem, but it is getting off lightly as compared with the

The fulfillment of such expectations of a year ago is the stuff that makes scientific and technical progress.

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poor folks of Asia and Africa. These continents, the speaker said, are the lands of really heavy worm infestation.

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SEISMOLOGY

Seawaves Travel at Speed Of Modern Planes

► SEA WAVES such as the six that recently devastated the southern coasts of Japan sometimes travel as fast as the swiftest present-day airplanes. Six hundred miles an hour has been calculated for some of them. The deeper the water the faster they travel; shallow water makes them "drag their feet" and slows them down.

Destructive waves of this kind are always started by submarine earthquakes. However, not all such earthquakes start waves. Just what kind of sea-bottom dis-

turbance is needed to start one is still a matter of debate among scientists. Many of them hold that a vertical drop or jump of a considerable sector of crustal rock is involved, rather than the grinding sidewise shear and shift of rocks past each other, such as was the cause of the San Francisco earthquake of 1906.

The force of 8.25 reported for the recent Japanese earthquake puts it in a class with the biggest. Only two of that force have been reported in recent years: one in mid-Atlantic in 1941, the other in Peru in 1942. Seismologists of the U. S. Coast and Geodetic Survey are, however, reserving judgment on the claim that this is the worst earthquake in recorded history, at least until more data come in.

They do state that the quake and the sea waves it generated seem to be similar to the disaster that struck Japan in 1943. The extent of damage in that wartime catastrophe will probably never be disclosed by the Japs.

Waves of this kind are familiar enough to the Japanese to be given a special name: "tsunami". There is no good English equivalent. The most frequently-used name, tidal wave, is a misnomer, because these earthquake-generated waves have nothing to do with the tides.

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A portable corn dehydrator, to prevent spoilage when corn is cribbed damp, is suitable for use on individual farms.



MONSTER—This is believed to be the only picture ever taken of a seawave. It was taken from an elevation of about 60 feet above sea level on the north coast of the island of Oahu, Hawaii, of the seawave that struck that island April 1.

MEDICINE

New Theory on Cancer

"Plasmagenes," partial replicas of genes in the body, compete with each other for food from the cell substance. This competition might result in cancer.

► A NEW theory which may lead to better understanding of cancer and heredity has been developed by Drs. S. Spiegelman and M. D. Kamen of Washington University School of Medicine.

The new conception strikes at the heart of life itself and starts with genes, the hereditary units in the chromosomes within the cells which carry inheritable characteristics. Genes, the scientists suggest, continually produce at different rates partial replicas of themselves. "Plasmagenes" is the name these replicas of genes have been given by another scientist attempting earlier to explain through such a concept certain facts that contradict the classical Mendelian concept of the gene.

An atomic physicist listening to Dr. Kamen report some of the studies leading to this theory likened it to the quantum theory of modern physics.

A report of the new ideas is in the journal, *Science* (Dec. 20).

The chemical nature of these plasmagenes is nucleoprotein, that is, like the protein in the nuclei of cells. The plasmagenes are able, in varying degree, to duplicate or reproduce themselves, according to the theory. Their presence in the cytoplasm of the cells controls the

types and amounts of proteins and enzymes synthesized.

Plasmagenes compete with each other for food from the cell substance for survival. The outcome of their competition and the reactions involved would determine the enzymatic make-up of the cell cytoplasm. This being the case, it would be possible to change the result of the competition by varying the conditions under which it takes place. Such changes, if practical methods for accomplishing them can be found, might lead to a method of cancer prevention, though such a result seems remote at present.

Competition among the plasmagenes might result in cancer. This would explain, as is necessary to understanding of the basic problem of cancer, why a sudden heritable change appears in body cells making them into cancer cells. In other words, everyone has plasmagenes that could start cancer as well as genes in the cells of his body tissues all the time. If the cell environment is favorable to the plasmagenes that will develop cancer cells, cancer occurs. If the cell environment is unfavorable to these particular plasmagenes, cancer does not develop.

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ules are estimated to have between a hundredth and one-tenth the mass of sun.

The globules are believed to have sufficiently high density to keep them from being disintegrated by the shearing forces of galactic rotation. Through combined effects of their own gravitational attraction and of external radiation pressure, they will contract to form the beginnings of a star.

How a Star Is Born

The stages by which pre-stellar clouds are built up were outlined by Dr. Lynn Spitzer, Jr., of Yale University, lead American investigator of the interaction between solid particles and gas atoms in interstellar space.

Stars get their start in the world chiefly in the cooler parts of interstellar space away from the white-hot giant stars. Solid grains are built up, as described by Dr. H. C. van de Hulst, astronomer at Yerkes Observatory, largely of carbon, oxygen and nitrogen; hydrogen and helium probably remain gaseous.

These cosmic grains are gradually molded into clouds by the force of radiation pressure. The clouds condense to form roundish, small dark nebulae. Such a dense cloud, with its mixture of solid particles and gas atoms, contracts as a whole. Individual atoms and dust grains both share in the contraction. Influenced first by radiation pressure alone, then the combined effect of radiation pressure and the clouds' own gravitational attraction, one or more pre-stellar masses are created.

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ASTRONOMY

Stars Are Being Born

Two dozen stars are being born in Sagittarius and will shine millions of years hence. Stars are believed formed from condensed cosmic clouds.

► ALMOST two dozen stars that will shine forth millions of years from now are being born in the constellation of Sagittarius, the archer, not far from the center of the Milky Way, Dr. Bart J. Bok of Harvard Observatory told members of the American Astronomical Society at the Harvard Observatory Centennial meeting in Cambridge.

A recent survey of the heavens made by Dr. Bok and Edith F. Reilly of Radcliffe College revealed 23 roundish small, dark nebulae in the region of the diffuse nebula Messier 8. The process of star

formation is believed to have progressed farthest in such small, round nebulae, called globules. Globules are sometimes seen in front of star-rich fields and sometimes against the luminous background provided by diffuse nebulae.

Most of these dark nebulae found in the region of Messier 8 are quite small, cosmically speaking, being 930,000,000-000 miles to 3,250,000,000,000 miles in diameter. In other parts of the sky at least 20 more globules have been located, but some of them are as large as 9,300,000,000 miles in diameter. These glob-

PHYSICS

Man Has Created His First Snowstorm

See Front Cover

► MAN-MADE snow, induced by showering a "supercooled" cloud with dry ice, fell over western Massachusetts recently. Man's snow creation is pictured on the cover of this issue of SCIENCE NEWS LETTER.

The cloud had moisture which would have liquid despite the fact that the temperature was below freezing. Dry ice, falling on the cloud, caused submicroscopic bubbles of ice to appear in the cloud which then turned to snow and fell earthward.

Vincent J. Schaefer, scientist in the General Electric Research Laboratories at Schenectady, N. Y., first produced snow in his laboratory. Then he flew above a natural supercooled cloud to create the first artificial snowstorm.

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GEOLOGY

Oil On Atlantic Seaboard

OIL MAY yet be found on the Atlantic seaboard. Conditions such as accompany oil pools elsewhere were described for the coastal region of North Carolina and Virginia by Prof. E. Willard Berry of Duke University, speaking before the Geological Society of America in Chicago.

Massive layers of sandstone, shale and other rocks formed from sea-bottom sediments extend downward as much as 5,000 feet in this area, Prof. Berry declared. This is far deeper than has hitherto been supposed to be the case. Drilling may have to go deep, but there is still hope of finding oil.

Dust storms are dreaded and cursed by the Midwestern farmer, yet he makes his living by farming soil laid down as dust in terrific storms that howled across the land some 25,000 years ago. A large part of the best soil in the Corn Belt consists of this wind-blown material, technically known as loess, Dr. M. M. Leighton, state geologist of Illinois, stated.

Before it was dust it was mud, and before it was mud it was solid rock. The ponderous ice mills of the Pleistocene glacial epoch ground the rock into fine silt. When the ice sheet finally began to melt this silt was carried out by rushing streams of water, to be deposited in great outwash sheets. As these dried, wind

picked up the fine particles and carried them away, sometimes for hundreds of miles. Something like 160,000 square miles in the central states where the tall corn grows were formed in this manner.

Ol' Man Ribber isn't the near-omnipotent giant that he appears in the popular song. The Mississippi has been shoved around a lot in its long geologic history, Prof. William H. Hobbs of the University of Michigan told the meeting.

Ice did the shoving. The same great glacial sheets that ground up rocks to make the fine soil of Midwestern cornfields slowly pushed across the Mississippi's original channel in three great lobes—and Ol' Man Ribber had to make wide detours. Prof. Hobbs has traced Ice Age channels as far west as Des Moines, Iowa, and Jefferson City, Mo.

Nobody has ever seen any volcanic activity in the neighborhood of the Great Lakes, yet a part of the shore of Lake Superior consists of massive lava flows, Dr. Robert M. Grogan of the Illinois Geological Survey stated. The area he studied extends along the western shore of the lake, from Duluth to the Canadian border, covering nearly 2,000 square miles.

The lavas, which have an aggregate depth of 3,200 feet, poured from fissures in the earth more than a billion years ago, in pre-Cambrian geologic time.

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ASTRONOMY

Solar System Formation

A NEW IDEA of the way in which the solar system was formed from the clashing of two cosmic clouds of gas and dust was offered by Dr. Fred L. Whipple of Harvard College Observatory to the American Astronomical Society meeting.

Promising to explain how great stars other than the sun may have acquired planets of their own, the Whipple theory may also fit the facts of earth history and astrophysics more closely than the nebular and planetesimal theories of solar system formation that have long been favorites.

A sun and accompanying planets would be born of cosmic dust and gas in a relatively short time as the universe counts time. The early stages of the birth process might take some hundreds of millions of years, while the

period during which the planets take their shape and get their rotation, might be as little as a few hundred thousand years.

This solves one of the great dilemmas of astronomy and geology, because geology will allow astronomy only two or three billions of years for the age of the earth, and astronomy has heretofore demanded much longer than this to make a solar system out of the chaotic material of the universe.

Here is the way a planetary system like the sun's might evolve according to Dr. Whipple's "cosmic cloud theory": A great cloud of gas, dust and cosmic debris would start to collapse. This cloud would have little or no whirling motion, otherwise it would turn into a double star. The great cloud would col-



JUST PILLS—Workers making the new antimalarial take dried Aralen crystals from oven for transfer to tablet-making machine in the Winthrop Chemical Co. laboratory.

lide at an early stage with a smaller cloud containing partially formed planetary bodies, which would be very rare and small in weight.

Then these little planet masses spiral inward, faster and faster, picking up matter and getting bigger and bigger. As they are increased in size, the matter added to them would cause them to rotate in the direction that most of the planets are known to twirl.

The large cloud collapses slowly until the accelerating motion causes "shock waves," exactly the same kind of barrier that modern planes and rockets now strike here on earth in going to supersonic speeds. The collapse of the large cloud is then speeded so that it leaves the planets rotating in their orbits. The main matter of the cloud collapses further to form the sun.

The star-sun itself would likewise have its rotation controlled and fixed by the import of debris and the motions in the collapsing cloud.

If Dr. Whipple's theory is accepted, there need be no more searching for a hidden planet within the orbit of Mercury, which has long been one of the problems of astronomers. He finds that the preservation of a planet closer to the sun than Mercury would be extremely unlikely.

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ZOOLOGY

Zoo Answers Its Most-Asked Queries

► TO ANSWER some of its most-asked questions, the Lincoln Park Zoo in Chicago started a series of bulletins which are posted in each of the five animal houses.

Here are some of the answers:

Monkeys and dogs both scratch, but the monkeys are scratching for salt, not fleas. Tiny particles of salt on the simian skin are considered tasty by the monkeys.

Cats can see in the daylight and are blind in total darkness.

Opossums are related to kangaroos. Both are marsupials, and the females of both animals carry their young in pouches.

The fastest running animal is the cheetah. Record speed: 70 miles per hour.

Gestation periods for elephants are from 19 to 20 months; giraffes, 14 months; tigers, 120 days; lions, 102 days; opossums, 13 days; dogs, 2 months; mice, 19 days.

Snakes are among the farmers' best friends; they eat mice that eat grain.

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ICHTHYOLOGY

Guppies Prove Useful in Tropical Disease Control

► GUPPIES, those interesting little fish best known to most of us because of their blithe disregard of birth control, may have a serious job cut out for them in the world's warmer countries. They may be a means of control of parasitic worms known as flukes, that cause the disease known as schistosomiasis—which is even more dreadful than it sounds.

When the flukes are not infesting human beings they live in the bodies of a certain kind of snails, much as malaria germs live in anopheles mosquitoes between rounds. Reduce the snail population and you will reduce the number of schistosomiasis cases.

Here is where the guppy comes in. Dr. Jose Oliver-Gonzalez, of the School of Tropical Medicine, San Jose, P. R., noticed that the snails in certain Puerto Rican areas where the fluke-caused malady had been common were disappearing. He noticed also that there were numerous guppies in the waters where they once had lived.

Brought into the laboratory and put into the same aquaria with the fluke-carrying snails, the little fish eagerly de-

voured the egg masses that the snails had laid on the glass, on rocks in the water, and even on each other's shells. It looks as if the guppies might be responsible for the disappearance of the snails.

The experiment is being continued on an outdoor scale, by introducing the guppies into waters where snails abound. Close track is being kept of the density of the snail population, to see whether the guppies can be entrusted with a mop-up job on these indirect enemies of mankind.

Science News Letter, January 4, 1947

ANTHROPOLOGY

Research Lowers Opinion Of Early Mayan Culture

► THE CARNEGIE Institution's division of historical research, which has specialized on Maya research for three decades, has decided that the Mayan culture was not what it was once thought to have been. The Maya were in many ways the most brilliant exponents of higher aboriginal culture, but research has discovered that, like the ancient Greeks, they built on foundations reared by earlier peoples. Instead of uniquely outstanding leaders in cultural development, the Maya are now considered only one of many groups in both North and South America which were of greater or lesser importance hundreds of years ago.

Science News Letter, January 4, 1947

ARCHAEOLOGY

Expedition to Investigate Lowering of Sea Level

► DID PREHISTORIC man walk dryshod across the bed of the Mediterranean from Tangiers to Gibraltar?

Possibility that he did so, at a time when the general sea level was hundreds of feet lower than it is now, will be investigated this spring by a Harvard University expedition headed by Dr. Hugh O'Neill Hencken, curator of European archaeology at the Peabody Museum. This lowering of sea level is thought to have occurred when a large part of the earth's water was locked up in ice during the Pleistocene glacial era.

Skull fragments of Neanderthal man were found in the Caves of Hercules near Tangiers in 1939 by Dr. Carleton S. Coon, also of the Peabody Museum. Research in these caves, curtailed by the war, will be resumed by Dr. Hencken's expedition.

Science News Letter, January 4, 1947

IN SCIENCE

MEDICINE

Brain Waves of Sleeping Babies Aid Diagnosis

► THE DIFFICULTY of getting brain waves from babies, whose lively arms and legs cause errors in the brain wave records, has been overcome by Drs. T. Barnes and Ruth Amoroso, of Hahnemann Medical College and Hospital, Philadelphia.

They simply put the baby to sleep using an injection (rectally) of pentothal sodium, one of the modern sleeping medicines.

Object of getting the brain wave would be to determine as early in life as possible signs of epilepsy or of brain damage. At the meeting of the American Association for the Advancement of Science, Drs. Barnes and Amoroso reported success in getting brain wave records from babies aged eight months to two years and seven babies between two and one-half and five years. In three-fourths of the records had clinical value.

Science News Letter, January 4, 1947

CHEMISTRY

Dry Air System Prevents Cargo Spoilage

► DRY AIR, forced through holds of vessels to protect cargo in transit, has experimentally proved its worth and promises to become standard equipment on many cargo carriers.

Several ships of the Delta Line and South American trade, have just been equipped with a dry-air system known as Cargocaire. It consists of three main components: an air-drying unit, a circulating system, and the necessary fans and recording instruments.

The air-drying unit is located near the engine room and uses heat and silica to remove the moisture from the air. Under average moist summer conditions about 75% of the water is taken off. The dried air is then forced through ducts into the holds, and out after circulation by exhaust fans.

The result of this air circulation is that cargo grain does not sweat, fruit decays less, machinery does not rust, and implements and furniture of wood do not warp or become disjunct.

Science News Letter, January 4, 1947

FIELDS

MAN-MADE Weather to Test Planes

MAN-MADE weather of the worst type will be available at Wright Field for testing airplane accessories in a new laboratory under construction by the Army Air Forces. When completed, it will be the country's most modern equipment for this purpose.

Articles to be tested include aircraft instruments, deicing and heating devices, ground equipment, electrical systems, generators, motors, power distribution systems, and training equipment.

A system of 10 chambers has been devised for the weather testing. They furnish facilities for studying effects of high altitude, high and low temperatures, humidity and aridity, sun and rain, fungus growth, salt fog, sand and dust.

To test the effects of vibration, an accelerometer, or centrifuge, will be installed, aimed to be the largest of its kind ever built. It will be used to test accessories, test pilots, and will be equipped with television to make constant observation possible.

Science News Letter, January 4, 1947

Properties of Steel Vary With Iron Carbide Content

THE PROPERTIES of a steel may vary depending upon whether such alloying metals as manganese, chromium, molybdenum or tungsten are in the metallic iron itself or in the iron carbide that forms within the steel, Dr. J. B. Austin, U. S. Steel Corporation, reported to the American Society for Metals in Atlantic City.

This iron carbide is often known as cementite, a name given it by early scientists who believed erroneously that the carbide forms a cement that holds the metal grains together.

Iron carbide, he stated, is represented by a chemical formula that shows it to be composed of three atoms of iron to one of carbon. Recent X-ray studies show that the proportion may vary. At high temperature there may be less carbon. From non-conclusive evidence, some of the carbon atoms may be replaced by nitrogen. The iron may be replaced by other alloying elements. Indeed, he said,

when manganese, chromium, molybdenum or tungsten are present in steel, they tend to concentrate in the cementite.

The hardness of the carbide and its resistance to etching depend upon how much alloying element it contains. Thermal expansion, electrical resistivity, magnetic quality and sometimes corrosion resistance of the steel may be affected.

A new one-kilowatt electronic power generator for brazing and soldering in small and medium-sized operations was demonstrated at the National Metal Congress exposition. By use of this induction heating equipment, production is four times as great as with older methods. It is a development of the Radio Corporation of America.

The set-up includes a conveyor belt which carries radio condenser cans and base-assemblies, each with a preformed ring of solder previously inserted, through the field of an induction coil. High-frequency power from the new generator is fed to the coil at controlled intervals. The induced currents in the condenser cans generate enough heat to melt and flow the solder uniformly at the junction of the base and can.

Science News Letter, January 4, 1947

MEDICINE

Experiment Shows How Nerves Act as Batteries

▶ A TEST-TUBE demonstration of how nerves act as electric batteries was presented before members of the American Association for the Advancement of Science by Dr. T. C. Barnes of Hahnemann Medical College. Into a test-tube containing salt solution and an oil solution of the nerve-chemical, cholesterol, he introduced a small quantity of a compound known as acetylcholine, which is released by nerves in action. The resistance of the oil to the passage of an electric current immediately dropped to little more than one-eighth of its initial value.

"This test tube model of living nervous electricity," Dr. Barnes stated, "helps us to understand the cause of epileptic fits, which are produced by high-voltage rapid waves in the brain. Convulsions are probably produced by excess acetylcholine in the brain. This excess acetylcholine generates the excess electrical potential that spreads to the nerves in the limbs giving convulsions. The enzyme called choline esterase is the janitor of the nervous system that removes waste acetylcholine not needed for normal nerve electricity."

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MEDICINE

Curare Is Hard to Make By Impure Native Methods

▶ CURARE, deadly Indian arrow poison that has come to be an exceedingly useful drug, is still in a pretty badly "messed-up" condition because of traditional native methods of making the crude extract from the South American plant that secretes it, Dr. D. L. Tabern of the Abbot Laboratories, North Chicago, told members of the American Chemical Society.

Said Dr. Tabern: "The native is no expert botanist, and he usually—perhaps to increase the magic of his brew—insists on using a number of different plants, and may toss in a few small animals for good measure, and there is not much the chemist here in the States can do to convince him of the error of his ways. It is quite probable, too, that the type of alkaloids present in any given species of plant will vary with the conditions of growth—the net result being that each lot presents a problem all its own."

For this reason, chemists in this country are hard at work in an effort to prepare curare in as nearly pure form as possible.

Curare, which in large doses causes fatal paralysis by severing communications between nerve and muscle, merely produces surgically desirable relaxation when administered in safely minute concentrations.

Science News Letter, January 4, 1947

PUBLIC HEALTH

Graduate Fellowships In Public Health

▶ FELLOWSHIPS for post-graduate training in public health are available for the school year beginning next fall from a grant of \$228,400 made by the National Foundation for Infantile Paralysis, Surgeon General Thomas Parran of the U. S. Public Health Service has announced.

The fellowship funds come from contributions to the National Foundation for Infantile Paralysis March of Dimes drive. Fifty-three students were awarded fellowships beginning last fall.

Fellowships provide an academic year of graduate training in an accredited school of public health or school of sanitary engineering. Applications for the fellowships will be received until May 1, 1947.

Science News Letter, January 4, 1947

GENERAL SCIENCE

Science Previews for 1947

Use of radioactive isotope 14 of carbon may lead to cancer control; supersonic air travel may become reality; many research projects will be completed.

By WATSON DAVIS

► LIST these long shots for scientific achievement in 1947.

Discovery of the secret of photosynthesis—how the green leaf converts sunshine into energy we can eat and use.

Demonstration of the possible control and prevention of some kinds of cancer based on better understanding of the mechanism of the disease.

These discoveries will be indirect consequences of the release of atomic energy if they come as the result of the use of radioactive isotope 14 of carbon used as a tracer element in experiments upon the two great problems.

Here are other possibilities in science for the new year:

Photographing of starlight never captured before, the part of the stellar spectrum cut off by the ozone layer high in the earth's upper atmosphere. These valuable pictures would be made from V-2 rockets.

New methods of weather forecasting will be pioneered through use of electronic computer techniques for speedily solving complex meteorological equations.

The giant 200-inch telescope, world's largest, on Mt. Palomar, Calif., will at last be completed and get into operation, capturing evidence of great galaxies or other universes so distant that light takes close to a billion years to travel to us (at 186,000 miles per second!).

The discovery of a chemical element—perhaps even two or three—heavier than curium, number 96, now the heaviest man-made transuranium element resulting from atomic bomb research.

Operation experimentally of the first atomic energy power plant in its pilot stage, still a long way from a practical power producer threatening coal and oil.

More knowledge of the barrier to speed of travel through air at about the speed of sound, and possible conquest of this shock wave area by an experi-

mental supersonic airplane.

The first jet-propelled transport plane may take to the air.

Instrument "push button" launchers for airplanes will probably come into limited commercial transport use.

Such positive research achievements are in many respects safer to forecast than what will happen in the organization and financial support of scientific research.

The establishment of a National Science Foundation for federal support of research on an adequate scale is a year overdue. Congressional action failed because of a schism among scientists over methods of organization. Whether the scientists will get together and whether a Republican congress will enact the necessary legislation, remains to be seen.

A rising conflict between military and civilian science and research may change the situation. When war-time research was terminated by the Office of Scientific Research and Development, military branches of the government, particularly the Navy, used existing funds for support fundamental, as well as applied, research in universities and other laboratories. This saved many research projects that would otherwise have stopped. It also gave the military an upper hand in the planning of research, which is the scientists' fear.

Civilian Atomic Control

The civilian Atomic Energy Commission during 1947 will gradually take over nuclear research for peaceful and military purposes, continuing the broad fundamental development that was the spectacular science push of the war.

Less will be said about the continuing work on biological warfare, but in secrecy experimentation and development will continue on germs, toxins and other disease-producing agents. Cures of dread diseases are likely to result, just as during the war years countering some of the worst biological poisons, such as botulinus toxins, was discovered.

America's largest tests of one weapon against tuberculosis, the BCG vaccine, used for over two decades in Europe, will be made in 1947 and you may expect some clinical results from tests of some of the new antibiotics upon the disease.



OAK RIDGE—Lead bricks absorb radiations from the material in the beaker, in this laboratory at Oak Ridge, Tenn. The chemist watches his work in the mirror and handles the apparatus with a relatively short pair of tongs. Equipment of this type is used in the production of radioactive materials.

n the field of endocrinology there will continued exploration of the intricate relationship between various glands of the body. There should be substantial progress in connection with the interplay between the hypothalamus and the anterior pituitary, one of the fundamental glands in gland control.

Because our population has more older people in it, due to medical science's lengthening of the life span, you will hear more about forestalling and alleviating the disabilities of persons past maturity. Gerontology, the science of old age, will be more widely known.

ew Mineral Riches

Don't be surprised if there are discoveries of importance of new mineral resources within the earth and within reach of man. One promising field of study is the radioactivity of oil field waters and brines, and there seems to be hope that newer methods of geological exploration will find rich ores, even bonanza deposits of metals needed by our industries. From the expeditions that for military purposes are probing the arctic and the antarctic there will come geographical and mineralogical discoveries of importance.

First on the search lists of geologists are the ores of uranium and thorium, elements from which atomic bombs can be made. Whether any more really rich deposits will be found and in what location they will be located; these are great question marks for the future.

Watch for radar in aviation. Light aircraft, suitable for installation in transports as an anti-collision device, will be ready for use, and very light sets for private planes may be ready. Ground radar at airports, to talk pilots down in overcast, is promised that will require only one generator instead of the six needed with the war-developed Ground Control Approach device.

Color Television Perfected

All-electronic color television, now experimentally successful in laboratory demonstrations, will be perfected and made ready for mass production for the public. It is a complete departure from television in mechanical color which has been shown in various forms during the past few years.

Coal-burning gas turbine locomotives, with internal combustion engines fed with finely divided coal powder instead of diesel oil, will be designed. A gas turbine engine using this atomized coal has completed a year's test and proved the principle. The first applications are



UPPER ATMOSPHERE RESEARCH—A German rocket specialist assists in preparing a V-2 for firing at the Army Ordnance Proving Ground at White Sands, N. Mex., in connection with rocket and aviation research.

planned for locomotives.

Behind the wall of military secrecy there is intensive work on rockets and other guided missiles for fighting any war of the future. Because this is military research, there will be few, if any, announcements as results are obtained, but in 1948 if not in the coming year, rockets rising farther from the earth than the hundred-mile record of the V-2 may be expected.

Defense Against Rockets

One of the major problems in atomic age defense is some method of shooting down supersonic rockets once they are launched, something that could not be done in the Nazi attacks with the V-2. This will be a prime job for Army and Navy scientists for 1947.

There will be a continuing search for knowledge of the cosmic rays that bombard our atmosphere from outer space. Rockets and high-altitude planes will gather more information about this radiation, with some chance that the observations will help explain the composition of the atomic nucleus, and the kinds of really fundamental particles in nature.

Astronomers from all over the world will travel to South America and Africa to see the total solar eclipse on May 20. Simultaneous observations taken from the two coasts may extend our knowledge of the sun and of the earth itself.

Notable advances in pesticides can be

expected. These chemicals that kill insects, rodents, weeds, etc., without material harm to man and the things he cherishes are only now being freed from their shackles of wartime secrecy, and further research is still needed to make some of them safer.

Some variant of DDT that will kill mosquitoes without killing fish in the waters where they breed can be looked for soon. The weed-killer, 2,4-D, has more than a thousand chemical relatives, many of which have yet to be tested; some of these may prove better than the compound first marketed.

Soil fumigants, that clean out destructive little worms known as nematodes, have made only a relatively small start; great extension of their use can be expected during 1947. Perhaps other fumigants can be found that will kill such soil-dwelling pests as wireworms, white grubs and Japanese beetle larvae.

Extension of the already successful artificial insemination technique to include the artificial implantation of pre-fertilized ova in the bodies of foster-mother animals may be announced. Steps leading in this direction have already been taken, and the goal of producing blooded livestock out of the bodies of unpedigreed animals is not too

(Turn to page 12)



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Do You Know?

Over half America's supply of *electric power* is produced by coal-burning equipment.

Vicuna coats, that may cost \$1,000, are made from wool clipped from the massive beard on the Peruvian vicuna's chest.

Milk, long regarded as good for teeth because of high calcium content, also helps prevent decay, it is now claimed.

The *Thunderjet* (Army P-84) is the first American jet fighter to exceed 600 miles per hour in speed; its record is 611 miles an hour.

Scientists of the University of California report the finding of *skeletons* of men who lived in the Sacramento delta region 4,000 to 8,000 years ago.

The Humboldt ocean *current*, that passes along the western coast of South America from the south, is responsible for the cool climate of the coastal area.

Bristles for brushes can be made from casein by a new process developed by the U. S. Department of Agriculture; casein is obtainable in large quantities from waste skim milk.

British Honduras' former famous *sponge* industry is now near death because of a fungus that invaded the sponge-planting grounds in 1939 and wiped out all live commercial sponges.

The mightiest *dam* in the southern hemisphere will soon be constructed in Australia only 70 miles from Sydney in the Warragamba gorge; it will be 380 feet high but only 250 feet long.

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From Page 11

far off. When it is reached, it will mean as great a revolution in animal industry as the introduction of hybrid corn was in grain production.

The world's biggest soilless gardens, with a total area of 80 acres, will come into production in Japan during the spring of 1947. While their produce will

be used exclusively by American occupation forces, these gardens are being eagerly studied by Japanese agriculturists and plant scientists, who see in them the possibility of supplementing Japan's meager food-producing acreage by planting up similar installations on rocky, uncultivated slopes of the island.

Science News Letter, January 4,

GENERAL SCIENCE

New Freedoms For Science

TO THE four freedoms that were the Allies' pillars of fire in the night of war, Dr. E. F. Degering of Purdue University added three more in his address before the chemical section of the National Association for the Advancement of Science in Boston. As he defined them, they are freedom of economic enterprise, freedom from prejudice, and freedom from research.

Freedom of economic enterprise he considers threatened by too much planning from above. Freedom from prejudice is something within the command of the individual; the speaker confessed to having violated it, at his own cost, on some occasions when he made up his mind in advance what the results of an experiment were going to be. When he went into the laboratory with a free mind he achieved results of real value. For freedom for research ample material means are necessary, he pointed out, hailing present research support by the Navy and the prospective establishment of a well-funded research program by the Congress as important steps in this direction.

Under the Navy's free-handed support of research, nearly 300 contracts with scientific institutions have already gone into effect, Vice Adm. Harold G. Bowen, in charge of the Navy's research program, told the meeting. He made it clear that there are no strings tied to any of these grants, and that no special institution or group is being favored.

"Any college or university, large or small, anywhere in the United States, is free to propose a research project to the Navy," he said. "In addition to meeting the requirements of naval applicability, the proposer must have the necessary personnel and facilities to conduct the task."

In a companion report, Maj. Gen. Curtis E. LeMay stressed the importance of active research in aeronautics for the national defense. With most of the

world's industrial capacity crowded in areas within easy reach of each other, transpolar flight, our frontier now across the arctic wastes, he emphasized.

If war comes again, Gen. LeMay continued, the United States will be attacked first: "Twice in our lifetime have been the principal factor in the defeat of the aggressor nation. The son is too plain for anyone to overlook. . . . The war will start with bombs and guided missiles falling on the United States."

To face this unpleasant fact with readiness for prompt action, the Air Forces have taken steps, a highly important one being the establishment of an office responsible for research and development. Coordinated with this will be an advisory board on which 30 civilian scientists and engineers will sit with military men, to give the Air Forces information and advantage of new developments in all its fields of activity.

Science News Letter, January 4,

YOUR HAIR

AND ITS CARE

By Oscar L. Levin, M.D.
and Howard T. Behrman, M.D.

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ASTRONOMY

Sun Broadcasts to Earth

The sun sends up radio antennae in the form of thread-like prominences. These radiations affect greatly our radio reception and television.

THE SUN sends up its own radio antennae for broadcasting to the earth.

Radar bearings of the sun indicate that the newly discovered radio noise is definitely of solar origin. The antennae used in broadcasting are the long, thread-like prominence filaments that surge into coronal regions, Dr. Donald H. Menzel of Harvard University told members of the American Astronomical Society at the Harvard Observatory Centennial in Cambridge.

"Just as a lamp with a long filament radiates more energy than one with a short filament, these prominence threads emit far more radio energy than does the solar surface," Dr. Menzel reported during the symposium on the gaseous envelope of the earth.

The sun's envelope was pictured as a sort of ionosphere like that surrounding the earth. It retains all electromagnetic waves below a certain frequency. Such radiations do not get through the solar gases as well as do the light waves.

The greatest portion of the noise blasts from the sun, picked up on radar and television, have been found to come from active sunspot regions rather than

from the entire surface. The total area of the long, thread-like prominences may be many thousands of times greater than that of the spherical solar surface, the Harvard astronomer stated.

Streamers of gas bubbling up from the sun's interior were pictured by Dr. Leo Goldberg, director of the Observatory of the University of Michigan, in an effort to explain the fact that the corona, pearly halo that makes total solar eclipses so spectacular, is 100 times hotter than the surface of the sun.

These streamers, perhaps as hot as 1,000,000 degrees Centigrade, gradually cool and produce various forms of coronal and prominence streamers, Dr. Goldberg stated in reporting one theory reached by himself and Dr. Menzel in a joint research.

Cosmic eruptions resembling those of the atomic bomb, complete to the mushroom cap but infinitely larger, were shown in a series of motion pictures taken at Climax, Colo. Dr. Walter O. Roberts, superintendent of the High Altitude Observatory of Harvard University and University of Colorado, presented another set of pictures depicting

the eruptive arch of last July 4, the greatest ever recorded. It was almost as large as the sun itself.

The sun is not only the direct or indirect source of all our power, light and heat, but it and its variations affect magnetic compasses, radio communications, power and transmission lines.

"From a study of the sun's profile," Dr. Roberts stated, "we at Climax have discovered that magnetic disturbances usually occur three to seven days after brilliant areas of coronal emission have appeared at the east limb of the sun."

Radio reception in turn is strongly influenced by magnetic upsets.

The hope that further studies of solar activity would directly benefit those concerned with radio communications problems was expressed by Dr. Joseph H. Dellinger, chief of the Central Radio Propagation Laboratory of the National Bureau of Standards.

A better understanding of how changes in solar radiation affect the earth's gaseous envelope would improve radio communications and make air travel safer.

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SUN'S ANTENNAE—The long thread-like prominence filaments seen in this picture of the sun's prominence taken at the High Altitude Observatory of Harvard College and the University of Colorado at Climax, Colo., help in beaming radio waves to the earth.

miles above the surface of the earth are responsible for long-distance radio communication. The electrification changes not only with the daily and seasonal position of the sun, but also with the conditions of solar activity. Studies are now underway to discover just what influence the sun and even other stars have on the ionosphere, the frontier of our planet.

Accurate weather forecasts several months in advance may result from further study of the relation between the weather and solar activity, Dr. B. Haurwitz of the Massachusetts Institute of Technology stated.

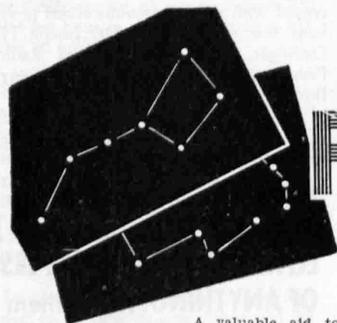
A small change of solar energy may result in a marked change of weather. Dr. Haurwitz explained that the effects

of variation upon weather occur through the medium of the so-called ozone layer.

From 12 to 25 miles above the earth's surface we find a layer of this peculiar compound of oxygen, highly absorbing in the ultraviolet region. Small changes of solar activity could cause the temperature of this region to rise or fall 50 degrees Centigrade.

The temperature increase, however, would not be uniform. Where the sun is near or below the horizon the increase will be smallest or even non-existent. This lack of uniform heating will set the air in motion, disturbing the equilibrium of the entire atmosphere. Air movements in the lower levels would thus be initiated.

Science News Letter, January 4, 1947



STAR FINDER



A valuable aid to the student of astronomy or of navigation has been designed to locate celestial bodies quickly and accurately. The Millar Observoscope is made on the same principle as the equatorial mounting of the astronomer's telescope. This precision instrument is constructed of impact-resistant phenolic plastics with declination and latitude scales impressed in the body of the instrument. Impressed also are scales which indicate month, clock and sidereal hour angles.

Use of the instrument helps the student in visualizing the coordinate system and the apparent motion of the stars, while locating instantly the desired star. Intricate and confusing charts become unnecessary. In use, the latitude scale is set to the latitude of the observer and the civil time, opposite the day of the month. The star or constellation to be observed is looked up in the list of 55 stars provided and the sidereal hour angle set and declination indicated. The instrument is then oriented to true north and the star or constellation will be seen in the viewing tube.

The instrument may be mounted on a camera or astronomical tripod or simply placed on its weighted base for accurate observations. It may be used equally well to locate true north, to indicate civil time or latitude if all known settings are made and the sight tube is pointed to a known star. It is designed for use north of the equator. For use south of the equator, a special instrument can be supplied.

Professional astronomers who are accustomed to using complicated devices will be amazed at the accuracy and mechanical simplicity of this device.

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Frozen Blessings

➤ SNOW AND ICE and piercing winds are little liked by the general who are past the age of skating and ing. With their minds on solid and pical things like making money enjoying a good dinner, they are appshudder at the mere thought of free weather, and to reach for travel folk decorated with pictures of palm t and bathing beauties.

Which is really a most ungrateful formance. That money, and those m are the gifts of the cold, to an ex greater than they realize. If you w rough index of what all this is ab compare the number of persons know who can spare cash to go s for the winter with the number w permanent homes are in the South who can afford to go north for the s mer. Prosperity and winter cold close companions.

If you want to probe a little fur and can get at a really good map col tion, just try comparing maps show per-capita wealth by states, or car l ings, or volume of manufactures, y a map showing the southern limit snow on the ground on March 1. C map showing average farm land p with the area covered by the gla mantle of the Pleistocene ice age.

There is more than coincidence in concentration of wealth where the at times a lack of warmth. Snow on ground through the coldest 10 to weeks of the year means good prote for fall-sown grains, and immed moisture available when spring w up stimulates them to new growth. D frost means a working and turning the soil because of the expansion contraction of ice in it: old Boreas

st-class plowman. A million years of
 icipation means deep, rich soil where
 at slow, long grinding took place.
 This does not mean that there are no
 as of good, productive, wealth-mak-
 g soil outside the regions that have to
 dure an annual attack of frostbite.
 here are such premium spots as the
 ramento valley, the Louisiana cane-

fields and the Lake Okeechobee shores
 in this country, for example, and similar
 choice bits elsewhere. But if you want
 deep, rich, black soil that stretches out
 endlessly, for thousands of square miles,
 you have to go where the ice once
 groaned, in the upper Mississippi valley
 and around the Great Lakes.

Science News Letter, January 4, 1947

Books of the Week

ING SUCCESSFULLY—George Lawton—
 Columbia, 266 p., \$2.75. How to enjoy
 a rich, constructive life as you grow older.
 A book for everyone who will ever be 60,
 and for everyone who is, or has been, 60.
 COMMUNITY CENTERS AS LIVING WAR
 MEMORIALS: A Selected Bibliography with
 Interpretative Comments—Compiled by
 James Dahir—Russell Sage Foundation, 63
 p., paper, 50 cents.

EMENTS OF GENETICS—Edward C. Colin
 —Blakiston, 402 p., illus., \$3.50. A text-
 book for college students which gives special
 emphasis upon the application of the
 principles of the Mendelian theory of
 heredity to man and the roles played by
 heredity and environment in man.

GUIDE TO SOUTHERN TREES—E. S. and
 J. G. Harrar—McGraw-Hill, 712 p.,
 illus., \$4.50. This book describes more
 than 350 species of trees native to the
 southern states. Included are notes of in-
 terest and historical significance pertain-
 ing to many of the trees described.

NE'S ALL THE WORLD'S AIRCRAFT 1945-
 1946—Compiled and edited by Leonard
 Bridgman—Macmillan, 652 p., illus., \$19.
 A book which gives the record of recent
 aeronautical progress throughout the world.
 Facts are given about all the important
 British and American combat planes, and
 extensive, detailed information on German
 and Japanese aircraft and aero-engines.

ATHEMATICS IN LIFE: Basic Course—
 Raleigh Schorling and John Clark—
 World Book, 500 p., illus., \$1.80. A high
 school textbook written to develop a broad
 and dependable mathematical competence
 for our citizens. The subject matter bridges
 the gap in mathematical preparation that
 was discovered during the training of men
 and women in the armed forces in World
 War II.

IL FOR VICTORY: The Story of Petroleum
 in War and Peace—by the Editors of Look
 —McGraw-Hill, 287 p., illus., \$3.50. This
 is essentially a story of people—of an un-
 sung task force who, by incredible labor
 and ingenuity, supplied the second World
 War's most vital munition, petroleum.

DECISION HOLE LOCATION: For Inter-
 changeability in Toolmaking and Produc-
 tion—J. Robert Moore—Moore Special
 Tool Co., 448 p., illus., \$5. A review of
 all hole-location practices and their evolu-
 tion to the point where the toolmaker can
 now employ engineered methods and apply
 the principle of interchangeability to his
 own operations.

TECTION OF CROPS FROM FROST DAM-
 AGE THROUGH THE USE OF RADIANT
 ENERGY—A. W. Farrall, W. H. Sheldon,

and C. Hansen—Michigan State College,
 10 p., illus., paper, free.

RARER METALS—Jack DeMent and H. C.
 Dake—Chemical Pub. Co., 432 p., illus.,
 \$7.50. A book in which the mineralogy,
 chemistry, physics and technology of the
 less familiar elements are described. It is
 suitable as a reference text or for supple-
 mentary reading in science and engineering
 courses.

THE SECOND FORTY YEARS—Edward J.
 Stieglitz, M. D.—Lippincott, 317 p., illus.,
 \$2.95. A book that tells how to grow old
 successfully, through a sound, scientific
 program for making the years after forty
 happy and fruitful.

SPINOZA: Portrait of a Spiritual Hero—
 Rudolf Kayser, with an introduction by
 Albert Einstein—Philosophical Library,
 326 p., \$3.75. The story of the life of
 Baruch Spinoza, based on all available docu-
 ments about his life and era.

THE SULFURATION OF UNSATURATED
 COMPOUNDS—Harry Westlake, Jr.—Mel-
 lon Institute, 20 p., paper, free.

SULFUR & SULPHIDES VS. MATERIALS OF
 CHEMICAL PLANT CONSTRUCTION—
 —James West—Mellon Institute, 4 p.,
 paper, free.

SURGICAL TREATMENT OF THE SOFT TISSUES
 —Frederick W. Blancfort, ed.—Lippincott,
 520 p., illus., \$15. Twenty-one leaders in
 the surgical world have contributed to this
 compilation of surgical treatments. It is
 assumed that the diagnosis has been made
 when the book is consulted.

THIS IS THE MOON—Marion B. Cothren—
 Coward-McCann, 87 p., illus., \$2. An up-
 to-the-minute account of the moon that
 reads like a story but is scientifically
 accurate; a fascinating book for boys and
 girls.

TUTORING AS THERAPY—Grace Arthur—
 Commonwealth Fund, 125 p., \$1.50. An
 analysis of each phase of the tutoring prob-
 lem, showing the role of the psychologist
 in diagnosing the difficulty, suggesting the
 teaching method and checking the progress
 of the work.

Science News Letter, January 4, 1947

ENGINEERING

Wood Gives Up More Charcoal in New Process

➤ MORE CHARCOAL is obtained from
 wood, also more acetic acid and methanol,
 by a new process described to the
 Northwestern Wood Utilization Council
 by Robert S. Aries of the Polytechnic

Institute of Brooklyn where it was de-
 veloped.

One ton of dry wood, under the new
 process, yields 1000 pounds of charcoal,
 125 pounds of acetic acid, and 80 pounds
 of methanol. This is roughly two-thirds
 more than obtained by present oven
 methods.

The Institute's new method employs
 a steel chamber into which the wood is
 fed at the top and emerges as charcoal
 at the bottom. Flue gases are circulated
 several times in the chamber, thus dry-
 ing the wood and saving on the amount
 of heat necessary for carbonization. In
 the ordinary process, wood is loaded by
 hand onto cast iron cars and run into
 a heated kiln.

Commercial charcoal makers ordinari-
 ly cannot operate economically without
 an income from the by-products includ-
 ing acetic acid and methanol. These es-
 sential chemicals can now be made syn-
 thetically. The larger yields by the new
 process will help the charcoal producers.

Science News Letter, January 4, 1947

NOW! The ONE-UNIT HEARING AID

Thousands Have Waited for

The New ONE-UNIT
Beltone
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HEARING AID

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powerful you hear even
whispers! Get helpful
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• New Machines and Gadgets

✿ **RIVET hand gun** is highly practical for use in installing large blind rivets where the quantity of rivets to be installed is small or in the field where air pressure is not available. It operates manually on the ratchet principle, and is about 29 inches long.

Science News Letter, January 4, 1947

✿ **LOCKING ADHESIVE**, glued in two strips to the bottom of boxes and packages in freight cars, keeps them from sliding around en route. It has a high shear strength to prevent shifting, but can be broken by a sharp upward blow of the hand to release a container.

Science News Letter, January 4, 1947

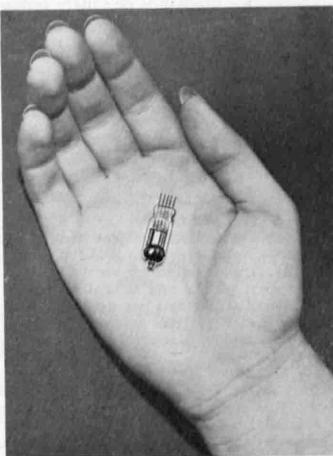
✿ **PLASTIC ADHESIVE** may be suitable to glue airplane sheet metal parts together instead of rivets. Recent laboratory tests with pieces of 1/16-inch duraluminum cemented together with the adhesive show the joint stronger than the metal itself under bending tests.

Science News Letter, January 4, 1947

✿ **SCRUB WATER pick-up**, recently patented, is a large dustpan-like device with a trough container extending along its rear. When its front straight edge is against the floor, the water can be swept up the inclined face into the trough and carried to the drainpipe.

Science News Letter, January 4, 1947

✿ **ELECTRONIC TUBE** used on a small-sized hearing aid is three-quarters



of an inch long. Three of these tubes, one of which is shown in the picture, are employed. The instrument can be used for moderate amplification, or can be converted to standard amplification.

Science News Letter, January 4, 1947

✿ **DISH-WASHER**, operated by the normal pressure of the water system in the home, has eight jets that reach the surface of every dish in the tray and spin the tray itself. Only two outside connections are required, one with the hot water system, the other with the drainpipe.

Science News Letter, January 4, 1947

✿ **HEMOGLOBIN content** of blood quickly measured by studying its intensity. A sample of the patient's blood treated with a hemolyzing agent placed within a pocket-size instrument where its light-transmitting characteristics are compared with glass wedges of known transmission properties.

Science News Letter, January 4, 1947

✿ **PLASTIC VISORS** for automobiles smoky green in color, are hinged at the front of the car and can be swung down over part of the windshield to lessen glare from road or sky. They are a two-shield model, with shields of different widths; the wider one cuts glare, the other eliminates sky glare.

Science News Letter, January 4, 1947

✿ **WARNING INSTRUMENT**, for use in the manufacture of explosives, sounds an alarm when excessive temperature or pressure is reached.

Science News Letter, January 4, 1947

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