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December 24, 1955

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SCIENCE NEWS LETTER

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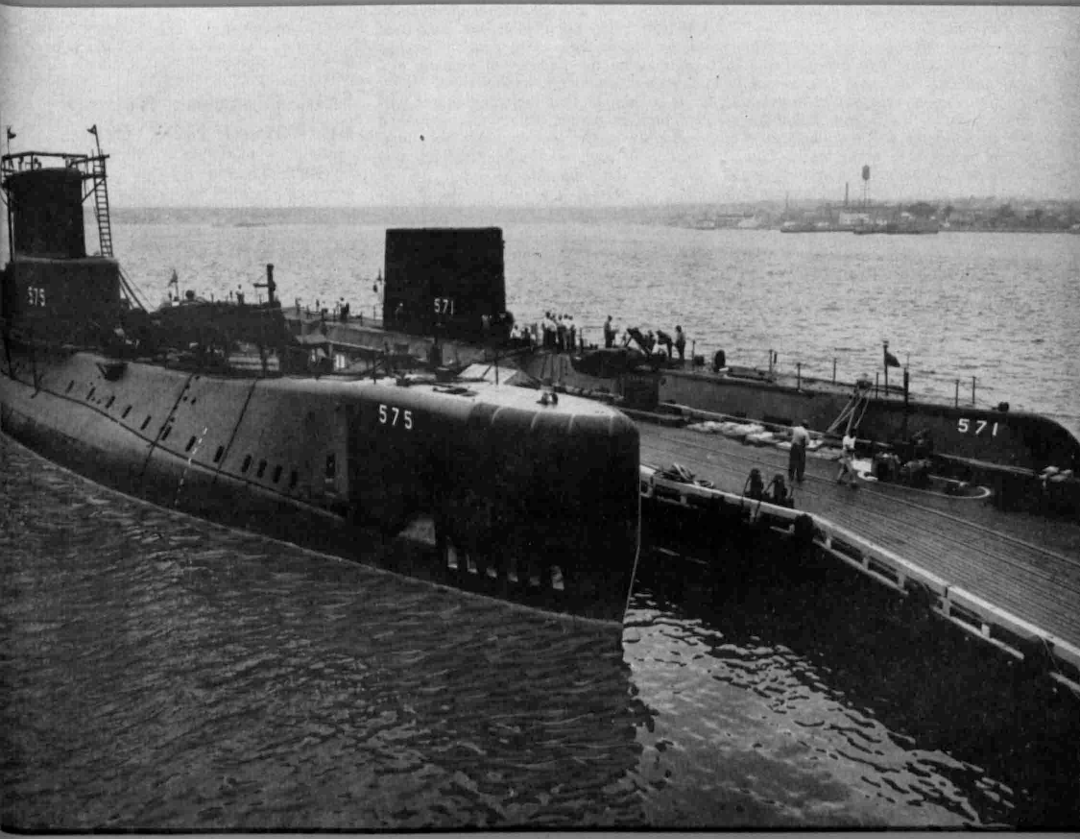
THE WEEKLY SUMMARY OF CURRENT SCIENCE



Atomic Submarines

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A SCIENCE SERVICE PUBLICATION

CRIMINOLOGY

Trial by Jury Outmoded

If trial by jury is to be maintained, administration of justice in these complex times requires introduction of new techniques for selecting jurors, professor charges.

➤ TRIAL BY JURY, although cherished as a fundamental right by most Americans, is an outmoded relic of the thirteenth century and is not appropriate for the present-day administration of justice.

This is charged by Prof. Charles L. Newman of Florida State University in the *Journal of Criminal Law, Criminology and Police Science.*

Historically, trial by jury was intended to replace the older trial by oath, trial by ordeal and trial by battle. In a trial by oath, the defendant repeated a set form of words presenting his defense and this was bolstered by oaths of "oath helpers." It was not necessary to testify to the facts.

In the trial by ordeal, the accused might be made to walk blindfolded among red-hot plowshares or to plunge his arm in boiling water.

Both trial by oath and trial by ordeal were of Anglo-Saxon origin and the latter was probably a survival of ancient heathen appeals to the god of fire or water, Prof. Newman explains.

Trial by battle was introduced by the Normans and was never very popular with the English.

Trial by a "jury of peers" was designed to meet the needs of non-urban, agricultural society. Originally, the jury was a group of neighbors who personally knew the accused and the circumstances of the alleged crime. But times have changed since the days of our great grandparents, Prof. Newman points out.

Then, when a man walked out of his house, every man or woman encountered was known by face, occupation, family and antecedents. Today it is possible for an urban dweller to walk for an hour, a day or a week without seeing a familiar face.

A jury, as selected today, lacks the training and natural ability to render a wise verdict.

And there is little hope, Prof. Newman concludes, that the objectivity desired will be obtained.

"The average juror is swayed by the emotion and prejudice of his heredity, background, training (and how often, his breakfast)," Prof. Newman states. The jury's attitude toward the accused can vary with the type of charge, he indicates.

When "indictment is for violation of one of the multitude of regulatory statutes, it is not impossible that the jurors can see themselves in the dock and sympathize with the defendant," he states. "Where the defendant has pulled off a fraud on big business, the jurors may regard him as a hero.

"But, woe to the defendant who is accused of the crime of robbery, rape, or something in that category! Whatever the law says, it may well be that the jury puts on the defendant the burden of proving his innocence. After all, is not the sanctity of the home and the chastity of womanhood at stake?

In terms of trial process, court decisions are still based upon precedent established in the Middle Ages, often without sufficient reference to the findings of modern sociology and psychiatry, he concludes.

If it must be that the technique of trial by jury is to be maintained, the legal profession might well consider the introduction of new techniques in the selection of jurors, he recommends.

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ENTOMOLOGY

Technical Assistance Aids War on Locusts

➤ THE DEVASTATING LOCUST hordes that have brought famine to the Near East since Biblical days may become unpleasant memories only, as ten nations engage in scientific warfare against the insect pests with technical assistance from the United States.

With the departure of entomologist Arthur Kaatz for Libya, that nation became the tenth in the area to receive technical aid in insect control through the U. S. Department of Agriculture.

U. S. insect fighters are already helping local government agencies in Pakistan, Iran, Iraq, Lebanon, Afghanistan, Jordan, India, Egypt and Ethiopia in the insect battle. Funds for this assistance are supplied by the State Department's International Cooperation Administration.

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BIOCHEMISTRY

See Another Role for Body's Anti-Clot Chemical

➤ HEPARIN, body chemical famous as an anti-blood-clotting substance, seems to have a different role than this in the body.

Its function may be concerned with what goes on in the tissues rather than with the clotting of the circulating blood.

Studies suggesting this are reported by Drs. J. F. Riley, D. M. Shepherd and G. B. West of Queen's College, Dundee, Scotland, and Dr. S. W. Stroud of Boots Pure Drug Co. Ltd., Nottingham, Eng., in *Nature* (Dec. 10).

Both heparin and histamine, they point out, are now known to be concentrated in certain cells of the body, the tissue mast cells. Damage to these cells that would cause release of histamine from them would be expected to cause also release of heparin. This is true of the dog under certain conditions.

In rats, however, the scientists found that, when given a compound (48/80) which produced disruption of the mast cells in the underskin tissues and almost complete loss of the histamine of these tissues, only about half the heparin of the tissues was lost.

Even with this loss of heparin there was no sign of any release of heparin into the circulating blood. The blood clotted in the normal time.

Rabbits and guinea pigs seem to be like rats in this respect.

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MEDICINE

Skin Diseases Helped By Potent New Drugs

➤ SYNTHETIC DRUGS first found useful in treating arthritis are proving useful also in treatment of skin diseases, Dr. Harry M. Robinson Jr. of the University of Maryland School of Medicine, Baltimore, reported at the American Academy of Dermatology and Syphilology meeting in Chicago.

The new drugs are prednisone and prednisolone. They are four to five times more powerful than cortisone and hydrocortisone.

The drugs can, however, cause adverse reactions, Dr. Robinson cautioned.

They are effective, he said, in temporarily clearing the skin and relieving symptoms in the serious disorder, acute disseminated lupus erythematosus, and in some others such as pemphigus, hives and peeling skin disorders.

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DERMATOLOGY

Gland Disease Epidemic From Hormone Use

➤ GLAND DISORDERS have become "epidemic" in the last few years, Dr. Samuel G. Taylor III of the University of Illinois Steroid Tumor Clinic Chicago, said at the American Academy of Dermatology and Syphilology meeting in Chicago.

Increased use of male and female hormones, cortisone and its relatives and thyroid extract are the cause of the gland disorder epidemic, he said.

Certain rare diseases have also become common for the same reason. Dr. Taylor warned the skin specialists that the normal action of the hormones should be understood before they are used. It may be desirable, he said, to produce some gland disorder through hormone treatment if the treatment controls a severely debilitating or fatal disease.

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METEOROLOGY

Hurricanes Never Same

Weathermen classifying meteorological traits of hurricanes find each one is different, making understanding difficult. Westward shift in paths of tropical storms noted.

➤ HURRICANES have personalities, and differ from each other just as much as do women, for whom they are named.

All of them are unpredictable, but the other personality characteristics weathermen see in hurricanes are not traits such as humor, kindliness, sensitivity or courage.

Instead they classify a hurricane's personality according to the following weather traits: cloud distribution, both horizontally and vertically; amount of rain about the center; size of the relatively calm "eyes"; patches of extra-strong winds; thickness of the spiral bands, and location of false "eyes."

These traits are each very different not only from one hurricane to the next but from day to day within the same storm.

This makes the job of understanding the nature of hurricanes extremely difficult. Weathermen once thought hurricanes had calm centers. There the pressure was lowest, winds were weakest, clouds were absent.

Now they have found that these points are not always at the same spot and also make sudden shifts.

That hurricanes are never the same is the conclusion of pilots and weather experts looking back over detailed information on 1955's tropical storms now the season has ended.

Hurricanes Connie, Diane and Ione in 1955 are examples of an unusual westward shift in hurricanes during the past two years resulting from abnormal upper winds in the general atmospheric circulation.

Weathermen doubt that these changes in the Northern Hemisphere's circulation patterns are permanent, but how long they will last cannot be predicted.

During 1955, the prevailing westerly wind belt whose center is usually found over northern United States was displaced several hundred miles northward. Similarly, the prevailing easterly wind belt, normally centered over southern Florida on the East Coast, was several hundred miles northward.

Hurricanes after being spawned in the tropical Atlantic are usually embedded in the trade, or easterly, winds and, therefore, move generally toward the west. However, on approaching North America, the tropical storms are usually sucked up into a meandering stream of the prevailing westerlies and from then on are carried eastward out to sea.

The extremely far northward shift of the two air rivers allowed hurricanes to stay embedded in the easterly current much longer than usual before the influence of the westerly current swept the storms to sea. Thus they slammed into the North American continent much farther north than has been usual in the past.

The abnormal upper wind conditions, which have led to the unusually high number of hurricanes along the Atlantic seaboard during the past few years, are considered climatic fluctuations.

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PHYSICS

Anti-Proton Seen For First Time

➤ FIRST VISUAL EVIDENCE of the anti-proton, new subatomic particle, is reported by scientists of the Universities of California and Rome, Italy. They found one photo-emulsion "star," an explosion of the nucleus caused by an anti-proton. (See p. 409.)

This new particle was discovered at Berkeley by precision measurements with counters (see SNL, Oct. 29, p. 275).

Protons are the positively charged hearts of hydrogen atoms. Anti-protons are their opposite number, having the same mass, but negatively charged.

Annihilation of matter results when proton and anti-proton collide, turning the material particles into bursts of energy according to the famous Einstein theory equating mass and energy.

In collaborative research at the Universities of California and Rome, emulsion plates were bombarded in the bevatron anti-proton beam at Berkeley. Half the plates have been under study in Berkeley, and the other half were taken to Italy for study by Prof. Eduordo Amaldi and colleagues.

One star was observed by the Amaldi group in mid-November and a joint paper describing the event, still unpublished, was written for the *Physical Review*, with names in the following order: Drs. Owen Chamberlain, Warren Chupp, Gerson Goldhaber, Emilio Segre, Claude Wiegand, all of Berkeley; and Eduordo Amaldi, C. Baroni, C. Castagnoli, C. Franzinetti and A. Manfredini of Rome.

This paper has been read to the Italian Academy of Sciences in Rome by Prof. Amaldi.

The star was made by an anti-proton entering either silver or bromine in emulsion. An eight-pronged star resulted, showing six heavy particles, either protons or alpha particles, and two mesons. Neutrons probably also emerge, but they are not visible.

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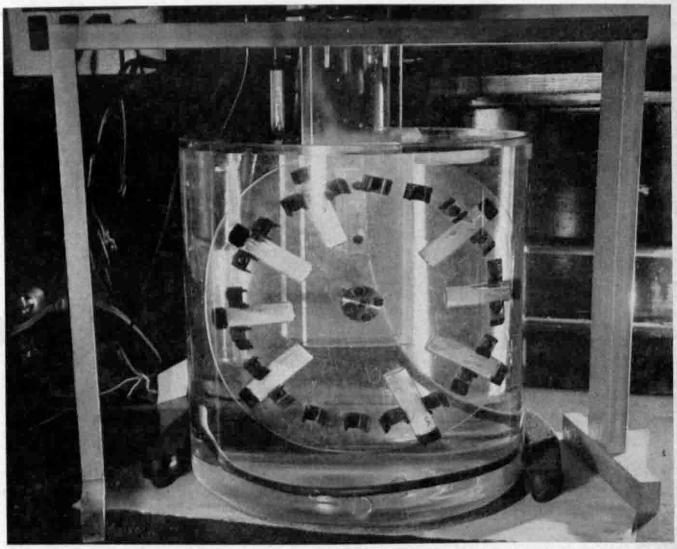

FERRIS WHEEL FOR MICROBES—To determine how soil microbes get organic nitrogen from clay particles, they are given ferris wheel ride in a University of California laboratory. Aim is to check theory that microbes send out enzymes to get from the clay particles the nitrogen that microbes can digest and pass on to new plants. Rotation keeps clay particles coated with organic nitrogen and enzyme solution in constant touch.

TECHNOLOGY

Metal Prevents Early Opening of Parachute

➤ THE FIRST HUMAN to survive a bail out at supersonic speed, George Smith, a test pilot for North American Aviation, Inc., may owe his life to a new metal that kept his parachute from opening until he had fallen to a safe height.

The new metal, Ni-Span C, is highly sensitive to changes in air pressure, while unaffected by wide temperature ranges. It is now used as an automatic trigger for parachutes, releasing them at atmospheric pressures below the region of killing cold and insufficient oxygen.

Ni-Span C is processed by the H. A. Wilson Company, Union, N. J., from material developed by the International Nickel Company. The release mechanism for the automatic parachute opener was designed by U. S. Gauge Company.

Test pilot Smith is reported to be the first human to survive a supersonic bail-out, when last February he ejected himself from an F-100A Super Sabrejet diving at 777 miles per hour. Badly battered internally and externally, he was hospitalized for months but is now reported to be almost totally recovered.

The Wilson Company said Mr. Smith told them the automatic release undoubtedly saved his life, since he was knocked unconscious when ejected from the plane.

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GENERAL SCIENCE

Top 1955 Science Events

➤ THE TOP IMPORTANT ADVANCES in science and technology during 1955 as picked by Watson Davis, director of SCIENCE SERVICE, are:

1. The Geneva International Conference on the Peaceful Uses of Atomic Energy, which opened the way to international atomic cooperation.

2. The reconstitution of an infective virus from its parts, viewed as a step toward conquering virus diseases, and the crystallization of another virus, that of polio, necessary for analysis and synthesis attempts.

3. Announcement of the "area rule" research by NACA that wasp waisting fuselages produced 25% more supersonic speed for U. S. military planes.

4. Mass use of the Salk vaccine against polio, with seeming success despite some trouble and delay.

5. The creation of the subatomic particle, the anti-proton, with the world's largest atomic accelerator.

6. Planning for launching of tiny artificial satellites to circle the earth when rocket-launched in 1957 as a U. S. contribution to the International Geophysical Year.

7. An increase in the age of the universe to six billion years due to further revision of astronomical distances to far-away galaxies.

8. Synthetic manufacture of real diamonds by use of high pressure and temperature.

9. First regular use in the United States of an electronic "brain" for weather forecasting.

10. Cruising 25,000 miles without refueling by the world's first atomic submarine, U.S.S. Nautilus.

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MEDICINE

Alcoholism Shrinks Brain

➤ SEVERE ALCOHOLISM of long standing may cause irreversible shrinkage of the whole brain, according to evidence obtained by Dr. S. A. Skillicorn, neurologist at the University of California School of Medicine.

Moderate social drinkers need not worry, Dr. Skillicorn said, for it apparently takes a great deal of alcohol regularly over a long period of time. Even then the condition is infrequent.

The neurologist studied six confirmed alcoholics while he was on leave of absence from the university and stationed at the U.S. Naval Hospital, San Diego. All patients were retired veterans.

Clinical signs showed the six had severe damage to the cerebellum, a particular portion of the brain behind and beneath the main part of the brain, the cerebrum.

The cerebellum normally controls coordination of movements. When it is damaged, the individual suffers from ataxia, or loss of control of coordinated movement. The victim has a permanently incoordinated gait, as though drunk.

Damage of this kind to the cerebellum associated with alcoholism has been known for about 50 years.

Dr. Skillicorn wanted to see if he could confirm the clinical evidence with experimental tests. He removed some spinal fluid from the patients, injected air, and then took X-rays. The air settles in spaces within the surrounding brain and shows up the spaces in X-rays.

The neurologist found not only damage to the cerebellum, but a generalized atrophy, or shrinkage, of the brain. The cerebrum, or main part of the brain, was severely affected.

A battery of psychological tests also pointed to generalized physical damage to the brain.

The exact mechanism by which the brain is damaged is not known, although it may be due to a toxic, or poisoning, effect. There is the possibility dietary deficiencies and a lack of oxygen for brain cells may also contribute to the damage.

The same kind of brain disease also occurs occasionally with other conditions, such as in severe sunstroke and heatstroke, or with sensitivity reactions to some drugs.

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The chances of a *quintuplet birth* are about one in 40,000,000 or 50,000,000.

College graduates only 10 years out of school now have almost as many children as the graduates of 25 years ago.

GENERAL SCIENCE

1955 Science Review

Top achievement of past year may be reconstitution of virus as first step in conquest of such diseases. Geneva Conference on Peaceful Uses of Atomic Energy judged important.

This summary of the year's happenings in the world of science is limited by space to just the highlights. Most of the events are described in detail in the pages of SCIENCE NEWS LETTER *for the current year. If you wish to refer to any particular report, you may find it readily through the index. (See SNL, June 26, and also the issue that will appear next week, Dec. 31.) If you want more information about any item in the summary, send 25 cents to help cover answering costs for each item about which more information is requested.*

By SCIENCE SERVICE STAFF

See Front Cover

➤ THE FUTURE may look back upon 1955 as the year when man first took apart an infective virus and put it together again into a living whole, a step toward conquering virus diseases.

It may, instead, be remembered for the Geneva atomic conference in August where scientists of the world revealed secrets and demonstrated that experimental findings, the same the world over, are not dependent upon ideologies.

One's scientific sights can be upon the next few decades or the next few years.

The peaceful atom at Geneva may have helped preserve the world's armed, cold peace, giving undisturbed chances to continue our scientific and technological evolution. An international atomic agency of the United Nations was projected as a consequence of the Geneva meeting.

The major atomic nations were revealed to have very long-range programs attempting to apply the principle of the thermonuclear or H-bomb to peaceful power, fusing light elements like heavy hydrogen instead of fissioning heavy elements, like uranium, to convert mass into energy.

Secret research continued on the intercontinental ballistic missile, to replace the supersonic bomber for delivering atomic bombs to enemy heart territory.

It was announced that tiny artificial earth satellites will be rocket-launched in 1957 as a part of the International Geophysical Year.

In aviation, the NACA-developed "area rule" that gives supersonic planes wasp waists was secrecy-unwrapped after having increased speeds 25% on U.S. military planes since 1952.

In medicine, mass use of the Salk vaccine against polio, marred by a few accidentally defective doses, dominated public attention, with a reduction in the case rate in 1955 over 1954.

Public attention was refocused upon the problem of heart disease, number one killer, by President Eisenhower's heart attack.

Steps toward the better understanding of life were taken both through the exploration of chemicals that make up living matter and through the partial rearrangement of a virus on the border between the living and the inanimate.

A virus, that of polio, was crystallized for the first time, a preliminary to its purification and analysis.

Controversy continued on the degree of danger from atomic radiation, both from bombs and power plants, to the health and heredity of human and other life on earth. The United Nations authorized a commission to study the problem.

Radiation applied to medicine, industry and biology is continuing to bring benefits, with prospects that new species created will eventually be of practical value.

Research on photosynthesis reached the point where only the first steps in the plant's capturing of solar energy remain to be discovered.

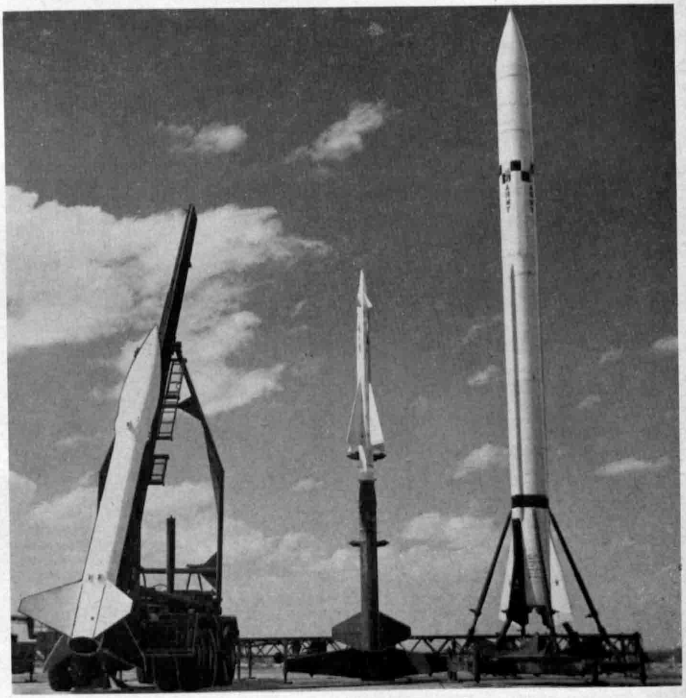
A world conference on solar energy focused light upon the problems and progress in using sunshine for heating and cooling, cooking, desalting water, and producing very high temperatures.

Antibiotics were used against formerly incurable plant diseases by spraying foliage, soil and by injection.

A major achievement in technology was the production synthetically of real diamonds by application of high temperature and pressure. Real garnets were also made by the same means.

Through the use of the world's largest atom smasher, the fundamental particle, the anti-proton, was produced, another step in the exploration of the nature of matter and energy.

Element 101 was created in extremely small quantity and named mendelevium, while elements 99 and 100, discovered in



REACHING FOR OUTER SPACE—Foreshadowing larger and more powerful rockets yet to be built from which earth-circling satellites will be launched, this photograph shows the U.S. Army's guided missiles, each one the first of its type to be ready for production. The Honest John is on the left, the Nike in the center and the Corporal on the right.

1954, were named einsteinium and fermium after great scientists who died recently.

The size of the universe expanded, not physically but because of new astronomical measurements. It is now estimated that it takes light six billion years to travel from the most distantly visible galaxies to us.

Weather began to be forecast by an electronic brain in the United States. This is only the beginning of the meteorological automation era.

Hurricane tracks for eastern United States shifted westward to strike populated areas more often for the second year, raising fear of a continuance of such paths.

The possibility of using space stations outside the earth for forecasting earthly weather was sugggested when a gathering atmospheric storm was detected in a photograph taken from a high altitude rocket.

The world's first atomic submarine, the U.S.S. Nautilus, cruised 25,000 miles without refueling, and the second, U.S.S. Seawolf, was launched. They are shown on the cover of this week's SCIENCE NEWS LETTER, lined up at Groton, Conn., for a family portrait, the Seawolf on the left.

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AERONAUTICS

"Area Rule" Principle Ups Supersonic Speeds

A new design principle called the "area rule" was developed and found to give airplane speed gains of 25% in the supersonic range.

The world's first multi-jet attack plane was introduced to the public.

Conventional jet fighter planes were launched from a truck platform, making use of guided missile launching equipment.

A simulated wind speed of 11,400 miles an hour was maintained continuously for ten minutes in a wind tunnel.

Through experiments with nylon balls fired at a speed equivalent to 15,000 miles an hour, it was found that gases around a super-supersonic missile dissociate when the projectile reaches Mach 10, serving to cool the surface of the missile.

The Air Force awarded a contract for the development of a vertical rising, man-bearing plane resembling a "flying saucer."

A circular platform about as wide as a man was flown successfully.

A "Flying Venetian Blind," an experimental airplane with a bank of slats attached to its wings permitting vertical take-off and landing, was tested successfully.

An experimental F-80C with a magnesium fuselage was flight tested.

An automatic ejection seat was put into use in vertical take-off planes.

A system was developed for remote control of jet planes with provision for an electronic "brain" to take over control in case radio signals are cut off.

A trail of turbulent air was found to follow an airplane, extending for miles and persisting as long as a minute.

The periodic wabbling of airplanes during flight called "snaking" was found to be caused by atmospheric turbulence.

The field of noise surrounding a jet bomber in flight was found to be shaped like an apple with the stem pulled out.

A power source was found available in the jet engine that will blow or suck the boundary layer from critical areas of the wings and control surfaces to allow high speed airplanes to land and take off in a much shorter distance.

A convertiplane with a helicopter rotor above the fuselage powered by small jet units at the tip of each blade and a small pusher propeller mounted between the double tail was made public.

An experimental wing flap that would permit vertical take-off for conventional looking planes was tested.

A tiny electronic computer operating on transistors instead of tubes was developed to aid airplane pilots in making split-second decisions.

A weather measuring system that would inform airplane pilots when they might expect to see vital ground reference points was developed.

A vertical transparent television tube for an airplane's windshield was developed for the purpose of replacing a multitude of dials on the plane's instrument panel.

A "ducted fan" jet engine, quieter and more economical on fuel than conventional jets, was tested on experimental planes.

A ski-wheel landing gear was developed that makes it possible for a bomber to land on water, snow, mud and ice as well as runways.

Crash-resistant, flexible gas tanks for airplanes were tested.

A new "windmill parachute" made possible drops of military supplies from high altitudes.

A research rocket was designed to carry 150 pounds of scientific instruments 180 miles into the air during the International Geophysical Year in 1957-58.

A strato-sailplane, huge two-man glider with pressurized cockpit, was proposed to explore the stratosphere, riding the jet stream.

A rocket was designed to carry an aluminum ball containing instruments 75 miles into the upper air where it would be dropped; the project was part of plans for the International Geophysical Year in 1957-58.

A closed circuit speed record for a 500-kilometer (about 300 miles) course was set when a Douglas A4D-1 was flown at 695 miles per hour.

A new transatlantic record was set when British flyers flew from London to New York and back in a total flying time of 13 hours and 47 minutes.

A "stratocell" balloon set a new altitude record at 121,000 feet.

A record was broken for speed in flight from California to New York when a Thunderstreak was flown the 2,445.9 miles in three hours, 46 minutes.

ANTHROPOLOGY-ARCHAEOLOGY

Dig in North China For Peking Man Remains

After a 12-year interruption, digging was resumed at the Choukoutien site of Peking Man in north China in a search for further remains and possibly for an even more ancient ancestor of modern man.

Bones of Australopithecus, ancient African ape-man, was found associated with primitive pebble tools, suggesting that he may have used and possibly made them.

M'lefaat, in northeastern Iraq, was found to be the oldest "village" in the world, more than 7,000 years old.

A new radiocarbon dating method involving converting the organic materials in the sample to gas gave an age of 25,000 to 30,000 years to New Mexico's Sandia Man.

ANCIENT TOOLS—Part of evidence that Dorset Eskimos were the dominant culture in the Canadian Arctic for more than 1,000 years were the tiny tools such as shown here, characterized by very delicate workmanship. Some of the stone blades, characterized by fine delicate workmanship, are about a third the size of a paper clip.

Now extinct American camels were a favorite food of early Americans, examination of a 23,800-year-old campfire site near Las Vegas, Nev., showed.

Charcoal from what is believed to be a campsite of ancient Indians in California was dated by the radiocarbon method as being 22,500 years old.

New fluorine tests of the bones of Natchez Man and the giant sloth buried with him confirmed the antiquity (11,000 years) of that ancient American.

Stone Age Indians understood something of astronomy when they occupied the oldest known village in the lower Mississippi Valley, between 800 B.C. and 400 B.C., it was found.

Comparison of the evidence found on a 1,000-year-old Dorset site with that found nearby on a site not more than a few hundred years old showed that the Dorset culture was the dominant, pervasive culture in the eastern part of the Canadian Arctic for more than a thousand years.

New evidence linking the Iranian Plateau with the Indus Valley was obtained with the finding of a splendid series of terra cotta figurines of humped bulls at a new archaeological site in Mekran, West Pakistan.

A large 80-acre town that was occupied by Greek colonists from about 600 B.C. to 200 B.C. was found in Sicily and excavation was begun.

Examination of over a thousand ancient Greek skulls showed that before 2,000 B.C. one out of every four had osteoporosis, a porous condition of the skull bones, none had syphilis.

The extent to which the bones of the skull are grown together was found to be unreliable as an index to the age of the skeleton.

The small stature of a South American tribe thought to be pygmies was found to be not racial but the result of miserable living conditions.

A contourometer, an instrument for mapping photographically and with accuracy the outlines of the human figure, was developed.

One of the Dead Sea scrolls, a unique manuscript dating back almost to the birth of Christ, was reported to contain an account of Noah's birth.

Evidence that American plants, including peanut, sweet potato and corn, reached China in the 16th century tended to disprove that they were introduced through pre-Columbian contacts between America and the East.

Chemistry provided archaeologists with a new technique for dating ancient Roman brass objects when analysis of coins of known date showed a steady increase in copper and corresponding decrease of zinc content in the 250 years following 45 B.C.

Chemical evidence was reported that silver money was debased by cutting down the silver content some 2,000 years ago in the ancient kingdom of Parthia.

Discovery was made of pictographs in Arizona indicating that the brilliant supernova of July 4, 1054, was observed and recorded by prehistoric American Indians.

Evidence was found that a variant of the Cochise culture, formerly believed confined to a limited area in southeast Arizona and southwest New Mexico, extended as far as what is now Sonora in Mexico.

Careful inspection of carved jade ornaments showed that ancient Indians of Costa Rica did fine carving on the hard jade by coating a fiber string with an abrasive and pulling the string back and forth.

In Central America, private ownership of coffee trees preceded and led to the private ownership of land, it was reported.

ASTRONOMY

U. S. Will Launch Artificial Earth Satellites

Announcement was made that the United States Government would sponsor the launching of several artificial satellites during the International Geophysical Year which starts on July 1, 1957.

Reception of radio waves from the center of the Milky Way indicated that it is located 8,500 parsecs from the sun and that it has arms spiraling toward the center; this confirms previous indirect observations.

The astronomical age of the universe was estimated to be close to 6,000,000,000 years on the basis of observations of the outermost edge of the visible universe through the 200-inch telescope, the result of a further revision of the distances to very distant galaxies.

Birth of a star may have been observed for the first time, providing supporting evidence that stars are being formed continuously.

A true radio star, first observed radio source of stellar size, was discovered at the north boundary of the constellation Hydra.

Radio waves from heavenly sources were found to show absorption lines just as does light from stars, providing astronomers with a new yardstick for measuring distances within the Milky Way.

A strong radio source was found in the Great Loop in Cygnus, the Swan, providing an unrivaled opportunity to study the correlation between radio emission and visible structure.

Jupiter was found to be the source of radio noise outbursts, the first planet known to act as such a source.

Discovery was reported of a star with smallest mass yet known, only one-twelfth that of the sun.

The largest star as yet recognized in our galactic system, Alpha Herculis, was reported to be 200,000 times the diameter of our sun.

The Andromeda galaxy was reported to be 14 billion billion miles away from the earth, half again as far as previously thought; "planetary nebulae" were discovered in it.

A 50-year research program on variable stars of the Magellanic Clouds, closest galaxies outside the Milky Way, was completed.

Report was made of 10,000 photographs of Mars taken in red, yellow and blue light during its close visit in 1954.

The spherical shape of globular clusters and their freedom from interstellar dust and gas was explained by the theory that the dust and gas have been cleaned out by frequent passage through nebulosities in the Milky Way.

New information about the planets include: Rediscovery of Jupiter's lost moon, solution of the problem of how Venus points in spinning, discovery that Venus has a magnetic field about five times stronger than the earth's.

Stars are being formed continuously, it was indicated by studies tracing the history and future of stars with aid of atom smashers and a giant electronic computer.

Heavenly sources were found to broadcast radio waves only an inch long.

Discovery was reported that the very dense clusters of cosmic dust in the dark spots of the heavens do not contain extra-strong concentrations of neutral interstellar hydrogen.

Observations made during the lunar eclipse of a stellar radio source indicated that the moon's atmosphere is less than a trillionth as dense as the earth's at sea level.

The variation in the rate of the earth's rotation was accurately determined showing that, in addition to annual and semi-annual variations, changes occur at intervals of 13.6 and 27.6 days due to lunar tides.

A theory was advanced that material spewed into space by old stars is used in the formation of new stars, thus accounting for observed abundances of the heavier elements.

Constellations of blue stars in the Large Cloud of Magellan were found to contain a few supergiant stars more than 200,000 times as bright as our sun.

A five-year plan to build a national astronomical observatory was announced; the U. S. Naval Observatory moved its 40-inch telescope to Flagstaff, Ariz.; a new astronomical observatory was under construction near Philadelphia, and two major observatories teamed up to study solar radiation.

Calculations indicated that the low point in the 11-year sunspot cycle was reached in April, 1954.

An eclipse of the sun with the longest period of totality since 717 A.D. occurred on June 20.

A total of nine comets were reported during the year, of which one was a rare split comet that appeared almost like a double star, and two were visible to the naked eye.

The sun's radiation in the extreme ultraviolet was found to vary over its surface, being brighter at the edges near the equator than at the edges near the poles.

Plans were confirmed for construction of a national radio telescope.

BIOLOGICAL SCIENCES

Irradiation Creates New Plant Species

A new species of plants was created by exposure of the parents to atomic radiation.

Atomic particle radiation was used to induce hereditary changes in plants that make them immune to certain diseases.

Some of the antibiotics now so widely used in human medicine were used commercially to fight formerly incurable plant diseases.

It was found that penicillin's ability to step up the growth of pigs is not entirely due to its germ-killing power; it is also due to one or more products from the breakdown of penicillin when it is no longer effective as an antibiotic.

Tobacco mosaic and cucumber mosaic viruses were inhibited by a chemical extract from the seeds of the plants.

Highly magnified electron microscope photographs were made of the protoplasm of slime mold, showing a well organized "assembly line" for the basic materials of life.

Computations showed that there are some 1,000,000 molecules in a single bacterium and that the organism is capable of manufacturing them at the rate of 21,000 per minute.

A gas-filled X-ray tube and a total reflection camera were combined to form a new instrument for studying small viruses and protein molecules.

Tar from both machine-smoked and naturally-smoked cigarettes was found to cause cancer-like tumors on plants.

A chemical, 3-Cl-IPC, was found to stop the sprouting of stored potatoes and cut rotting.

After exposure to atomic radiation, potatoes were found to keep for a year at 48 degrees Fahrenheit.

Experimental data indicated one reason why leaves fall and fruit drops when it is ripe is that the auxin level is higher in the stem than in the leaf or fruit.

Green plants were found to luminesce like fireflies, although on a small scale, and a sub-

stance was prepared in the laboratory that may be identical to the chemical making plants give off light.

A plant growth regulator gave promise of wiping out poison ivy and other pest plants, and was observed to cause albinism in the plants on which it is applied.

Chemicals were found that produce degenerative arthritis and bone, joint and artery changes in rats, leading to hope of finding a way to reverse the changes.

In an attempt to gain knowledge of the aging process, insects were produced that were half young and half aged.

Antibodies to all three types of polio were found in blood serum of cows.

Ordinary smallpox vaccination was found to stop a mouse disease, infectious ectromelia.

A new disease germ very much like that of tularemia was found in turbid water from the Ogden Bay Bird Refuge near Odgen, Utah.

A bacterium was discovered that thrives on the deadly poison potassium cyanide.

By placing embryos under the influence of the female hormone estradiol, male toads were changed into egg-laying females.

Sheep eggs in the two-cell through the 12-cell stages of development were transferred into the reproductive organs of female rabbits, where they continued to develop normally for at least five days.

DDT, aldrin, dieldrin and endrin were found to be highly toxic to game birds, either killing adults or interfering with the hatching or survival of chicks.

Breeding ground of the rare whooping crane was located in wilds of Canada after a ten-year search.

Texas longhorn cattle, close to extinction less than 25 years ago, were found to number more than 500.

Study of camels in the Sahara showed they do not have any compartment for storing water, but can go without drinking because they can endure much heat without perspiring.

Specialized organs in the reproductive tract of the female snake were found to act as storage spaces for male sperm cells, enabling her to have young long after separation from her mate.

Addition to DDT of another chemical with similar structure succeeded in breaking down the defenses of DDT-resistant insects.

The serious swine virus disease, vesicular exanthema, was brought under control by preventing feeding of raw garbage to swine.

A serious pest of cattle, the screwworm fly, was completely eradicated on Curacao by releasing male flies sterilized by atomic radiation, making females they mate with lay only sterile eggs.

Radioactive phosphorus-32 was mixed with corn, bran or grass and fed to migratory locusts for the purpose of tracing them and studying their habits.

A chicken liver vaccine was developed that provides baby chicks with a high resistance or immunity against visceral lymphomatosis, a serious poultry disease.

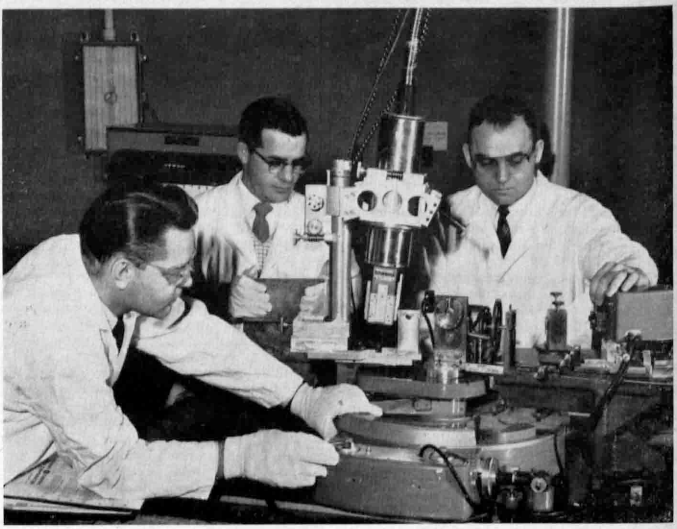
Improved relations between Russia and the U. S. were reflected by exchange visits of agricultural experts of the two countries.

A seven-year fight to rid the United States of scrapie, a deadly sheep disease, was successfully completed.

Mexico was found to be free of foot-and-mouth disease, and livestock were once again allowed to cross into the United States.

The greatest timber harvest on record, 6,328,229,000 board feet, was cut in U. S. national forests.

A device based on the principle of the snooperscope enabled forest rangers to spot forest fires.



HANFORD'S X-RAY SPECTROMETER—To measure submicroscopic damage suffered by solids exposed to nuclear heat and radiation in the Atomic Energy Commission's plutonium plant, General Electric engineers designed this double diffraction spectrometer, shown here before the lead shielding was put in place. The device is so sensitive it can detect changes as small as a billionth of an inch in the distance between crystal facets.

CHEMISTRY-PHYSICS

Atoms-for-Peace Discussed in Geneva

The International Conference on the Peaceful Uses of Atomic Energy held at Geneva in August resulted in the first important exchange between nations of atomic information; in many instances experimental information held secret, such as the cross-sections of fissionable materials, was shown to have been discovered independently by the atomic powers.

The method of separating fissionable uranium from thorium from which it is manufactured in breeder reactors was released from secrecy.

An atomic accelerator designed to reach energies of ten billion electron volts was announced as building in Russia, and predictions were made that through new approaches machines would eventually create artificially atomic particles with energies up to ten thousand billion electron volts, a thousand times higher than those of primary cosmic rays.

Through creation of the anti-proton in the University of California bevatron, it was shown that this particle actually exists and that annihilation of matter results from collision of the anti-proton with a proton.

Utilization of the sun's energy as a source of power was demonstrated on an experimental scale, and practical means of using it for producing very high temperatures, and also for food preparation, for heating and cooling, and for distilling fresh water from salt water, were discussed at an international conference.

Research programs on applying the hydrogen bomb or fusion reactions to generation of atomic power were acknowledged by the United States, Russia, England and France, as a consequence of speculation at the Geneva atomic conference about obtaining thermonuclear energy from light elements.

Thermonuclear research in the United States was revealed as being conducted at five different laboratories.

Discovery of the method of photosynthesis in the green plant progressed to the point that only the first and most important step remained to be determined, that is, the identity of the substance that seizes hydrogen from water dissociation and triggers the first attack on carbon.

Crystals were formed of a highly purified polio virus, removing a little of the mystery surrounding viruses; the crystal has a rectangular box shape with a pyramid on each end.

An infectious virus was re-created in the laboratory by recombining a protein and a nucleic acid, derived from the original virus, neither in itself infectious.

An improved model of the streaming birefringence apparatus accurately measured the length of giant elongated molecules such as those in certain viruses.

An atomic battery developed has a hot core of radioactive polonium that acts on 40 thermocouples to produce electric energy.

A button-sized battery was developed that delivers constant-voltage electricity for two years though use of indium as anode.

An engine powered by solar heat was designed to pump water.

A battery charged by the sun's rays was used experimentally to power a transistor radio set.

An atomic light source that can shine for years resulted from bombardment of phosphors by particles from radioactive strontium 90.

Five major atomic power reactor projects were under construction, atomic engines powered the submarines USS Nautilus and USS Seawolf, and two prototype submarine power plants were put to use.

Correlating the speed of ultrasonic waves passing through liquid organic chemicals with chemical structure provided an improved tool for chemical analysis.

Nuclear particle tracks, as in a cloud chamber, were observed as vapor trails in liquid hydrogen, in the so-called "bubble chamber."

An electronic computer was used in establishing the three-dimensional chemical structure of vitamin B-12, and part of a large fragment of the molecule was synthesized.

Soaking in water was found to protect living tissues from radiation injury.

Elements 99 and 100 were named einsteinium and fermium to honor two great scientists who died recently.

Element 101 was produced in a small quantity (17 atoms) and named mendelevium for the great Russian chemist.

New and economical processes of recovering uranium from ore were announced; kerosene is used in one process, and the other makes use of ion exchange resins in the form of plastic beads.

A new type of experimental transistor set a high frequency record, reversing current from positive to negative more than a billion times a second.

Boron nitride, an ivory-like substance similar to graphite in resistance to acids but having high electrical resistivity, was prepared.

An inquiry into the possibility of danger from radiation to life on earth was begun by the National Academy of Sciences.

Polarizing of protons, hearts of hydrogen atoms, was reported, an atomic physics achievement equivalent in importance to the discovery of polarizing of light.

One of the last gaps in the middle of the list of radioactive forms of common metals was filled by the identification of manganese 53.

The electric charge on raindrops was found to be produced by ions predominantly due to cosmic rays.

Amino acids, basic stuff of life, were produced spontaneously by sending electric charges through an atmosphere believed similar to that of the primitive earth.

A key building block of living matter, carbamyl phosphate, involved in the building up of urea and the nucleic acids, was discovered and synthesized.

Nucleic acids and cholesterol were synthesized from simple acetic compounds.

The complete structure of the ACTH molecule was determined, and each of its 39 amino acids was identified.

Lower temperatures than ever before possible were achieved by causing atomic nuclei to absorb energy from the motion of atoms when they are released from a strong magnetic field.

Diamonds were made artificially by combining enormous pressure with temperatures of more than 5,000 degrees Fahrenheit; garnets were also made from the mineral hornblende on the same press.

The male sex hormone testosterone was synthesized directly from simple coal tar chemicals.

A new concept, the "geon," or gravitational-electromagnetic entity, tying together the familiar effects of both forces, was reported.

A crystalline chemical, stevioside, from the leaves of a wild Paraguayan shrub was found to be 300 times as sweet as sugar, and a cyclic component attached to the stevioside molecule offered promise of becoming a raw material for cortisone-like compounds that may have a medical use against arthritis.

Better fuels including improved gasoline were extracted from crude petroleum by a very simple process using the common chemical urea to trap "straight chain" molecules.

Microwaves of extremely high frequency were generated by tapping directly the energy of molecules, permitting amplification of high-frequency radio waves without using vacuum tubes.

Technetium was found to be a neutron absorber, useful in atomic reactors.

Molten metallic sulfides were found to conduct electricity in the same way as does an ordinary wire.

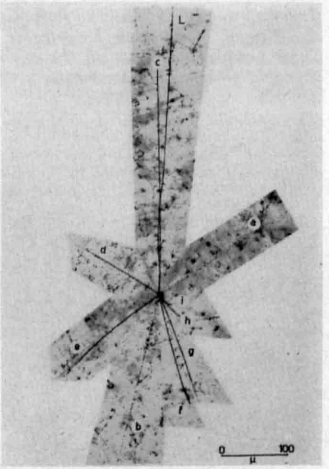
Unusual properties of ice were found to be due to a surface film of liquid water even at temperatures below freezing.

New chemical understanding of how the evolution of the stars can build light elements into heavier ones was derived from information about isotope transformations in recent studies of fusion reactions.

Radioactive beryllium 7 was found to be created in the upper air by bombardment of cosmic rays on atoms of nitrogen and oxygen.

The Nobel Prize in Chemistry was awarded to Prof. Vincent du Vigneaud for discovery of a process for duplicating in the laboratory fundamental chemicals controlling human body functions; two chemicals produced in the body by the pituitary gland have already been synthesized by Prof. du Vigneaud.

The Nobel Prize in Physics was awarded to Drs. Willis E. Lamb Jr. and P. Kusch for research which resulted in a complete restatement of the theory of atomic states as influenced by radiative interaction.



FIRST ANTI-PROTON PHOTOGRAPH — This photograph shows the first visual evidence for the existence of the anti-proton. The heavy negative particle enters the photoemulsion from the top, wavering as it slows down. When it comes to rest, it and a proton in either a silver or bromine nucleus are annihilated, exploding the nucleus into the many fragments. Those visible here are probably: a and b, mesons; c, energetic proton; f, g, h, i, protons of lesser energy, or possibly alpha particles. ***(See p. 403.)***

EARTH SCIENCES

Electronic "Brain" Makes Daily Weather Forecasts

Daily predictions of weather flow patterns by an electronic computer were made, the first operational use of an electronic computer in weather forecasting in the United States.

Assuming an atmosphere at rest, then introducing random disturbances, heating and friction effects, operating over a long period of time, typical long-period flow patterns were obtained by electronic computer.

Hurricanes during the past two years were found to have traveled farther westward than formerly because upper wind conditions that steer the tropical storms have been abnormally far north; three hurricanes caused much damage, hurricane Diane resulting in devastating floods in the New England region.

A five-minute, quantitative method for predicting hurricane paths was used operationally for the first time.

A high man-made sodium cloud was formed when a rocket spewed a 30-mile column of sodium vapor from 40 to 70 miles above the earth's surface.

It was demonstrated that amount of precipitation can be forecast by electronic computer, and that a computer can be used to analyze weather maps, a forecasting step previously done only by humans.

Audible radio waves called "whistlers," discharged by lightning, were found to travel along invisible tubes of force in the earth's atmosphere, suggesting these channels may be usable for long-distance communication.

Three separate evaluations of rain making showed that dry ice thrown from airplanes failed to increase rainfall in the Northwest, the Midwest and along the East Coast, but that chances of raindrops forming within warm tropical clouds is doubled if seed water is dumped into them.

The inversion layer thought characteristic of tornadoes may actually disappear gradually several hours before "twisters" are born, measurements by radio-sonde balloons showed.

Smog research showed that sources of smog can be located by mathematical and tracer techniques and that tear smogs in Los Angeles are partly due to ozone.

Radiocarbon dating by a new gas method showed that the Wisconsin glaciation began 25,000 or more years ago, reached a maximum between 20,000 and 18,000 years ago, and was in retreat about 13,000 years ago; dating was done on trees actually felled by the advancing ice.

A rocket-borne camera photographed, for the first time, a storm not suspected by earthbound meteorologists, indicating that unmanned earth satellites could televise such information.

A radar tornado warning network was inaugurated in the Southwest and a powerful hurricane radar station was established at Cape Hatteras, N. C.

The shape of raindrops was measured by beaming radar waves polarized in various ways at rain.

The world's largest lake, the Caspian Sea, was found to be drying up as a result of natural causes and artificial measures, seriously threatening the Soviet national economy.

Sweeping of the ocean floor revealed that roughly 7,000,000,000 particles from outer space, called caudaites, bombard the earth each year.

Auroras were reported to be composed of hundreds of thousands of relatively tiny rays, about 300 feet across and a mile in height, continuously forming and fading every second

along the invisible lines of the earth's magnetic field.

A tiny model of the earth inside a vacuum tube, the Stormertron, showed the complicated system of orbits into which incoming solar particles are thrown by the earth's magnetic field.

Accurate prediction of disturbances in short wave radio communication was made possible by a new method of forecasting magnetic storms.

Breakdown products of chlorophyll were recovered from the mud of Canadian lake bottoms and dated as from over 8,000 to 11,000 years old.

A wind of close to 300 miles an hour, highest ever reliably measured, was found as part of the jet stream 32,000 feet above the earth's surface.

An experimental program was inaugurated to take weather observations twice daily by radiosonde instruments released from cruising merchant ships.

Routine forecasts were made twice a day of atomic debris fallout patterns at selected points.

Similarities between Asian and Alaskan planaria (primitive worms) provided fresh evidence that the two continents were joined by a land bridge during the Ice Age.

The magnetic north pole lay in the vicinity of the present-day Hawaiian Islands 600,000,000 years ago, studies of "fossil" magnetic rocks revealed.

Discovery was reported from Colorado of a new uranium mineral, which is extremely radioactive, named coffinite in honor of a geologist of that region.

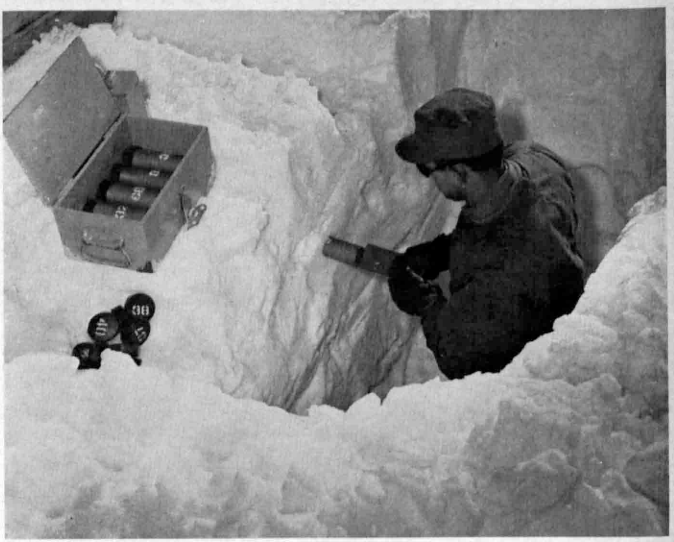
Radiocarbon dating of deep sea sediments showed that about 12,000 years ago the waters of the Caribbean Sea suddenly warmed up to present-day temperatures.

One of the world's richest deposits of titanium, located in Oaxaca, Mexico, was explored and developed.

Plans for world-wide research during the International Geophysical Year were advanced, including departure of "Operation Deepfreeze" to Antarctica.

Earthquakes during the year totaled about 200 of magnitude six or greater, including one in Mindanao that killed 432 and left 11,000 homeless.

Volcanic eruptions included at least 15 eruptions by 12 volcanoes.



POLAR SNOW STUDIED—To prepare for the many scientific stations to be set up during the International Geophysical Year beginning July 1, 1957, the Navy's "Operation Deepfreeze" recently departed for the Antarctic. Snow samples scientists on the expedition will take, as shown in this photograph, yield such information as the weight-bearing capacity of the snow.

ENGINEERING-TECHNOLOGY

Microscopic Whiskers Superconductivity Clue

Microscopic whiskers that grow out of the surface of tin and other metals are being studied to observe their superconductivity at temperatures near absolute zero.

A postage-stamp-sized battery, smallest rechargeable battery in the world, was developed to power a secret defense device.

An electronic computer was demonstrated that calculates at a rate of 1,000,000 digits a second.

A step was made toward all-electronic record-keeping with the development of a "memory" for feeding in and storing transactions one by one as they occur.

An automatic machine, operating from punched tape instructions, was developed to make connections in complex wiring circuits.

A guided missile was developed that is directed to its target by heat waves given off by the target itself.

Guided missiles for supersonic speeds, including some designed to guide themselves to enemy targets, were put through tests.

A torpedo using transistors was developed that guides itself toward the enemy target by means of sound waves in the water.

A "meltback" process was developed for making transistors that can operate efficiently at frequencies five times as high as those of ordinary transistors.

A machine was produced to carry out automatically the more than 15 steps in the production of experimental transistors.

A tiny radio transmitter powered by voice alone was produced.

A midget radio transmitter was made to operate on power from the sun's rays converted into electricity by a selenium converter.

A solar battery was put to practical use in furnishing power directly to a telephone line.

New techniques of radio propagation by "scatter" methods at very high frequencies were found to be up to 99% reliable over long distances.

Glass rods split in two were found suitable to guide extremely short millimeter radio waves.

A loudspeaker with a four-mile range was developed.

A tiny shock-proof radio transmitter was mounted in 20-millimeter projectiles to measure their rotation.

It was found possible to transmit hundreds of thousands of simultaneous telephone conversations in a single two-inch pipe over long distances with the use of waves of 35,000 to 75,000 megacycles.

A tiny electronic device, a silicon power rectifier, was made of extremely pure silicone to convert alternating current into direct current.

Television signals and 12-channel telephone conversations were transmitted through space for 200 miles without relay stations, using ultra-high frequencies.

A system was devised to broadcast color television programs without a camera.

A tiny ceramic vacuum tube was developed, making ultra-high frequency television channels more practical.

An experimental color television receiver was developed that projects the image on a cabinet screen.

A "traveling wave" television antenna, consisting of a pipe with thin slots cut in it, was found successful in emitting a circular wave with no gaps.

Work was begun on laying the first transatlantic telephone cable.

Rubber was vulcanized without heat and without addition of sulfur by exposing an experimental-type rubber to hard gamma rays from cobalt 60.

New lubricants for extremely low temperature service in turbojet engines were made from one of the major constituents of turpentine.

A liquid form of nylon was developed.

Paper was made from synthetic fibers including nylon.

A new paper was made of glass fiber.

Silicone rubber was used in a supersonic aircraft tire that can withstand temperatures above 500 degrees Fahrenheit.

A system was devised of robot radar stations for warning automatically of enemy attack.

Use of a technique for machining by etching in an electrically conducting solution made holes in metals so minute they are invisible.

Intense heat of over 2,800 degrees Fahrenheit was produced in a small furnace the size of an ordinary waste basket.

Transformer noise was experimentally cancelled out by adding another noise that was out of phase.

A silicone-modified enamel was developed for coating electrical wires that will make it possible to produce smaller electric motors with greater power.

Application was made of the centrifugal suction principle that may make the windmill again important as a source of power.

A gyroscopic mechanism was developed that eliminates the rolling of ships and reduces up to 90% of the pitching.

A new process was reported for coating steel automobile parts with aluminum, preventing corrosion and possibly doubling engine life.

Loud speakers and a tape playback machine provided a voice for automatic elevators that calls floors and gives directions to passengers.

A new process was reported for making gasolines of more than 100 octane for high-compression auto engines of the future.

A truck-train with huge balloon-like tires was produced to travel over almost any sort of roadless terrain.

Safety devices received emphasis on the new models of automobiles; these include safety belts, energy-absoring pad on the dash, safety double latches on doors, and recessed steering wheel post.

Indoor air-attack warnings that can be installed in homes were under test.

MEDICAL SCIENCES

President Eisenhower Suffers Heart Attack

President Eisenhower suffered a heart attack of the kind known medically as coronary thrombosis with myocardial infarction.

The Salk poliomyelitis vaccine was reported safe and largely effective on the basis of 1954 nation-wide trials.

Vaccination of children and expectant mothers with Salk poliomyelitis vaccine got under way after delays due to: 1. insufficient supplies and difficulties over allocation; 2. polio cases and deaths in some vaccinated children because of live virus in some batches from one manufacturer, which necessitated revision of safety testing methods and retesting of the vaccine already produced.

Tonsils and similar glands in the small intestines known as Peyer's patches were pinpointed as primary sites of poliomyelitis infection in the body.

Massachusetts suffered a severe outbreak of poliomyelitis, although cases in rest of nation remained at relatively low level, with numerous preliminary reports that vaccination had reduced numbers of cases.

Tests were started of a weakened live virus swabbed on the throat as a way to protect against poliomyelitis.

The paralytic process in poliomyelitis was reported halted in 48 hours instead of five to seven days by injections of the anti-inflammation enzyme, trypsin.

Successful tests of a vaccine against type 3 APC virus, cause of a common-cold-like illness, with hope for extensive trial in human volunteers of a vaccine against 3 types of APC virus, were announced.

Microscopic examination of sputum was reported effective in detecting lung cancer in 90% of the cases.

Benzpyrene was incriminated as the probable lung cancer-causing agent both in cigarettes and in city, but not rural, air.

Men who quit smoking have 14 times the lung cancer death rate of those who never smoked, but about half the rate of those smoking less than one pack of cigarettes a day, a survey showed.

Radioactive yttrium 90 was reported promising for checking fluid accumulations in some cancer cases.

Chemicals that cause cancer may all do it by attaching their molecules to protein molecules of the animal and human cells that then become cancerous, it was reported.

Pure crystals of the chemical kinetin, which makes cells divide and which, theoretically, could be changed to stop cancer, were announced.

A sulfur mustard was reported as likely to be more effective, because it is less poisonous and has a more lasting effect, than does nitrogen mustard for treatment of leukemia and Hodgkin's disease.

A purple color in a simple test was reported as telling whether or not the patient has the unusual tumor called metastatic carcinoid.

Whether or not a mole is malignant can be determined by a simple radioactivity test, it was announced.

Tiny amounts of radioactive Rose Bengal dye in the blood stream were found far superior in diagnosis of liver function to much larger, and in some bile conditions unsafe, doses of the inactive dye.

The death rate from leukemia declined slightly since 1951.

Particles that may be cancer viruses were seen in ultra-thin slices of mouse breast cancers viewed through an electron microscope.

Detection of breast cancer in an early stage before it has invaded other tissue and before any mass or lump can be felt was reported possible by microscopic examination of breast secretions to detect cancer cells.

Protons, the hearts of hydrogen atoms, beamed from the synchrocyclotron, were used with good results in treating patients with advanced cancer of the breast.

Precise diet requirements of certain human cancer cells and a mouse connective tissue cell were worked out for the first time.

A human kidney transplanted from one identical twin to another continued to function well for more than nine months, the longest previous survival being five and one-half months.

A method of linking the blood supplies of two brains was devised as a substitute for the "borrowed heart" technique for heart operations.

A technique for using radioactive potassium to study chemical activity of the heart muscle was devised.

The heart was found, contrary to previous belief, to have two zones, with severe, even fatal disease of the inner one failing to show on the electrocardiogram.

A quick blood test for extent of heart muscle damage following infarction, made by determining amount of the enzyme, glutamic oxaloacetic transaminase, was simplified for use by physicians without research laboratory equipment.

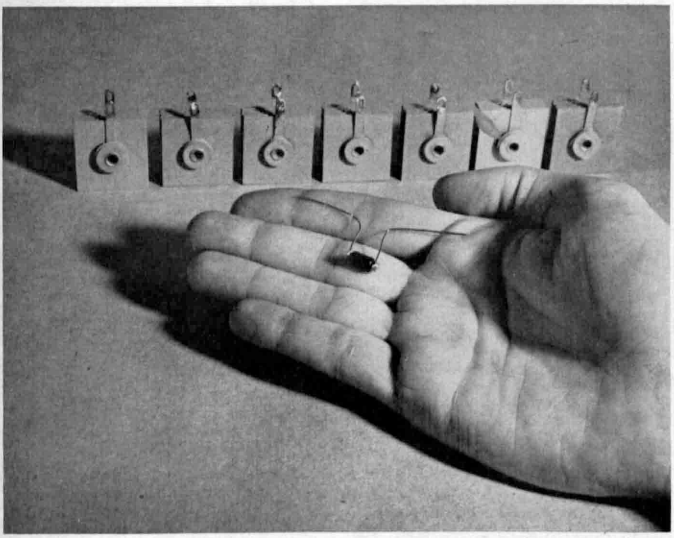
A new abnormal hemoglobin was discovered in blood of two members of a Chinese family who suffered lifelong easy tiring.

A prone-tilting-visceral shift method was devised to give artificial respiration safely to babies and small children with the child held prone and tilted on the operator's arm.

Blood transfusions may cause human red blood cells to change their group with regard to the Lewis antigens, it was found.

A significant difference in body chemistry between Chinese and Caucasians was found in the significantly greater quantities of amino acids excreted by Chinese.

Discovery of a new blood group antigen that belongs to the Rh system and is common among Negroes but quite rare among whites was announced.



SILICON RECTIFIER—Tiny device shown on the hand is one of Bell Telephone Laboratories' new silicon power rectifiers, which convert alternating to direct current. Lined up behind it are the seven selenium rectifiers, such as might be found in a television set, the tiny device can replace. Active element is a silicon wafer smaller than the head of a pin. The device operates at high temperatures and is expected to be long-lived.

Mingling of saliva as in intimate kissing was reported responsible for the spread of infectious mononucleosis.

A new remedy to speed recovery from mumps was found in the streptococcus germ enzymes, streptokinase and streptodornase.

For persons who have trouble wearing false teeth, a way to anchor the lower ones directly to the jawbone was developed.

Successful transplantation of the thyroid gland from the neck of a 21-day-old baby immediately after its death to the groin of a 29-year-old woman was reported.

Changes in the proteins in the blood of patients with Hansen's disease (leprosy) were reported.

In the event of an atomic bombing, drugs at a distance of 1,000 yards from the explosion will be safe for immediate use if their containers have not been damaged, it was learned from bomb tests in Nevada.

First conclusive evidence was found that humans develop immunity to syphilis after penicillin treatment, suggesting the possibility of vaccinating against the disease.

Hope of preventing some strokes of apoplexy by anti-blood-clotting drugs appeared in a report of a striking decrease in mortality following this treatment.

Plague may exist in non-fatal chronic form, contrary to long-standing assumptions of medical science, it was reported.

Manufacture of cortisone may be greatly simplified with the isolation of two new chemicals, gentrogenin and correllogenin, found in rare Mexican yams.

Hormones circulating in the body of an expectant mother can cross a membrane barrier to the unborn baby's body and there affect the baby's organs, it was announced.

The tropical disease, American trypanosomiasis or Chagas' disease, was reported in a human in the United States for the first time.

An enzyme chemical, uricase, involved in gout was isolated, and an old idea of how it works was exploded.

Submicroscopic particles, the microsomes of liver, were found to contain enzymes that account for the metabolism of the vast majority of drugs and other foreign chemical agents.

A new mold chemical, cycloserine, was obtained from soil and reported promising against tuberculosis.

New antibiotics, or mold remedies, announced were: Soframycin, Rovamycin, Eulicin, streptolydigin, rubidin, streptonivicin, Actinomycin C, Vancomycin, penicillin V, Amphotericins A and B, thiostrepton, Albamycin, Synergistin, cathomycin and Ramnacin.

Camoform, synthesized during World War II search for anti-malarials, was reported promising in amebic dysentery and the non-dysentery form of the disease.

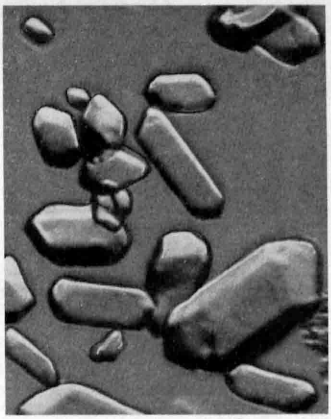
Adrenal gland hormones were reported life-saving for patients in shock after acute heart attacks.

Connection between joint disease and diseases of the nails was explained for the first time by discovery of a connection in unborn babies between site of generation of the nail and the end joint of the finger.

A frozen human semen bank, believed first in the world, was successfully established experimentally.

The first skin bank in a civilian hospital storing cadaver skin for burn victims was established.

For radiation injury, the following were reported promising in laboratory experiments: batyl alcohol, found in yellow bone marrow and made synthetically; zymosan, the insoluble cell-wall residue from yeast; giant molecule chemical from chromosomes separated from mouse spleen; aminoethylisothiouronium before radiation, and glutamic acid, uracil and guanine after exposure.



POLIO VIRUS CRYSTALLIZED— This picture is a photomicrograph of poliomyelitis virus crystals produced at the University of California. This was the first time any human or animal-infecting virus was obtained in pure enough form to produce crystals observable with an ordinary light microsocpe.

New drug for gout and rheumatoid arthritis was found in a chemical produced in the body from phenylbutazone, and was later made synthetically.

An enzyme derived from streptococci caused rapid destruction of heart muscle in tissue culture, possibly linking "strep" throat with rheumatic heart disease.

Detection of increased lipoproteins in the blood of patients in diabetic coma may provide a clue to the relation between diabetes and arteriosclerosis.

Two partially synthetic steroid drugs, prednisolone and prednisone, were shown to be three or four times as potent as cortisone in rheumatoid arthritis and bronchial asthma.

Fluorohydrocortisone, synthetic hormone 10 to 50 times more active than the natural one, was reported useful for treating Addison's disease, for diagnosing degree of adrenal gland function, and for distinguishing between adrenal gland cancer and over-stimulation of the adrenals by the pituitary gland in the head.

Success in stopping bad nose bleeds by injections of estrogen, or female hormone, was reported.

Apparatus for taking X-ray pictures at an exposure of one-thousandth of a second instead of the usual one-sixtieth of a second, which is expected to be especially useful in taking X-ray pictures of the heart and its blood vessels, was developed.

A chemical basis for itching was found in protein-splitting enzymes called proteases.

The 1955 Nobel Prize in Medicine was awarded to Prof. Axel Hugo Theorell for studies on enzymes involved in the body's utilization of oxygen.

PSYCHIATRY-PSYCHOLOGY

Drugs Found Successful Against Mental Illness

Various drugs were introduced in treatment of mental disease with the following important results: Reserpine and chlorpromazine were useful in calming disturbed patients; chlorpromazine also gave promising results in treating juvenile delinquents and in increasing intelligence test scores of mentally retarded children; Frenquel was found to clear delusions and hallucinations and to restore deranged brain waves to normal; cortisone was, however, disappointing.

A new approach to the problem of mental illness, which may lead to chemicals that will cure or control the symptoms, resulted from a study of the effects of nerve gases.

Discovery that reserpine, the tranquilizing drug from Indian snakeroot, causes the body to unload serotonin, a hormone found in many tissues, including the brain, suggested that some psychoses may result from abnormal serotonin metabolism.

A new movement was inaugurated to remove the locks and bars from mental hospital doors and windows.

Discovery was made of a substance in certain disease germs capable of causing a trance-like state similar to catatonic schizophrenia.

Anxiety produced by the drug mescaline was found to speed recovery from mental illness unless counteracted by the tranquilizing drug chlorpromazine.

Utrasound treatment relieved phantom limb pains and pains in amputation stumps.

A test of "ego strength" was used to predict how well a mentally ill person will respond to psychiatric treatment.

The effect of certain sedative or stimulating drugs was found to depend on the personality of the patient; some patients get an effect opposite to that expected.

A plastic coated magnetic rod was used to record the movements of the stomach under certain emotions and situations.

Large does of radiation acted as an unconditioned stimulus to change rats' preference for sweetened water to an aversion.

Thalamotomy brain operations performed on 30 patients revealed that multiple nerve circuits take part in giving persons a sense of time.

A function was discovered for the corpus callosum, a large area of the brain; it has to do with integration of what is seen with one eye with what is seen from the other.

Microelectrodes placed at different depths below the surface of the brain recorded a rich variety of activity not recorded from the surface.

Rates of blood flow to the whole brain and to 30 brain regions were calculated, revealing that fuel requirements did not vary with changes in conscious mental activity.

A progressive fall in cerebral blood flow and over-all cerebral metabolism was shown to accompany advancing age in humans.

A deficiency of glutamic acid in the brains of epileptic patients was clearly demonstrated.

Brain wave recordings made on the brain at work showed that most of the brain's energy is used to keep it alive, not for thinking.

Stammering was relieved when the stammerer was prevented from monitoring his own speech, either by masking with a loud tone in earphones or by having the stammerer repeat concurrently a passage read by another person.

Evidence showed that intelligence is maintained throughout the life span with much less decline than previously reported.

A 34-year follow-up of the development of gifted children showed that as adults they are functioning at high levels of mental activity and mental health.

A high IQ was found to affect the perception and ability to reproduce the exact shape a circular object appears to have when tilted.

Sounds were found to be heard better when sounded first in one ear and then in the other.

Measurement of the span of a cat's hearing showed that for frequencies below 500 cycles per second a man may hear better, but for frequencies above 2,000 the cat is superior.

Speech was demonstrated to be sometimes emitted through the ears, and ear-emitted speech is sometimes understood better than that from the mouth.

An underwater swimmer wearing goggles was found able to see the difference between hot and cold layers of sea water.

Hex and voodoo deaths were explained as due to extreme stimulation and excitement caused by despair.

Negro babies were found aware of race difference as early as two years of age.

The so-called "truth serum" was found as useless as whiskey for getting at the truth.

Play was observed to be a "psychic vitamin," lack of which may cause a child to develop a neurosis.

Doubt was thrown on a widely held theory when it was shown that allowing a baby to suck too long on a bottle instead of depriving him of it may be the cause of thumb sucking.

An individual was found to be a remarkably poor judge of his own abilities.

Eight different personality types were found to be commonly represented in large families.

Validity was upheld for a new District of Columbia law making commitment to a mental hospital for observation mandatory for persons who successfully plead not guilty of murder because of insanity.

Science News Letter, December 24, 1955

DERMATOLOGY

Man's Shoes Drove Him to Drink

➤ THE STORY of a man whose shoes drove him to drink was reported at the American Academy of Dermatology and Syphilology meeting in Chicago.

The shoes did it because of the chromium used in tanning the leather. The patient had worked in a leather factory and developed a rash that caused eruptions on his hands and feet for 21 years. He could never keep a job because his skin kept breaking out.

The man could not make a living and in desperation became an alcoholic.

He was found in a city-run home for indigents by Dr. George E. Morris of Tufts Medical School, Boston. Reporting the case, Dr. Morris said that when the man was told the cause of his troubles and persuaded to wear canvas or cloth shoes, his skin cleared up and has remained clear ever since, more than a year ago.

Nearly three-quarters of the leather in the United States is tanned by the chrome process. Chromium in the finished leather shoes, Dr. Morris said, is the basic cause of certain hitherto undiagnosed skin disorders.

Science News Letter, December 24, 1955

MEDICINE

Drug Against Cancer

Drug that failed as remedy for rheumatoid arthritis may prove helpful against some cancers and Addison's disease. Cancer researchers are now trying it.

➤ SOME CANCER PATIENTS might be helped by a drug that has failed as a remedy for rheumatoid arthritis.

The drug might also be useful for treating Addison's disease, the adrenal gland disorder that turns skins a dusky bronze color.

These possibilities were suggested by a report to the American Rheumatism Association meeting held at the National Institutes of Health, Bethesda, Md.

The report, by Drs. Roger L. Black, Lemone K. Yielding, Ralph E. Peterson, G. Donald Whedon and Joseph J. Bunim of the National Institute of Arthritis and Metabolic Diseases, did not mention cancer or Addison's disease. The scientists reported their tests of the drug as a possible remedy for arthritis. They also reported its drawbacks.

These drawbacks, which keep it from becoming an anti-arthritis drug, are what suggest its possible uses in some cancers and in Addison's disease.

The drug is delta-1,9 alpha-fluorohydrocortisone. It is called D-1-FF for short. It was made by shifting slightly the chemical structure of prednisone, synthetic anti-arthritis remedy announced just a year ago. Besides the shift in prednisone's structure, a fluorine atom was added to it.

This made the new chemical more potent than prednisone, as was intended. Unfortunately, it also made it cause too much loss of potassium from the body and too much retention of sodium with the watery swelling called edema. These side-effects are so severe that arthritis patients cannot take the drug.

The amount needed to relieve their pains and stiffness causes too much sodium retention. This, however, is what makes it seem that the drug might be useful in Addison's disease in which it is desirable to stimulate sodium retention.

D-1-FF also makes the adrenal gland cortex lazy. In scientific terms, it suppresses adrenal cortical function. Cortisone and hydrocortisone do this too, but to a lesser extent. Suppressing the gland's cortical activity, however, helps some cancer victims.

Doctors treating women with inoperable breast cancer have resorted to removing the pituitary gland in the head in order to suppress activity of the adrenal gland cortex.

There is hope now the new drug that failed as an arthritis remedy might prove as good as pituitary gland removal in such cancer cases. Cancer researchers, SCIENCE SERVICE has learned, are going to try it.

Also reported at the meeting by Dr. G. M. Neher, Purdue University scientist was the fact that rheumatic pigs have been enlisted in the fight against arthritis.

The pigs are the first non-human animal in which scientists have been able to induce rheumatoid disease. They did it by giving the animals the germs of swine erysipelas. This acute infectious disease when it attacks farm pigs gives them arthritis.

Of the animals given this disease for the study, 35% died of the acute infection. Half the survivors developed arthritis. Treatment with cortisone and ACTH helped them, as it does human arthritics.

Science News Letter, December 24, 1955

MEDICINE

Relaxing Drug Stops Spasms in Lockjaw

➤ THE JAW-LOCKING SPASMS of tetanus, or lockjaw, can be relieved by a drug now widely used to calm and help mental patients. The drug is chlorpromazine.

The spasms of neck and abdomen as well as of jaws in this potentially fatal infection can be relieved by the drug. The anxiety tension of the patients, a notable feature of tetanus, is replaced by a "lazy sleepiness."

Good spasm-stopping results with chlorpromazine given with a barbiturate sleeping medicine in treating six tetanus patients are reported by Drs. A. C. E. Cole and D. H. H. Robertson of the Colonial Medical Service, Tanganyika, in *Lancet* (Nov. 19). Tetanus antitoxin was of course also given to fight the tetanus germs.

Science News Letter, December 24, 1955

MEDICINE

Finds Sleeping Drug Faster and Safer

➤ A MEDICINE that puts patients to sleep faster, and makes them sleep longer, but leaves them wide awake the next morning is announced in a report by Dr. Robert L. Gatski of the Danville State Hospital, Pa., in *American Practitioner and Digest of Treatment* (Dec.)

The drug is pentaerythritol chloral, trade named Periclor by Ives-Cameron Company, Philadelphia pharmaceutical concern that developed it.

The drug is not a barbiturate. So far it has showed no sign of being habit-forming. Patients go to sleep naturally within 15 or 20 minutes. They get two hours more sleep from a quarter to a half the usual dose of other preparations, Dr. Gatski reports. The new drug has no disagreeable after-taste, no hangover effect, not even drowsiness, irritability or poor coordination.

Science News Letter, December 24, 1955

Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

CAN WE SOLVE THE FARM PROBLEM?—An Analysis of Federal Aid to Agriculture—Murray R. Benedict—*Twentieth Century Fund,* 601 p., $5.00. Reporting results of a study of the Government's farm programs, and intended to provide a better basis for intelligent public action relating to this important part of the national economy.

CARL FRIEDRICH GAUSS: Titan of Science—G. Waldo Dunnington—*Exposition,* 479 p., illus., $6.00. Biography of a famous mathematician and astronomer for whom the unit of magnetic flux density is named.

HOME WORKSHOP PROJECTS—*Arco,* Do-It-Yourself Series, 142 p., illus., $2.00. Material here is reprinted from the Deltagram, a craftsman's magazine published by the Delta Power Tool Division. Illustrations include full size designs that can be traced on your own material.

IMPROVING THE WORK SKILLS OF THE NATION: Proceedings of a Conference on Skilled Manpower Held April 27-May 1, 1955, at Columbia University — Bernard Roshco, Ed. — *Columbia University Press,* National Manpower Council, 203 p., paper $2.25, cloth $3.50. Leaders in education, labor, management, industry, government and the armed services discuss a common problem.

STANDING ROOM ONLY: The Challenge of Overpopulation — Karl Sax — *Beacon,* 206 p., illus., $3.00. From the faculty at Harvard University comes this new look at the pressing problem of matching world population with world resources.

TRACKING THE BIG CATS—Carl Hert as told to Martha P. McMillin—*Caxton,* 330 p., illus., $5.00. True adventure tales about hunting in California by a lover of wildlife.

WHAT IS SCIENCE? Twelve Eminent Scientists and Philosophers Explain Their Various Fields to the Layman—James R. Newman, Ed.—*Simon and Schuster,* 493 p., illus., $4.95. Contributors include such able writers as Bertrand Russell, Edward U. Condon, Julian Huxley, Edwin G. Boring, Clyde Kluckhohn, Eric Fromm and Hermann Bondi.

Science News Letter, December 24, 1955

PUBLIC HEALTH

Untreated Water Is Rare in Larger Cities

➤ USE OF UNTREATED WATER by the nation's larger communities has virtually ended, a survey by the U. S. Public Health Service revealed.

Of 570 cities with more than 25,000 population in the survey, only 14 fail to provide a supply of treated water for its citizens. Eight more cities offer both treated and untreated water, and the rest have only treated water.

In terms of population, less than one percent of the people in the cities tested are receiving untreated water.

Science News Letter, December 24, 1955

ENGINEERING

Nuclear Gas Turbines

➤ THE MARRIAGE of the engine of the future with the fuel of the future was described at the first unclassified public discussion of nuclear gas turbines in the United States.

Coupling nuclear energy with gas turbines was described as "a perfect combination," by Dr. J. J. McMullen, chief of the office of ship construction and repair of the U. S. Maritime Administration.

"Gas turbines now appear," he said, "to be the ideal power take-off for the nuclear reactor and they seem to be married to each other, the atomic reactor supplying fuel and the gas turbine supplying mechanical power."

Nuclear gas turbine plants, four scientists at the symposium indicated, will have their greatest application in ships and in areas where other power plants cannot be used.

They could be used in remote areas where power is now unavailable, wherever storage of conventional fuels is a problem, and during wartime where both storage and refueling for long life-lines are all-important.

The gas turbine atomic power plant takes up less space and operates at a higher efficiency than do power plants run on water or fossil fuels. Another advantage is that they can be transported from one place to another.

One such plant, described by T. Jarvis of the Ford Instrument Company of New York, is only 13 feet high.

The scientists agreed that, although there are still refinements to be made, nuclear gas turbine power plants are a fact and will come into wide use in the not too distant future. At first, one scientist pointed out, they will not be in direct competition with conventional power plants. The prohibitive cost of nuclear fuel was one reason given for trying the gas turbine plants in other areas.

The U. S. Maritime Administration has an invitation out to industry on the possible application of such a nuclear gas turbine plant to power a ship.

J. G. Gallagher of ALCO Products, Schenectady, N. Y., S. T. Robinson of American Turbine Corporation, New York, and C. H. Fox of the Glenn L. Martin Company, Baltimore, Md., also spoke at the meeting, which was sponsored by the Washington section of the American Society of Mechanical Engineers.

Science News Letter, December 24, 1955

CARDIOLOGY

Heart Specialist Warns Against Ovary Removal

➤ REMOVAL of a woman's ovaries may have harmful effects on the blood circulation system, a California heart specialist, Dr. George C. Griffith of Los Angeles and Pasadena, warned at American Academy of Obstetrics and Gynecology meeting in Chicago.

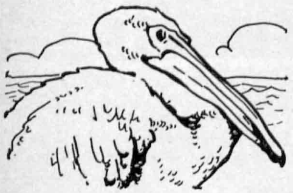
In some cases the benefits from ovary removal, for example in cancer cases, are outweighed by the danger to circulation. Dr. Griffith said, however, that it is a mistake to believe the glands are useless in women past the childbearing age and to remove them therefore in the course of other surgery.

Science News Letter, December 24, 1955

ORNITHOLOGY

NATURE RAMBLINGS

by Horace Loftin



That Wonderful Bird

➤ "A WONDERFUL BIRD is the pelican, Whose beak can hold more thas his belican . . ."

If you have ever heard this poem, there is no escaping the fact that you will repeat it each and every time you see the ponderous pelican. It seems to happen to everybody from the causal viewer to professors of ornithology.

The reason for this is as obvious as the pelican's oversized beak pouch when it is crammed and distended with fish. While no figures are readily available as to the capacity of the average pelican stomach, it is reported that the brown pelican of the east coast has a pouch capacity of three and one-half gallons. So the unknown poet was probably close to fact.

Collecting fish in its pouch offers certain frustrations to the pelican. For instance, where cormorants and pelicans fish together, the quicker cormorants will steal fish in front of the open scoop-like bill of the pelicans. The man-o'-war bird (Fregata magnificens) is also adept at snatching fish from the mouth of the overloaded pelican.

Pelicans are found throughout the tropical and temperate regions of the world, although they do not occur in temperate eastern South America, New Zealand and Oceania. While the majority of pelican species frequent large freshwater lakes, lagoons and estuaries, the two species that commonly occur in the United States are ocean-lovers by habit.

Many kinds of pelicans work together to harvest fish. To do this, a flock will form a long line close to shore to herd schools of small fish into the shallows where they are easily scooped up by the pelicans. The white pelican, *Pelecanus erythrorhynchus*, of the United States fishes in flocks like this.

The other American species, the brown pelican *Pelecanus occidentalis*, generally feeds by diving. Circling at a good height above the water until fish are spotted, the brown pelican almost closes its wings and plummets to the sea with a resulting big splash and loud noise. It may stay under water for several seconds. When it emerges, it is generally tail-first, with the pouched beak containing the prey popping up last.

Science News Letter, December 24, 1955

MEDICINE

Brain Uses Less Oxygen After Years of Illness

➤ AN ABNORMALITY in the brain chemistry of mentally ill individuals has been found for the first time by a group of University of California School of Medicine scientists.

The scientists found that schizophrenics with an illness of four years or more show a rate of oxygen use in the brain noticeably lower than normal.

Scientists long have sought to explain mental illness on the basis of some difference in the chemical functioning of the brain. But in previous experiments no significant differences from normal had been noted.

The work was done in the Langley Porter Clinic by Drs. Gilbert S. Gordan, Floyd M. Estess, John E. Adams, Karl M. Bowman and Alexander Simon. Support came from the Multiple Sclerosis Society.

Science News Letter, December 24, 1955

ARCHAEOLOGY

No Repeat of Piltdown

➤ REPETITION OF A HOAX like that of the bogus Piltdown Man is now "virtually impossible," the Royal Institution of Great Britain has been assured.

Sir Wilfrid Le Gros Clark, professor of anatomy, University of Oxford, one of the scientists who exposed the Piltdown fraud in 1953, calls the Piltdown forgery the greatest archaeological hoax of its kind ever perpetrated.

Detection of the forgery has led to development and perfection of many techniques that in the future will be of the greatest use in estimating the antiquity of genuine fossils. These techniques would make a repetition of the hoax impossible, it is believed.

Ironically, it is now known the Piltdown gravels are so acid they would decompose fossile bones remaining in them for any considerable length of time.

During the exposure of the hoax, it was at first thought that only the puzzling jaw and teeth were fraudulent. But later it was found that the skull bones had also been doctored to look ancient, and even the remains of extinct animals reportedly found at Piltdown were really from elsewhere.

The unique bone tool made from the thigh of a fossil elephant was found to have been shaped with a steel knife.

"It gives one a furious sense of anger," Sir Wilfrid commented "when one thinks of the hours and weeks and months of wasted time spent on the study of these bogus fossils."

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Questions

CRIMINOLOGY—In what way is trial by jury thought outmoded? p. 402.

□ □ □

DERMATOLOGY—How did a man's shoes drive him to drink? p. 413.

□ □ □

MEDICINE—How do years of alcoholism effect the brain? p. 404.

□ □ □

METEOROLOGY—How do weathermen classify traits of hurricanes? p. 403.

□ □ □

PHYSICS—What is an anti-proton? p. 403.

□ □ □

PHOTOGRAPHS—Cover, U. S. Navy; p. 403, University of California; College of Agriculture; pp. 405 and 410, U. S. Army; p. 406, Fremont Davis; p. 408, General Electric Company; pp. 409 and 412, University of California; p. 411, Bell Telephone Laboratories; p. 416, Bakelite Company.

New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 810. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

SYNCHROFLASH TESTING DEVICE enables both the professional and amateur photographer to check his equipment. It tests shutter synchronization, flash circuits, flashlamps, batteries and B/C cartridges. The tester measures only two by three by four inches.

Science News Letter, December 24, 1955

CAULKING GUN that works on air pressure is described as twice as fast for applying caulking compounds as hand operated guns. Made of rustproof metal, the 2-by-14-inch barrel has a capacity load of 45 cubic inches. A retractable rod makes caulking possible in the tightest areas.

Science News Letter, December 24, 1955

MECHANICS' STETHOSCOPE is equipped with a seven-inch-long probe and a sensitive diaphragm. Tuned to the frequency range of the human ear, the 'scope can be used to pinpoint noise sources such as worn gears and bearings, piston slap and leaky valves. It has no electrical connections.

Science News Letter, December 24, 1955

CHRISTMAS TREE APRON made of plastic catches spilled water, needles, and

makes a festive background for gift packages. The 72-inch square white apron, shown in the photograph, can be gathered at the tree's base to hide the holder. The floor protector can be washed and reused.

Science News Letter, December 24, 1955

PISTOL-LIKE PROSPECTING DEVICE for radioactive minerals operates on two standard flashlight cells. Weighing less than four pounds, the Geiger counter gun has a free swing meter that gives readings in both counts per minute and milliroentgens per hour. It can be holster-carried.

Science News Letter, December 24, 1955

RUG HOOKING FRAME for the do-it-yourself enthusiast is portable and has no limit on the size of the rug to be hooked. Designed to be used in bed, on the lap or on a table, the frame measures 12 by 16 inches and weighs less than five pounds.

Science News Letter, December 24, 1955

POCKET TOOL KIT from Germany contains anvil hammer, awl, file, standard small and large screwdrivers, Philips screwdriver, punch, five-inch wire cutting pliers and blunt-nosed side cutter pliers. Each tool fits into its niche in a five-by-six and one-half inch leather case.

Science News Letter, December 24, 1955

PLASTIC ICE BUCKET has a six-and-one-quarter quart capacity and will keep ice cubes for as long as 18 hours. Insulated with fibrous glass, the plastic bucket has brass trim and handle and will not rust, chip, or sweat.

Science News Letter, December 24, 1955

Do You Know?

An estimated 25,000,000 people suffer from the tropical disease, *yaws*, in Africa.

At present, *fish* represent only two percent of the world's food supply.

The total land *area* owned by the Federal Government is approximately equal to the area of all states east of the Mississippi River, excepting Kentucky, Tennessee, Mississippi and Alabama.

Swedish scientists have created a new *cereal* plant, Triticale, a cross between rye and wheat.

A favorite *food* in the East is ghee, made by boiling away practically all moisture from butter, then draining off the clear, floating milk fat; in Bombay, at least 40,000 to 50,000 pounds of ghee are sold every day.

Survival for humans without food is a matter of weeks, without water a matter of days, and without air a matter of minutes.