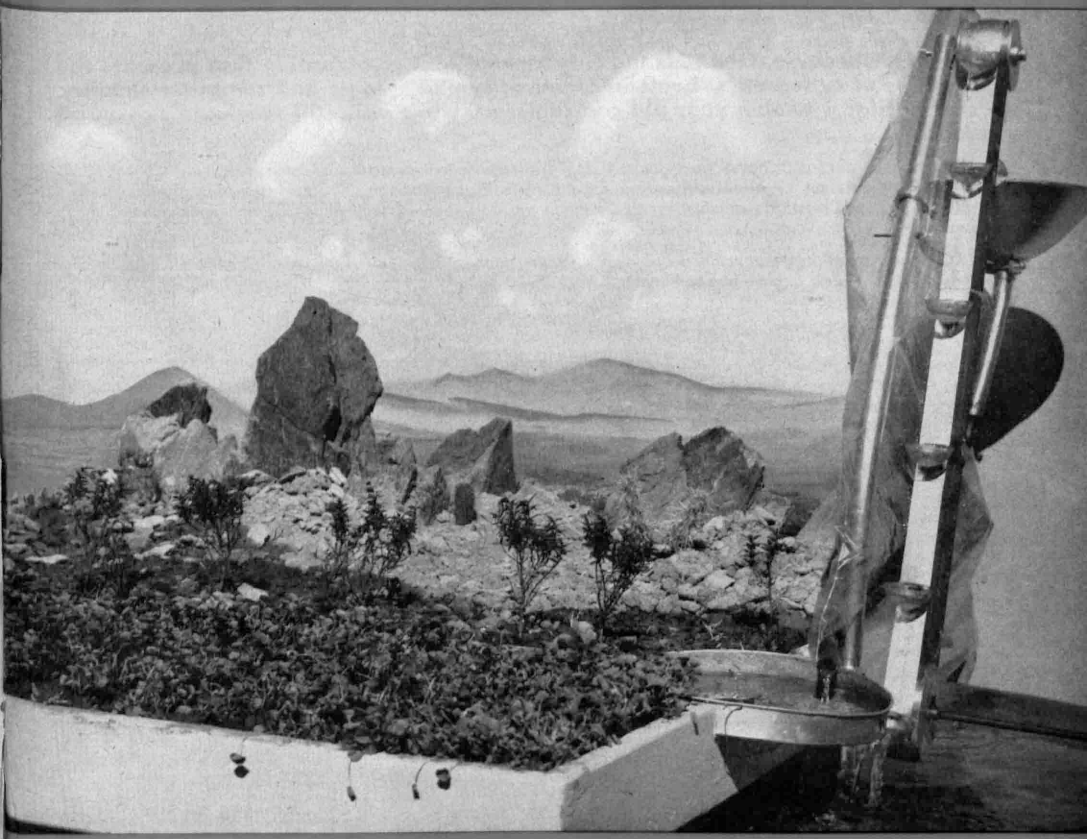
15¢
$5.50 A YEAR
November 19, 1955
VOL. 68, NO. 21 PAGES 321-336

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



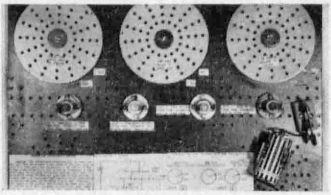
Solar Water Pump

See Page 325

A SCIENCE SERVICE PUBLICATION

Why have hundreds of schools bought GENIAC,

The Electric Brain Construction Kit?



This is the control panel of GENIAC set up to solve a problem in symbolic logic analysis.

We think it's because GENIAC is the only kit and text combination that presents the basic ideas of cybernetics, boolean algebra, symbolic logic and computer circuitry so simply that a twelve year old can construct what will still fascinate advanced students.

The partial list of our institutional purchasers below indicates a cross section of our customers. GENIAC is not only an excellent classroom demonstrator but it provides hours of fun abuilding. As such it makes a perfect Christmas present for the science minded teen-ager. As a father-son project it can't be beaten.

GENIAC is sold to all customers on a one week return guarantee. You may actually use it in that time, returning it *as is* if you decide not to keep it.

Order yours now only $19.95

Some of the 33 GENIACS you can build from the completely detailed instruction manual are:

LOGIC MACHINES: Comparing; Reasoning; Syllogism Machine; Intelligence Tester.

GAME PLAYING MACHINES: Tic-Tac-Toe; Nim (Think you can beat the machine?).

ARITHMETICAL MACHINES (Binary and Decimal): Adder; Subtracter; Multiplier; Divider; Arithmetical Carrying.

CODE MACHINES: Secret Coder; Secret Decoder; Combination Locks.

SIMPLE MACHINES: Burglar Alarm; Automatic Oil Furnace Circuit.

PUZZLE SOLVERS: The Space Ship Airlock; The Fox, the Hen, the Hired Man and the Corn; The Uranium Shipment and the Space Pirates.

ACTUARIAL: Dougles MacDonald's Will.

GENIAC parts are specially manufactured to high tolerance; they include a special six deck switch of unique design and over 400 components plus a book "GENIACS SIMPLE ELECTRICAL BRAIN MACHINES AND HOW TO MAKE THEM." GENIAC is a remarkable buy for

only $19.95

Kit and instructions are returnable for full refund in seven days. This is a perfect father and son project; your whole family and your friends will enjoy the finished machines. You can design new computers from the adaptable parts.

---------- MAIL THIS COUPON ----------

SCIENCE KITS, Dept. SL12, Oliver Garfield Co., 126 Lexington Ave., New York 3, N. Y.

Please send me:

1 GENIAC Electric Brain Construction Kit and Manual.

$19.95 (East of Mississippi) .....

$20.95 (Elsewhere in United States) .....

$21.95 (Outside the United States) .....

Returnable in seven days for full refund if not satisfied. I enclose $.....in full payment.

My name and address are attached.

SOME FIRMS AND INSTITUTIONS THAT HAVE ORDERED *GENIAC:*

Allis-Chalmers
Remington-Rand
International Business Machines
Wheeldex Mfg. Co.
Manuel Missionary College
Walter V. Clarke Associates
Barnard College
Westinghouse Electric
Phillips Laboratories
General Insurance Co. of America
Lafayette Radio
Rohr Aircraft Co.
Southwest Missouri State College
Fibreglass Corp.
Stamford Research Institute
The Heath Co.
American Management Assoc.
De Paul University
Hydro Electric Tower Commission of Ontario
Adams State Teachers College
Abercrombie and Fitch
Kleinschmidt Laboratories
Kansas State Teachers College
Albert Einstein Medical College
Naval Research Laboratories
Board of Education, Tecumsah, Nebraska
Marshfield Public Schools
Los Angeles Public Schools
Jefferson Union High School
Oklahoma A&M
Kansas City University
Duke University
Coral Gables Senior High School
Courtland Jr. High School
Bell Telephone Laboratories
Lovell Public Schools
Clearwater High School
St. John's Seminary
Orange County Community College
Morningside College
New Hampshire Public School
Kentucky Wesleyan College
University of Ottawa

. . . and hundreds of other individuals and institutions

ASTRONOMY

Interstellar Deuterium

Russians report detecting hydrogen's heavy twin in space between stars by radio waves it emits. Abundance of one deuterium atom per 400 hydrogen atoms thought high.

➤ DEUTERIUM, hydrogen's heavy twin, has been discovered in interstellar space by three Russian astronomers.

They spotted the very sparse substance by the radio waves it broadcasts. Astronomers have long suspected the existence of deuterium, an H-bomb element, in the vast spaces between the stars.

Although the amount of deuterium in interstellar space is so minute it could have no practical value to humans, its discovery is expected to yield better understanding of the structure of the Milky Way.

Only four years ago astronomers confirmed directly that space between the stars is filled very sparingly with hydrogen gas. The deuterium now discovered is associated with the hydrogen in a ratio of one atom of deuterium for every 400 atoms of hydrogen.

Hydrogen was the first gas whose invisible presence was detected by the radio waves it emits. Theoretical evidence suggested there would be only one deuterium atom for every 6,000 normal hydrogen atoms.

Since the Russian astronomers, G. G. Getmanzev, K. S. Stankevitch and V. S. Troitsky, reported the much higher abundance, other radio astronomers are now trying to tune in on the deuterium's radiation to confirm their observations.

The Russians found the deuterium as a small absorption dip in the strong radio radiation being emitted by the center of our Milky Way galaxy, a pin-wheeled shape grouping of billions of stars.

The deuterium signaled its presence at a frequency of 327 megacycles per second, which is a wavelength of 91.6 centimeters, or about three feet. Radio waves in the middle of standard AM broadcasts have wavelengths of about 1,000 feet.

The radiation from deuterium suggests that it has a temperature of 300 degrees absolute.

Discovery of the interstellar deuterium radiation may rank with the discovery in 1951 of the interstellar hydrogen line, studies of which have yielded important information about the Milky Way's spiral structure.

There is as much matter in the space between the stars as in all the stars together. Most of this matter is believed to be neutral hydrogen gas, mixed with exceedingly minute quantities of other gases. There is estimated to be about one atom of free hydrogen in every cubic centimeter of space, while deuterium is found only once for every 400 or more hydrogen atoms.

In 1944, Dr. H. C. van de Hulst of Leyden Observatory, the Netherlands, predicted that this neutral hydrogen in interstellar space would emit energy of 21 centimeters wavelength that might be picked up with delicate radio equipment.

On March 25, 1951, Drs. H. I. Ewen and E. M. Purcell of Harvard University succesfully obtained direct evidence of this energy emission from the otherwise invisible hydrogen gas. In the Netherlands, Drs. C. A. Muller and J. H. Oort of the Leyden Obeservatory confirmed this first experimental evidence less than two months later.

Shortly thereafter, detection of the interstellar hydrogen line by J. V. Hindman and W. M. Christiansen of the Radio Physics Laboratory in Sydney was reported.

Although investigating such invisible radiations in the radio range is an especially promising new method of attacking many astronomical problems, astronomers still know more about the form of the Andromeda nebula than the Milky Way.

Science News Letter, November 19, 1955

METEOROLOGY

From Drought to Flood Was U. S. Water Picture

➤ FROM DROUGHT to flood was the picture for the 1955 "water year," as revealed in the U. S. Geological Survey's annual summary of water resources. The official "water year" ended Sept. 30.

At the beginning of the year, general drought conditions threatened most of the nation. But by September, only Texas and Florida were considered drought states by the Geological Survey, so much rain had fallen over the country.

"Disastrous" floods occurred at Chicago, and in Pennsylvania and New England. "Outstanding" floods were reported from New Mexico, Tennessee, Alabama, Mississippi and North Carolina.

In spite of flood waters, flow of the Mississippi, Ohio and Missouri rivers was below normal, and Colorado River flow was called "far below normal" by the Survey.

Ground-water levels remained mostly below normal in the southern two-thirds of the country, and fell to below average in parts of the Great Lakes region. Areas of the Atlantic coast states, where heavy precipitation fell due to hurricanes, saw water levels generally well above average by the year's end.

Science News Letter, November 19, 1955

RARE LANGAHA SNAKE — This snake is so seldom seen that nothing at all is known about its habits in the wild, the New York Zoological Society reports. Its mottled gray coloration is excellent camouflage against bark. The Langaha's peculiarly developed nose, shown at the top, may be further camouflage when it is stalking its prey. The specimen was found in Africa by Peter Beard of New York, who presented it to the Society's reptile department.

MEDICINE

Bone Marrow Damage

➤ THE BONE MARROW damage that causes hemorrhages and death in victims of radiation can be reversed.

This has been found in studies of Siamese twin animals. The studies were shown in an exhibit by the Department of the Navy at the meeting in Washington of the Association of Military Surgeons of the United States.

The studies were made by Dr. Eugene Cronkite at the Naval Medical Research Institute, Bethesda, Md., and Dr. George Bricker of the National Institutes of Health, Bethesda. Dr. Cronkite is now at the Atomic Energy Commission's Brookhaven National Laboratory, Upton, N. Y.

The Siamese twin animals were attached from shoulder blade to hip. This caused some mixing, or cross circulation, of blood of the two animals. The amount was not massive. Dr. Bricker described it as "a trickle."

One of the twin animals had been exposed to irradiation. The other had not. The "trickle" of blood from the non-irradiated animal was enough to stimulate or speed recovery of the bone marrow that had been damaged by radiation in the other twin.

It did this, the scientists think, because there exists in the normal body some "humoral factor" which can speed formation of new bone marrow.

It would be "delightful," Dr. Bricker said, if this humoral substance could be isolated and put up in capsules that all of us could carry for use in the event of an A- or H-bomb attack. Unfortunately this is not likely to become possible.

Some of the material has been isolated by English scientists but it loses its activity except when handled and stored under very special conditions. Even adding a bit of distilled water destroys its activity.

Since, however, it is now known that bone marrow destruction can be reversed, there is hope of finding some practical way for doing it.

No Human Antidote

➤ NO ANTIDOTE for radiation injury for humans exists at present and there is no early probability of one being developed, Dr. Cronkite said at the meeting.

Much has been learned about the course of radiation injury. Much has been learned, he said, about how to speed recovery "at the experimental level." But he said "there is nothing that is clinically practical for use on human beings on any scale at the present time."

Wounds and other injuries and heat burns, he said, "will dwarf radiation injury as a practical problem" after a nuclear attack.

Doctors are learning, he said, that in mass care of casualties they must compromise with ideal methods in order to do the most good for the largest number. These compromises include saving stores of blood and plasma for those casualties who will benefit from it and not wasting any on those certain to die regardless of what can be done.

Use Animal Hospitals

➤ ANIMAL HOSPITALS where you or your neighbors take pet dogs and cats when they are sick may be the place where you and other humans are cared for in case of a mass disaster such as bombing with nuclear weapons.

This use of the 2,300 or so veterinary hospitals in the nation was forecast by Lt. Col. Leslie C. Murphy, Army Veterinary Corps officer stationed at Walter Reed Army Medical Center in Washington, reported.

Many of these hospitals, especially those for treatment of small animals, are well equipped and could be used as first aid stations, he said. Many are located on the edges of our large cities and might therefore be undamaged. They would have available an emergency supply of drugs, dressings, anesthetics, sterilizers and surgical, X-ray and fluoroscopic equipment.

Veterinarians themselves, trained in giving anesthetics, repairing wounds, stopping hemorrhage and giving vaccines and antibiotics to their animal patients, will be able, Col. Murphy said, to help overworked medical doctors care for mass casualties.

Evacuate Vertically

➤ EVACUATE VERTICALLY, either up by aircraft or down into basement shelters, when thermonuclear bombs start going off.

This advice was given by Lt. Col. S. E. Lifton, Air Force Medical Corps and special weapons defense officer to the Surgeon General of the Air Force, at the meeting.

Lateral evacuation, that is along the ground, may be "walking from the frying pan into the fire," if multiple bombs are dropped, Col. Lifton said. In other words, trying to get away from one bomb by walking, running or driving, may bring the evacuees into the radioactive fall-out of another bomb.

For the military, it will only be necessary to remain in shelters for a critical few hours, he said. This is because of the rapid decay rate of radioactive fall-out.

As an example of how military personnel could continue to operate, he said that if the mission of an Air Force base calls for aircraft to take off, the base could go underground during several hours of active fall-out. Then the support personnel could come out to prepare the planes and return underground. At this point the air crews, which have remained in the shelter, could come out and start on the mission with comparatively little delay, despite fall-out.

INVENTION

Walking-Doll Balloon Receives Patent

➤ A RUBBER BALLOON, fashioned into a doll and supplied with cardboard feet and cuffs, can be made to walk down an inclined plane. The invention of John T. Andreadis of New York, the walking-doll balloon is described as inexpensive and uncomplicated, "and is attractive and amusing for children." The toy was awarded patent No. 2,722,774.

Science News Letter, November 19, 1955

SCIENCE NEWS LETTER

VOL. 68 NOVEMBER 19, 1955 NO. 21

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., NOrth 7-2255. Edited by WATSON DAVIS

Subscription rates: 1 yr., $5.50; 2 yrs., $10.00; 3 yrs., $14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C., under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 34.40, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925: 39 U. S. Code 283) authorized February 28, 1950. Established in mimeographed form March 19, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation, Advertising Representatives: Howland and Howland, Inc., 1 E. 54th St., New York 22, ELdorado 5-5666, and 435 N. Michigan Ave., Chicago 11, SUperior 7-6048.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees — Nominated by the American Association for the Advancement of Science: Kirtley F. Mather, Harvard University; Paul B. Sears, Yale University; Karl Lark-Horovitz, Purdue University. Nominated by the National Academy of Sciences: Edward U. Condon, Berkeley, Calif.; Harlow Shapley, Harvard College Observatory; George W. Corner, Carnegie Institution of Washington. Nominated by the National Research Council: Ross G. Harrison, Yale University; Leonard Carmichael, Smithsonian Institution; Jerome Hunsaker, Massachusetts Institute of Technology. Nominated by the Journalistic Profession: Nell H. Swanson, Ruxton, Md.; O. W. Riegel, Washington and Lee University; Michael A. Gorman, Flint Journal. Nominated by the Scripps Estate: Edward J. Meeman, Memphis Press-Scimitar; John T. O'Rourke, Washington Daily News; Charles E. Scripps, Cincinnati, Ohio.

Officers — President: Leonard Carmichael; Vice President and Chairman of Executive Committee: Charles E. Scripps; Treasurer: O. W. Riegel; Secretary: Watson Davis.

Staff — Director: Watson Davis. Writers: Jane Stafford, Marjorie Van de Water, Ann Ewing, Horace Loftin, Howard Simons, Dorothy Schriver, Helen M. Davis. Science Clubs of America: Joseph H. Kraus, Margaret E. Patterson. Photography: Fremont Davis. Production: Priscilla Howe, Marcia Nelson. Interlingua Division in New York: Alexander Gode, 80 E. 11th St., GRamercy 3-5410.

GENERAL SCIENCE

Simple Solar Engine

Efficiency being sacrificed for simplicity in designing machines to use the sun's energy for useful work. Old ideas, once by-passed, are being dusted off and found promising.

See Front Cover

➤ THE MACHINE age is taking a new direction. Efficiency is being sacrificed to simplicity in design of solar engines revealed at the World Symposium on Applied Solar Energy in Phoenix, Ariz. (See SNL, Nov. 12, p. 309.)

Faced with actual shortages of fuel now in many parts of the world and potential shortages in future time measured only in decades, scientists find comfort in the abundance of energy pouring down from the sun. They can afford to waste a good deal of it while concentrating on cheap construction and easy operation.

Old designs, by-passed in development of the internal combustion engine, are being dusted off and are often found promising for the new requirements. Distinctions are being drawn between what cannot ever be done and what has not been done yet.

Needs to be met are pumping water for irrigation of desert land, distillation of fresh water from the sea, combined installations to heat houses in winter and cool them in summer, solar cookers for use where no fuel is available, production of power with sunlight substituting for fuel in conventional heat engines and creation of electrical energy directly from chemicals through the aid of the sun.

A working model of a gravity-type irrigation system is shown on the cover of this week's SCIENCE NEWS LETTER.

Unsolved problems challenging scientists at the symposium are better collection methods to concentrate diffused sunlight for production of higher temperatures, electrical or chemical means for storing energy developed by sunlight, improved machine designs for the special conditions where solar energy will do the most good.

Restrictions expressed as the Carnot cycle and the second law of thermodynamics limit machine design, but offer challenge to ingenuity.

As the source of life on earth, the sun controls photosynthesis. Sessions at the symposium considered algae, one-celled plants used for photosynthesis studies, in reaction to solar energy. Dr. Hiroshi Tamiya, Tokugawa Institute for Biological Research, Tokyo, recommended chlorella algae for food and feed supplements.

Russian Solar Boiler

➤ DESERTS could be turned into flourishing gardens, if the world's largest solar boiler, designed by a Russian, were ever built.

In a paper sent to the symposium, Dr. V. A. Baum of the Heliotechnical Laboratory, Moscow, reported a scheme for the design of the boiler.

Dr. Baum, who was scheduled to attend the Symposium, did not arrive in the United States. His paper was read by Merritt L. Kastens of the Stanford Research Institute.

The huge solar boiler, as outlined by Dr. Baum, would be set on a tower approximately 131 feet high. It would be surrounded by 23 concentric railway tracks, on which would move flat cars carrying reflectors measuring almost ten by sixteen and one-half feet each.

Each reflector itself would consist of 28 flat mirrors, revolving to keep the reflected beams on the center boiler, which rotates to follow the sun.

The small reflectors, the Russian solar expert explained, cut down wind resistance. The total area of the reflectors would equal approximately 24,000 square yards.

Dr. Baum estimates that the device would operate for 1,800 hours per year and produce nearly 10,000,000 kilocalories per hour, or 13 tons of steam per hour. This is equivalent to 1,000 kilowatts of electricity plus 19 tons of ice or 44 cubic meters of fresh water per hour.

Such an installation would be cheaper than bringing in fuel from far away, he estimated, and could return deserts to life.

The Soviet scientist also described Russian solar cookers, heaters and refrigerators, operating experimentally in the Soviet Union, some since 1947 (see SNL, Oct. 29, p. 278).

He outlined the utilization of solar energy for heating water for domestic use and for washing sheep, but said that in many places the climate is too cold and the sky too cloudy for using solar energy to heat houses.

Science News Letter, November 19, 1955

GEOPHYSICS

Prove Lightning Sends Radio Waves Into Space

➤ PROOF that lightning sends whistling radio waves thousands of miles into space, then back to the earth again in the opposite hemisphere has been found. (See SNL, March 5, p. 148.)

In their travels, whistlers reach a height above the equator equal to the earth's diameter, or nearly 8,000 miles.

Experiments by Dr. Millett G. Morgan, director of research at Dartmouth College's Thayer School of Engineering, Hanover, N.H., and George McK. Allcock of the Dominion Physical Laboratory, Wellington, N.Z., have proved that radio energy generated by lightning flashes travels along invisible tubes of force in the earth's atmosphere, as first proposed by Dr. L. R. O. Storey, an English scientist.

Their studies were undertaken preparatory to the International Geophysical Year in 1957-58, and were reported to the National Academy of Sciences. Dr. Morgan is chairman of the panel on ionospheric physics of I.G.Y.'s U.S. National Committee.

To prove Dr. Storey's theory, two radio observatories were set up, one on Unalaska Island and the other in New Zealand. The two spots are at the same geomagnetic latitude and longitude but in opposite hemispheres.

By taking simultaneous magnetic tape recordings, Dr. Morgan and Mr. Allcock, with Prof. H. W. Curtis of Dartmouth College, captured the sound of the whistlers as they bounced back and forth between hemispheres.

Dr. Storey's theory requires at least 400 free electrons per cubic centimeter of space along the path. Geophysicists have never before been able to demonstrate that this concentration actually exists almost 8,000 miles in space above the earth's surface.

The experiment was supported in part with funds from the National Science Foundation, the agency handling financial support for U.S. participation in I.G.Y.

Science News Letter, November 19, 1955

DENTISTRY

Arrow Poison Stops Pain Of Pulling Wisdom Tooth

➤ THE PAIN, swelling and jaw spasm that so often follow pulling an impacted wisdom tooth can be overcome in most patients by a shot in the arm of a special preparation of the old Indian arrow poison, curare, Dr. Murray M. Hoffman, Chicago dentist, reports in the *Journal of the American Dental Association* (Nov.).

The arrow poison preparation is a mixture of tubocurarine with beeswax, peanut oil and oxycholesterol derivatives. These cause a slow release of the tubocurarine, prolonging its relaxing effect on muscles. The preparation has been used in surgical operations to get better relaxation without giving more anesthetic.

Dr. ~~Murray~~ Hoffman gave this preparation to 264 patients having an impacted wisdom tooth extracted in the office. Results were compared with 48 patients who got no curare.

Pain requiring aspirin within the first 20 hours after the tooth was removed occurred in less than 10% of the curare-treated patients, but in more than 80% of the others.

Swelling and difficulty in opening the jaws were also much less in the curare-treated patients.

Because of the possibility of blurred vision and lessened control of all skeletal muscles, patients getting the curare preparation were told they must have someone accompany them home from the dentist's office and that they should not drive their cars for 12 hours.

Science News Letter, November 19, 1955

BIOCHEMISTRY

Mental Disease Antidote

A chemical that sometimes acts as an antidote for anxiety and mental disturbances has been discovered, studies of the effects of drugs on nerve centers called synapses show.

➤ A DRUG that may be an antidote for anxiety and mental disturbances in some cases has been discovered.

It acts as an antidote to certain chemicals naturally manufactured in the brain. Too much of these chemicals or too little resistance to them may help bring on anxiety and abnormal mental states, particularly in the elderly.

The drug is a piperidyl chemical trade named Frenquel. It has already been reported as promising for treating mental disease.

Research showing that the drug "begins to acquire the characteristics of an antidotal action" was reported at the Gerontological Society meeting in Baltimore. The report was given by Dr. Amedeo S. Marrazzi of the Army Chemical Center, Edgewood, Md., of studies by himself and his associate, Dr. E. Ross Hart.

They studied the effects of drugs on nerve centers called synapses, which Dr. Marrazzi explained as switchboards of the brain and central nervous system. As in other communicating systems, these are both the strategic and the most vulnerable portions.

Some chemicals stop transmission of nerve messages by blocking the switchboards, the Army Chemical Center scientists found. This can result in abnormal mental states.

One chemical acting in this way is mescaline, a powerful drug first used by the Plains Indians to achieve intoxication during religious rites. Mescaline is known to produce anxiety states in humans as well as hallucinations.

A chemical found in the brain, serotonin, also blocks the nerve switchboards, the scientists found. Serotonin is about 1,500 times as powerful as mescaline. Dr. Marrazzi said it may be "of the highest importance in naturally occurring anxiety and in human mental disturbances."

Frenquel and the tranquilizing drug now widely used in mental disease, chlorpromazine, block the action of mescaline on the nerve switchboards. Chlorpromazine stops anxiety but does not affect other mental aberrations.

Frenquel not only blocks anxiety but also in some cases the attendant hallucinations. It therefore is more than a tranquilizing chemical. Dr. Marrazzi sees it as an antidote to the chemicals that block the switchboards.

Sedative drugs such as the barbiturates depress nerve message transmission through the nerve switchboards. This eliminates anxiety by impeding transmission but the change, although helpful, is not a change toward normal.

Frenquel, on the other hand, overcomes the switchboard blocking action of mescaline, and presumably of serotonin also, without depressing the switchboard unless 20 times the necessary dose is given.

A question raised by the studies is whether anxiety and mental disturbances in the aged come because of too much serotonin being made or because aging makes the nerve switchboards more vulnerable to this chemical.

Science News Letter, November 19, 1955

MEDICINE

Disease-Fighting Milk

➤ HOPE of making milk a disease-germ-fighting substance so that all who drink it would have immunity to a host of ailments is held by two University of Minnesota researchers.

They base their hope on experiments reported in *Journal-Lancet* (Nov.).

The method would be to inject vaccines for disease-causing bacteria and viruses into the cow's udders. In response to this kind of vaccination, cows produce large quantities of antibodies. These get into the milk, so the person drinking enough of it daily would get the antibodies.

This would give the milk drinker passive immunity, which is not as long-lasting as the kind one gets in response to an attack of a disease or to vaccination with the killed disease germs themselves. However, by continuing to drink the milk, the passive immunity could be continued, according to the theory.

The scientists who announced this new idea are Drs. William E. Petersen of the Minnesota Institute of Agriculture dairy husbandry department and Dr. Berry Campbell of the university medical school department of anatomy. Funds for the present stages of testing are being provided by the American Dairy Association.

A chicken disease organism, *Salmonella pullorum*, was used in many of the experiments because of the ease of identification of the antibody and because cows and human beings are not infected by it.

Five-month-old calves were fed milk from a cow vaccinated with this organism, and it was found that their blood promptly went from negative to positive to the agglutination test.

In experiments upon themselves and five graduate students, all negative to the test for *Salmonella pullorum*, the research men reported tests showed a positive reaction after several days of consumption of milk from a cow which had been vaccinated with the *Salmonella pullorum* antigen.

Tests were also made with germs of other animal diseases. Pasteurization and drying do not destroy the immunity-conferring property of the milk, the scientists found.

They foresee the day when a "standard packet of antigens" for vaccinating dairy cows against a host of diseases would be available. Special packets of antigens might be made for populations exposed to particular diseases, or for diseases prevalent at special seasons.

The scientists point out that, although their research started nine years ago, much remains to be done before this anti-disease milk will be available.

Science News Letter, November 19, 1955

PSYCHOLOGY

Boys Join Gangs Because Love for Father Lacking

➤ WHETHER A YOUNG BOY joins a gang or not depends largely on whether he loves and admires his father.

A study of 111 gangs of both boys and girls from nine to 13 years old shows that boys tend to join a gang when there is a lack of affectionate attachment to an adult male.

These boyhood gangs are common among pre-adolescent boys, A. R. Crane of Teachers College, Armidale, Australia, reports in the *Journal of Genetic Psychology* (June). Although the boys engage in activities frowned upon by adults, the gangs are not the same as those of juvenile delinquents.

If a boy belongs to the young boy gang, he will not necessarily go on into a delinquent gang as he grows older.

The harm done when the young boy lacks a father to love can be overcome if he forms an affectionate attachment to an older male by the time he is 14 years old.

The young boyhood gangs, Mr. Crane explains, allow the youngster to test the barriers imposed on him by the adults. This is not as true for girl gangs.

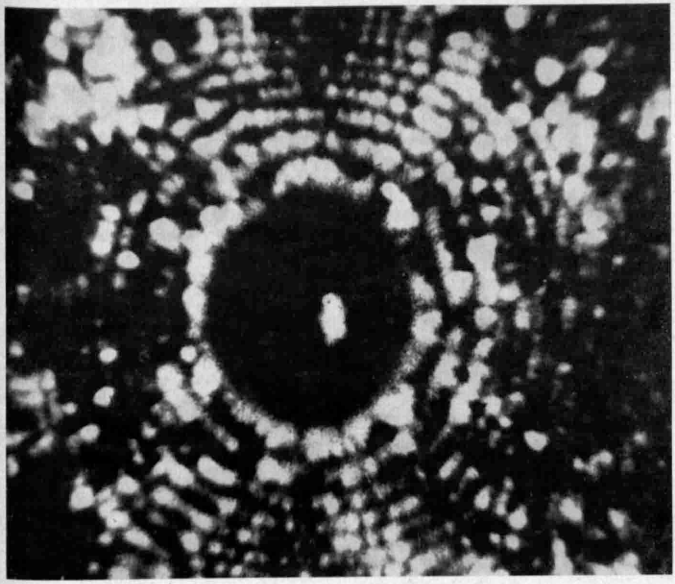
Boys, he states, unlike girls, learn the difference between real life and the idealized life from older males outside the family. Usually, the father is seen in only a few aspects of his role in life.

"The occupational and sexual roles of the father," he points out, "are all but a closed book to most boys."

Girls, on the other hand, see at first hand most of the woman's role when they help their mothers to cook, clean and entertain.

"An educational implication of this (gang joining)," Mr. Crane concludes, "is the importance of bringing pre-adolescent boys into contact with socially acceptable men both inside and outside the school."

Science News Letter, November 19, 1955



ATOMIC ARRAY—The pearl chain arrangement of tungsten atoms is shown in this photograph taken by Dr. Erwin Muller, professor of physics at the Pennsylvania State University. The image of a tungsten specimen is projected on a fluorescent screen by the field ion microscope developed by Dr. Muller. One side of the picture represents an enlargement that equals about one-millionth of an inch on the actual specimen.

BIOCHEMISTRY

Life on Earth-Like Planets

➤ LIFE like that on earth may be a "common event" in the universe, Dr. Martynas Ycas of the Quartermaster Research and Development Center, Natick, Mass., says.

If earth-type planets exist around other stars, as many astronomers believe, then life would occur on them in much the same way it did here, Dr. Ycas reports in the *Proceedings of the National Academy of Sciences* (Oct.).

Earth's life got started in the ocean, he believes. In the very beginning, there were no distinct organisms, but the ocean as a whole was the only living thing. It could build up and break down chemicals, or metabolize, as the body's cells do.

The earth's atmosphere then was a reducing one, not an oxidizing atmosphere as it is now. Using the energy of light or of electrical discharges, simple compounds, such as methane and ammonia, of the original atmosphere formed a great variety of organic compounds in solution in the ocean. These compounds were not stable but disintegrated at varying rates. While in solution, the organic compounds interacted, forming numerous molecular species.

Further evolution of this system led to the production of catalysts of high molecular weight and peptide nature. These may have joined together and eventually the system would form small masses, the individual organisms.

This proposal has the advantage that it is not necessary to use a series of highly improbable events to account for the origin of life, Dr. Ycas says.

Since the system's metabolism is determined by the catalytic properties of compounds rather than by the initial concentrations, similar systems might arise in any large solution of organic compounds. The original composition would not have much influence on the final mixture.

Dr. Ycas points out that Dr. A. I. Oparin suggested the earth's original atmosphere was reducing, thus accounting for the great abundance of organic compounds.

Dr. Harold C. Urey of the University of Chicago later brought forward geochemical and astronomical arguments to support this theory. Recently Dr. S. L. Miller has shown that passage of electrical discharges through a reducing atmosphere produces many and varied organic compounds.

Science News Letter, November 19, 1955

PALEONTOLOGY

Pacific Continent 20 Million Years Ago

➤ A SMITHSONIAN INSTITUTION botanist has pieced together evidence for the existence of a large continent in the southwest Pacific some 20 million years ago.

Dr. Albert C. Smith's evidence for the "Melanesian continent" comes from his study of the plant life of several Pacific islands. He believes the similarities of plant life on Fiji, New Guinea, the Solomon Islands and other islands in the Melanesian area back up a long-standing theory of geologists of an ancient Pacific continent.

Dr. Smith recently completed his third expedition to the Fiji Islands, where he collected plants from the rain forests of the little-known Korombasambasanga Mountains. A statistical analysis of Fijian plants shows that an overwhelming proportion shows affinities with plants of New Guinea, the Solomon Islands and the New Hebrides, he reports.

The result of this study supports the hypothesis that Fiji lies near the edge of a Melanesian continent that embraced New Guinea and Australia. Fiji's separation from other parts of the continent did not take place until the Tertiary period, Dr. Smith states. At this time, the existing families and genera of flowering plants were largely differentiated and often widely distributed.

The studies indicate that the last land connections to be sundered as the old continent broke up were along the Fiji-New Hebrides-Solomon Islands chain. Land connections leading from Fiji toward New Caledonia and Australia must have been broken much earlier, Dr. Smith says in the Smithsonian Institution's annual report.

Science News Letter, November 19, 1955

AGRICULTURE

Seek Cotton Strains With Disease Resistance

➤ COTTON GROWERS may soon be able to forget the three diseases that annually cost them some $100,000,000, as U. S. Department of Agriculture experts push forward their program to develop cotton with hereditary resistance to all three.

Varieties of cotton already exist with resistance to either fusarium wilt, verticillium or root knot, but the plant breeders are shooting for a single variety unaffected by all of them.

Center for the research is in Mississippi, where USDA scientists are working with State College experts at the Mississippi experiment station.

The scientists are presently trying to develop high resistance to each of the diseases in individual varieties, while maintaining desired properties like earliness, yield, plant type and fiber quality. With these new strains, they plan to cross-breed until they get a single variety with three-way resistance.

Science News Letter, November 19, 1955

TECHNOLOGY

Tin Cans Will Flatten in Atom Food Sterilization

➤ THE ROUND TIN CANS of the supermarket shelves may give way to flat containers like sardine tins if food sterilization by atomic radiation comes into general practice.

The penetrating power of sterilizing radiation from X-ray machines, cyclotrons, bevatrons and other radiation-producing machines is so shallow that only small objects, films of liquids or flat containers can be successfully treated, according to Dr. Z. I. Kertesz, food specialist with the New York State Agricultural Experiment Station, Geneva, N. Y.

Radiation from these kinds of machines is advantageous because high, sterilizing doses of radiation can be delivered in a second or less, Dr. Kertesz reports in *Farm Research* (Oct.).

Another source of radiation that may be used to sterilize foods are radioactive isotopes, such as cobalt 60. While foods must be exposed to cobalt 60 for hours instead of seconds for a sterilizing dose of radiation, the rays penetrate deeply.

Science News Letter, November 19, 1955

PSYCHOLOGY

Stammering Cured When Speech Not Heard

➤ SEVERE STAMMERING cases can be completely cured in a short time when the stammerer is kept from hearing himself talk, it is reported in *Nature* (Nov. 5).

Both normally fluent speech and stammering are habit-forming for the speaker, the report says. Stammering is not caused by malfunction of the muscles of speech, but by faults in the "monitoring" by the speaker of his own speech.

These surprising facts were revealed through experiments conducted by E. Colin Cherry and B. McA. Sayers of the department of electrical engineering at City and Guilds College in London, and Dr. Pauline M. Marland of the speech therapy department of St. Mary's Hospital, Paddington, and St. Thomas's Hospital.

In their experiments, the investigators made it impossible for the stammerer to listen to or "monitor" his own speech. This was accomplished in two ways. One way was to "drown out" the sound of the stammerer's voice by a loud tone heard through headphones worn over his ears. A frequency of about 150 cycles per second, the low part of a tenor's range, was found most effective.

The stammerer was required to read aloud a simple text of about 120 words while his ears were filled with the loud tone.

In 24 cases out of 25 the improvement was "remarkable," the investigators report. The single exception was a person who normally works in very noisy surroundings.

The second way tried for interfering with the monitoring of the stammerer's own speech did not require the stammerer to read and did not make use of the loud tone sounded in his ears.

Instead he was asked to "shadow" or repeat concurrently a passage read by another person steadily and continuously.

It was already known that such shadowing presents no difficulty to persons of normal speech. The experiments revealed that stammerers too can shadow fluently when they are reassured, even without practice.

The stammerers were taught to imitate intonation and rhythm of the person they were shadowing, and to work at steadily increasing speeds. In five severe cases of stammering, this shadowing method produced a striking improvement in a period of only two to four weeks. The improvement has been maintained in all cases.

Science News Letter, November 19, 1955

PHYSIOLOGY

Function Discovered for Mysterious Brain Area

➤ A USE has been found for a large brain area for which scientists in the past have been unable to discover a function.

This area, called the corpus callosum, is concerned with the integration of what is seen with one eye with what is seen with the other, Dr. Ronald E. Myers of California Institute of Technology reported at the National Academy of Sciences meeting in Pasadena, Calif.

In experiments with cats, Dr. Myers said, an operation insured that impulses entering the right eye went only to the right hemisphere of the brain and that what was seen by the left eye was received only by the left half of the brain.

Then each cat, with a mask covering one eye, learned simple pattern discriminations. The mask was later shifted to cover the other eye.

Transfer of what the animal had learned from one eye to the other was almost perfect when the corpus callosum was intact. In cases where the corpus callosum had been removed before the training, the cats were completely unable to transfer the training.

With the corpus callosum divided, the cats could learn completely conflicting lessons with the two eyes separately, and there would be no signs of interference because the learning remained compartmented.

Transfer of learning from one eye to the other was found to be possible if as little as 20% of the total cross-sectional area of the corpus callosum was left uncut at the rear.

Before these experiments, Dr. Myers said, extensive sensory, motor and psychological tests failed to demonstrate any clear-cut functional deficiencies even when the whole corpus callosum was cut in two in man. This puzzled scientists because of the very large size of this tract and because it serves as the principal connection between the cortex of the two sides of the brain.

Science News Letter, November 19, 1955

IN SCIEN

BIOCHEMISTRY

Vitamin Detoxifies Some Antibiotics

➤ COMBINING ONE of the B vitamins with streptomycin and related mold remedies takes away the ear-damaging feature of these antibiotics, four German researchers reported at the Third Annual Symposium on Antibiotics, held in Washington.

The B vitamin they found useful for this detoxifying purpose is pantothenic acid. It reduces both the acute and chronic damaging effect of streptomycin and its relatives on the ears, without affecting the ability of the antibiotics to check TB germs. The streptomycin relatives the scientists tested are neomycin, viomycin and dihydrostreptomycin.

Lack of pantothenic acid, they said, does not result in damage to the hearing nerve. So the chemical's action in protecting against such damage by the streptomycin chemicals is really a detoxifying one, an example of the close connection between vitamins and antibiotics in the body's chemical processes.

The finding was made by Drs. H. Keller, W. Krupe, H. Sous and H. Muckter of Chemie Grunenthal GMBH in Stolberg on the Rhine, Germany.

Science News Letter, November 19, 1955

TECHNOLOGY

Automation Will Mean Return of Artisan

➤ AUTOMATION can mean an era wherein each worker is an individual artisan, Dr. Elmer W. Engstrom, executive vice-president of research and engineering for the Radio Corporation of America, has predicted.

Addressing the Centennial Symposium on Modern Engineering, sponsored by the University of Pennsylvania, Dr. Engstrom said that the increasing use of automation seems likely to lead us to a return to the era in man's history when "each trained man was an individual artisan."

Outlining the degree of automation being applied today, the RCA executive pointed out that the completely automatic factory does not yet exist.

"This ultimate form of automation," he stated, "could be described as a very large black box into which raw materials and data flow automatically for processing and distribution."

In addition to the use of automation in the factory and on the production line, there is also a growing trend in offices toward electronic data handling, he told the symposium, held in Philadelphia.

Science News Letter, November 19, 1955

E FIELDS

VETERINARY MEDICINE

New Diseases Strike At Nation's Cattle

➤ CATTLE in at least 20 states are succumbing to attacks by a host of apparently new diseases, the U. S. Department of Agriculture has revealed.

The new diseases are appearing in widespread areas, under such names as viral diarrhea, mucosal disease and rhinotracheitis. Scientists have discovered already that viral diarrhea in New York, viral diarrhea in Indiana and mucosal disase in Iowa are not the same, and none of them produces immunity to any of the others.

However, the USDA's Agricultural Research Service does think some of these diseases are related, and they are called the "mucosal complex." Rhinotracheitis as it occurs in both California and Colorado probably is the same disease, although different from the mucosal complex diseases.

Cattle suffering from the new diseases eat reluctantly and lose weight. Mortality varies greatly. The agents responsible for the diseases, which are highly infectious, have not been identified yet, but viruses are under suspicion.

Federal, state and private organizations are pooling their efforts to control and eventually stamp out the diseases. Following a meeting of research workers and regulatory officials, the ARS has undertaken to contact all laboratories working on the diseases to determine what they are doing, act as a clearing house for exchange of information, and select two laboratories as identification centers for the diseases.

Science News Letter, November 19, 1955

BIOCHEMISTRY

Warn Against Protecting Only One Cell

➤ NEW AND FUNDAMENTAL knowledge of what goes on inside body cells during damaging radiation has come from studies at the University of Rochester School of Medicine and Dentistry, Rochester, N. Y.

Protection of one vital chemical in a cell nucleus, these studies show, may actually cause the damage or make it worse.

This is because the various enzyme chemicals in the nuclei of body cells normally are in balance. Scientists ordinarily think of the destruction of an organism by radiation as due to a "stripping of the gears" that throws the complex chemical systems out of balance. One gear, to continue the mechanical comparison, gets to running much faster than the others. This is why the effects of radiation are so much greater than would be expected in terms of the energy involved.

The new findings, however, show that the damaging action may be due to a reverse effect. One enzyme system in the cell nucleus may be protected by its physical relation to other molecules. If it is protected more than the other systems, this may throw them out of gear and thus cause the damage.

The experiments leading to this new idea were made by adsorbing the vital cell nucleus enzyme, deoxyribonuclease, on cellulose powder. The adsorption of the enzyme on a liquid-solid interface resulted in protection of the enzyme against radiation damage. Other adsorbing substances, such as ion exchange resins, silica gel, "Celite" and bone ash also gave the protective effect.

The studies, by G. L. Fletcher, now with Distillation Products Industries, Rochester, N. Y., and Dr. S. Okada of the University of Rochester, are reported in *Nature* (Nov. 5).

Science News Letter, November 19, 1955

BIOPHYSICS

Repeated X-Rays Affect Body More Than Mind

➤ THE MIND can withstand repeated doses of radiation better than the body, studies with monkeys at the University of Wisconsin show.

Previous findings of the effects of X-rays and other radiation have been on the results of a single large dose. The monkeys in the university laboratory were given 100 roentgens every 35 days until they died. The 100-roentgen dose is about one-eighth of that which, when given all at once, kills monkeys.

As has been found before, the animals could withstand more radiation when given in divided doses. Some of these in the studies absorbed 1200 roentgens before they died, Drs. Louis E. Moon, Harry F. Harlow and George P. Bogumill report in *Science* (Nov. 4).

The animals all lost appetite and weight. The first two that died, after 300 and 500 roentgens respectively, were found at autopsy to have tuberculosis of the lungs.

The next one died after receiving 900 roentgens over a period of nine months. This one showed severe damage to its heart, including widespread hemorrhage into all three layers of the heart wall, a partially healed infarction and a recent clot attached to one cusp of the tricuspid valve.

All subsequent animals were found to be anemic and showed bone marrow function for blood production had been depressed.

All animals, after death, showed severe damage to one or more organ systems. Most frequently damaged were lungs, heart, kidneys and large bowel.

The irradiated monkeys, however, showed no deterioration of their ability to solve even the most complex learning problems. It was repeatedly found that animals on the verge of death, nevertheless kept their high level of performance until they became so weak they could no longer respond.

Science News Letter, November 19, 1955

FORESTRY

Storage of Pine Seeds Is Studied

➤ COLD STORAGE of immature seeds from the sugar, Jeffrey and Ponderosa pines, has uncovered some interesting facts, Gilbert H. Schubert of the California forest and range experiment station at Berkeley told the Society of American Foresters meeting in Portland, Ore.

Immature sugar pine seed lost almost all of its viability after two years of storage, Mr. Schubert reported. Some of the stored seed of the other two species showed higher germination than fresh seed, but these small differences may have resulted from chance alone.

Extensive occurrence of abnormality in germination was discovered and found to be associated with immature seed, Mr. Schubert said. This was probably the most important discovery in the series of tests covering a period from 1952 to 1955.

Abnormalities included seedlings emerging from the seed in a reverse manner, some without roots, some with their cotyledons tightly enclosed by the enlarged endosperm, he said. These seedlings at first glance appeared to be normal, and could have been overlooked many times in germination tests, giving a false impression of seed quality, he pointed out.

Abnormal seedlings were discovered only among seedlings derived from sugar pine and Jeffrey pine and they occurred most frequently in fresh seed. Nearly half of the sugar pine and a third of the Jeffrey pine seedlings from immature fresh seed were abnormal, Mr. Schubert stated.

Science News Letter, November 19, 1955

PALEONTOLOGY

Fossil Alaskan Insects 60 Million Years Old

➤ INSECTS preserved in amber for some 60 million years have been discovered in Alaska about 150 miles north of the Arctic Circle, the Arctic Institute of North America has revealed.

The mummified insects are thought to be many millions of years older than any other whole insect fossils yet found.

The fossil finds were made by Drs. Robert L. Usinger and R. F. Smith, entomologists with the University of California, in amber deposits of the Colville River valley and along the Kuk River of Alaska, far above the Arctic Circle.

Amber is a resinous substance in which insects are often trapped. Although buried for millions of years in the amber, these insects are preserved almost intact. The amber deposits, discovered by the U. S. Geological Survey only a few years ago, probably represent the oldest amber yet found, dating its entombed insects to Cretaceous times.

The scientists' expedition was sponsored by the Arctic Institute.

Science News Letter, November 19, 1955

BIOLOGY

Pilgrims' Thanksgiving Gold

The Pilgrims, in the first grim winter when half the settlers perished, learned that the corn grown by the American Indians was worth more than any coin of the realm.

By HORACE LOFTIN

➤ LIKE THE SPANISH conquerors of Mexico, the Pilgrim fathers in the Plymouth Colony were not long in the New World before they discovered a treasure of gold.

Shortly after they landed, a band of adventurous Pilgrims began to explore their new home, when they came across a mound of freshly turned earth, some three to four feet high. They dug eagerly through this mound, then down into the earth, where they discovered the treasure.

Buried there, the Pilgrims found "a little old Basket full of faire Indian Corne, and digged further and found a fine great Basket full of very faire corne of this yeare, with some 36 goodly eares of corne, some yellow and some red, and others mixt with blew which was a very goodly sight; the Basket was round, and narrow at the top, it held about three or four Bushels, which was as much as two of us could lift up from the ground, and was very handsomely and cunningly made."

The Pilgrims had hit upon one of the food caches of the Wampanoag Indians, whose country they had invaded and called Plymouth Colony.

Before the long winter ahead was over, the Pilgrims came to recognize the corn of the Wampanoag to be worth more than the gold of the Aztecs; for half their people were to perish of cold, disease and hunger in those bitter months.

Befriended by Indians

After a period of hesitation, brought forth by ill treatment from white men who had visited what is now Massachusetts earlier, the Indian people befriended the Puritans. Although they themselves were recovering from the great plague of 1617, which nearly depopulated the Indian settlements of the southern New England coast, they helped feed the starving Pilgrims over their first grim winter.

The Indians taught the newcomers how to survive in the new colony. The southern New England Indian tribes were far from simple hunters of the forests. They had a well-established agricultural system. They periodically burned the woodlands, so that the forests were clear of underbrush. They were good fishermen. They built substantial houses and even had large barricaded forts. They knew how to preserve their foods for the long winters.

Among the first lessons the Indians gave the Pilgrims were those on the cultivation of native crops. The Indians planted "when the leaves of the white oak were as large as a mouse's ear." The ground was burned over first, then dug with sticks of hard wood. Hills were placed about three feet apart.

Two or three fish for fertilizer were put into each hill, then about four kernels of corn, *Zea mays* and as many beans, *Phaseolus vulgaris*. Squash, pumpkins and artichokes were also planted.

For luxury, the Indians cultivated a small, hardy variety of tobacco, *Nicotiana rustica*, often the only crop attended by the men. The drudgery of cultivation was thought to be squaw's work.

The Indians' food, which became the Pilgrims' food, provided a varied diet, although its content depended on the season and its quantity on the generosity of nature.

Green corn and other garden products were the principal foods until harvest time. From autumn until the coming of the deep snows, hunting provided most of the fare.

In winter, the Indians used their stored corn and other vegetables, along with dried meats from the hunt, as well as acorns, nuts and berries. Fish and shell fish also added to their larder.

Since corn was their principal product, the Indians devised numerous ways of preparing it, dishes surely present at the first Thanksgiving table. One corn dish, nokake, was made of kernels parched in ashes. Hulled corn and hominy were prepared by soaking kernels in lye made from ashes, then boiling till soft. They made succotash, a mixture of corn and beans boiled.

Staple Dish Was Stew

The staple dish was a stew of many and varied ingredients. Here is a recipe for what may well have been an original Thanksgiving Day specialty, left by an early explorer, Daniel Gookin:

"Their food is generally boiled maize or Indian corn mixed with kidneybeans, or sometimes without. Also they frequently boil with this pottage fish and flesh of all sorts, either taken new or dried, as shads, eels, alewives or a kind of herring or any other fish. These they cut into pieces, bones and all, and boil them in the aforesaid pottage.

"I have wondered many times that they

WEALTH OF THE NEW WORLD—More than turkey or any other food for the Thanksgiving table, golden ears of Indian corn are the true symbol of the Pilgrims' thankfulness. Without corn, which the friendly Indians taught them to grow, the Plymouth Colonists might never have survived.

were not in danger of being choaked with fish bones; but they are so dexterous to separate the bones from the fish in the eating thereof, that they are in no hazard.

"Also they boil in this furmenty all sorts of flesh they take in hunting . . . They mix with the said pottage several sorts of roots, and pompions (pumpkins), and squashes, and also several sorts of nuts or masts, as oak acorns, chestnuts, walnuts . . ."

Without the help and friendship of the Indians, it is doubtful whether the struggling band of Pilgrims would have been able to survive in the new and harsh continent.

At the first Thanksgiving feast, held at the Pilgrims' first harvest time in Plymouth Colony, the Indians, led by the great chief Massasoit, were welcome guests. The treasures they provided the Pilgrims had proved greater than all the gold of Montezuma.

Peace Treaty Breached

An unfortunate postscript must be added to the final picture of the relations between the Indians and the whites in Plymouth Colony.

When the Pilgrims arrived, Chief Massasoit of the Wampanoag made a treaty of peace with them, which he firmly maintained until his death in 1662.

His son Metacomet, known to the English as King Philip, took over the old chief's place and, incensed by ill treatment of his people by the colonists, he plotted war. Starting with 500 warriors from his own tribe, he formed alliances with other Indians of the region to drive out the whites.

King Philip started his war in 1675. The bloodshed lasted for two years, the most destructive in the history of New England and completely disastrous to the Indians. Philip and most of the allied chiefs were killed. The Wampanoag and Narraganset Indians were almost totally exterminated, while many of those who surrendered were sold into slavery by the Puritans.

Again as with the Aztecs, the treasure of the Wampanoag had cost them their freedom.

Science News Letter, November 19, 1955

BIOCHEMISTRY

New Anti-TB Drug Safer Than Isoniazid in Tests

➤ A NEW "highly active" drug for treatment of tuberculosis has been found only one-third as toxic, at least in guinea pigs, as the now widely used isoniazid, two Australian scientists report in *Nature* (Nov. 5).

The drug is a relative of isoniazid, called verazide. It is active when given by mouth but more active when given by hypodermic injection. Good results were obtained in the guinea pigs when the drug was given at intervals of one, two or four weeks.

The findings are reported by Drs. S. D. Rubbo of the University of Melbourne and J. Cymerman-Craig of the University of Sydney.

Science News Letter, November 19, 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.

ATOMIC ENERGY RESEARCH AT HARWELL—K. E. B. Jay—*Philosophical Library*, 144 p., illus., $4.75. Report of the Atomic Research Establishment in England from 1951 through August, 1954.

BIRDS AND MEN: American Birds in Science, Art, Literature and Conservation, 1800-1900—Robert Henry Welker—*Harvard University Press*, 230 p., illus., $5.75. The coming of the 19th century coincided with the arrival in the United States of its first modern ornithologist, Alexander Wilson, and of John James Audubon, its most famous ornithologist.

COMMUNITY PROGRAMS FOR MENTAL HEALTH: Theory, Practice, Evaluation—Ruth Kotinsky and Helen L. Witmer, Eds.—*Commonwealth Fund (Harvard University Press)*, 362 p., $5.00. Papers dealing with current efforts to maintain mental health at the highest possible level on a community-wide basis, suggesting the directions to be taken if the aim of the work is to be fulfilled.

DIESEL ENGINE PRINCIPLES AND PRACTICE—C. C. Pounder, Ed.—*Philosophical Library*, 848 p., illus., $17.50. Arranged in 26 sections giving the theory, construction and applications of diesel engines of all types. Each section covering one aspect of diesel engineering.

HOW TO REDUCE SURELY AND SAFELY—Herbert Pollack with Arthur D. Morse—*McGraw-Hill*, 157 p., illus., $2.95. A reducing plan based not only on counting food calories, but also on the calories used in daily activities.

NIELS BOHR AND THE DEVELOPMENT OF PHYSICS: Essays Dedicated to Niels Bohr on the Occasion of his Seventieth Birthday—W. Pauli, L. Rosenfeld and V. Weisskopf, Eds.—*McGraw-Hill*, 195 p., illus., $4.50. Essays and articles by outstanding scientists summarizing some of the great developments of 20th century physics, in many of which Dr. Bohr played a large part.

THE OPEN MIND—J. Robert Oppenheimer—*Simon and Schuster*, 146 p., $2.75. Eight lectures given by the famous atomic scientist discussing atomic weapons and the relationship between science and the wider culture of our times. Included is the address made before the winners of the Science Talent Search, March 7, 1950.

THE REPTILE WORLD: A Natural History of the Snakes, Lizards, Turtles, and Crocodilians—Clifford H. Pope—*Knopf*, 325 p., illus., $7.50. A comprehensive survey of what zoologists have been able to learn about the earth's reptilian population, with special emphasis on the reptiles of the United States and adjacent countries.

THE SHIP: How She Works—Stuart E. Beck—*Adlard Coles (John de Graff)*, 71 p., illus., $2.75. The size of modern vessels and mechanization, not only of the ships themselves, but also of the navigational methods, has brought about a tremendous increase in the number of scientific and mechanical devices that are an essential part of every large liner.

STRENGTHS AND WEAKNESSES OF THE JUNIOR HIGH SCHOOL: Report of the National Conference on Junior High Schools, Washington, D. C., February 24-26, 1955—Compiled by Walter H. Gaumnitz—*Govt. Printing Office*, Office of Education Circular no. 441, 56 p., paper, 40 cents.

A SURVEY OF THE EDUCATION OF GIFTED CHILDREN — Robert J. Havighurst, Eugene Stivers and Robert F. DeHaan—*University of Chicago Press*, Supplementary Educational Monograph No. 83, 114 p., paper, $1.50. Giving criteria for a good program of education for gifted children and summarizing programs of schools, school systems and projects for serving the gifted child, such as the Science Talent Search.

TALL TIMBER: The Work, Machines and Men of the U. S. Forest Service—C. B. Colby—*Coward-McCann*, 48 p., illus., $1.25. A book for children telling of the many duties and the great responsibility of the Forest Service to the nation.

TOMORROW'S BIRTHRIGHT: A Political and Economic Interpretation of our Natural Resources—Barrow Lyons—*Funk & Wagnalls*, 424 p., $5.00. Natural resources, the author says, are one of the most important links joining a nation's past, present and future, because they form the continuing base for the production of all material goods. Despite this fact, progress in conservation is relatively small.

WATER: The Yearbook of Agriculture 1955—Alfred Stefferud, Ed.—*Govt. Printing Office*, 751 p., illus., $2.00. Explaining the nature, behavior and conservation of water for farmers and others who use water, emphasizing that more information and wisdom are needed in using this most valuable resource.

Science News Letter, November 19, 1955

TECHNOLOGY

Synthetic Fiber To Make Coats

➤ A VERSATILE man-made fiber, Darlan, which may rival the popular nylon, rayon and Dacron, has been developed by the B. F. Goodrich Chemical Company, Cleveland, Ohio. Its strands can be used for almost any type of wearing apparel from sweaters to dresses, suits and overcoats.

Now in pilot plant production at Avon Lake, Ohio, the new fiber will be used in women's luxury deep-pile coats with a soft, fur-like texture. Darlan's chemical name is vinylidene-dinitrile.

Science News Letter, November 19, 1955

Only Science News Letter **SUBSCRIBERS** are invited to give Science News Letter subscriptions as Christmas Gifts . . .

CHRISTMAS COUPON

To Science News Letter
1719 N Street, N. W., Washington 6, D. C.

Please send Science News Letter every week of 1956 (and include the holiday week's issue of 1955) to the following:

GIFT TO

Name _____

Address _____

City & State _____

☐ **Send direct to me the specially designed Christmas card so that I may announce my gift personally.**

GIFT TO

Name _____

Address _____

City & State _____

☐ **Send direct to me the specially designed Christmas card so that I may announce my gift personally.**

GIFT TO

Name _____

Address _____

City & State _____

☐ **Send direct to me the specially designed Christmas card so that I may announce my gift personally.**

GIFTS FROM: *My Name* _____

My address as on the label attached here ←

☐ **One of these subscriptions is to be a one year renewal of my own.**

☐ I enclose $. . .

☐ Bill me after Jan. 10, 1956

(See Special Christmas Rates at the right.)

286

YOU KNOW Science News Letter and therefore you can judge which of your relatives and friends (and the students among them), which of your business and professional associates would appreciate and enjoy Science News Letter for Christmas.

Your name on the label attached below authenticates you as a subscriber when your order is received on this page, just as the post card order form enclosed in this issue certifies you as a subscriber.

To you as a subscriber, we not only offer a money-saving bargain in the special Christmas Rates, but we offer the privilege of renewing your own subscription at a saving of $1.50 if accompanied by one or more gift subscriptions.

The SPECIAL CHRISTMAS RATES are:

The First Gift subscription (1 year)	**$5.50**
EACH ADDITIONAL subscription	**4.00**
Your own renewal accompanied by one or more gift subscriptions	**4.00**

(The more subscriptions you give, the lower your cost per gift.)

This year, who will be the person or persons to receive Science News Letter as a Christmas Gift from you? Decide now and mail in your order. Note that we will provide you with gift announcement cards that you can *yourself* sign and send to your friends.

BIOLOGY

NATURE RAMBLINGS

by Horace Loftin

63,000,000 Turkeys

➤ NATIVE, WILD TURKEYS furnished meat for the first Thanksgiving, but the chances are that the Pilgrims were quite used to turkey meat long before they came to the New World.

Our domestic turkeys, differing in many ways from our wild turkeys, originated in Mexico and Central America, where the highly civilized Aztec and Maya Indians had long raised them.

They were introduced into Spain as early as 1520, and from there were quickly established as a barnyard fowl throughout Europe. These Mexican turkeys probably came into England somewhere between 1524 and 1541.

There is no record that the Pilgrims brought turkeys over with them on the Mayflower, but very likely these Mexican travelers were introduced into New England only a few years later.

Except for a slight mixing of the blood from wild Toms paying surreptitious social calls into domestic flocks, the 63,000,000 turkeys raised commercially in this country in 1955 are of the Mexican sub-species.

When the turkey was first introduced into Europe, people had a hard time finding a name for it. It was generally thought of as a relative of the peafowl, due to the Tom's handsome, spreading tail feathers. The name Englishmen settled on has never been satisfactorily explained, and there are as many theories as theorizers.

Perhaps the best guess is that "turkey" is a corruption of the Hebrew word "tukki," which means a peafowl.

Even the scientific name, *Meleagris gallopavo,* brings in the peafowl mix-up, since "gallopavo" is another word for that bird.

While both the Mexican and our own native wild turkeys are sub-divisions of the same species, there is yet another species, the ocellated turkey, found in Yucatan, British Honduras and Guatemala. This bird, *Agriocharis ocellata,* is a seldom-seen inhabitant of the jungle whose colorful tail rivals that of the peacock.

Science News Letter, November 19, 1955

Questions

ASTRONOMY—How was deuterium spotted in interstellar space? p. 323.

□ □ □

GEOPHYSICS—What are "whistlers?" p. 325.

□ □ □

MEDICINE—To what use may animal hospitals be put in case of enemy attack? p. 324.

□ □ □

PSYCHOLOGY—What is a suggested reason that boys join gangs? p. 326.

How can stammering be cured? p. 328.

□ □ □

VETERINARY MEDICINE—What new diseases are striking the nation's cattle? p. 329.

□ □ □

Photographs: Cover, Phoenix Chamber of Commerce; p. 323, New York Zoological Society; p. 327, Erwin Muller; p. 330, Fremont Davis; p. 336, Eastman Chemical Products, Inc.

GENERAL SCIENCE

Eye Diseases, Physical Sciences Get New Funds

➤ RESEARCH into the causes, treatment and cure of blinding glaucoma and other eye diseases is getting more financial support from a new program of grants from the Alfred P. Sloan Foundation in New York, its annual report reveals.

Basic research in physical science likewise becomes a new area in which the foundation will give support. A special gift of $5,000,000 made to the foundation by Mr. and Mrs. Alfred P. Sloan Jr. was the start for this support of physical science research.

Current annual expenditures for the eye disease research total $150,000. They are being administered under an organization specially set up, the Council for Research in Glaucoma and Allied Diseases, in New York.

Science News Letter, November 19, 1955

ENTOMOLOGY

Predict Army Ant March

➤ WHEN ARMY ANT hordes will march can be predicted, Dr. T. C. Schneirla, animal behavior expert with the American Museum of Natural History, New York, has reported.

Experiments with two army ant species show that their mass migrations are not sporadic occurrences tied to food supply, but rhythmic phenomena based on the stages of growth of immature ants in the colony, Dr. Schneirla told the American Philosophical Society meeting in Philadelphia.

In the column-raiding species, *Eciton hamatum*, the nomadic period lasts for 16 to 17 days as a rule, followed by an immobile period of about 20 days. The nomadic phase of *Eciton burchelli* is somewhat more variable, but still within predictable limits, Dr. Schneirla said.

According to Dr. Schneirla, migration of his experimental species is triggered by the emergence of new "callow" worker ants from their cocoons.

These additions to the colony have a striking effect on the old workers who lick, stroke and manipulate them constantly. The almost incessant movements of the callow ants put the workers in a state of high excitation, which is soon followed by the start of the migration.

A sort of lingering effect, the "metabolic-trace factor," from the emergence from the cocoons keeps the migratory instinct going until later the colony's eggs hatch into larvae. Like the callow ants, these larvae have an excitatory effect on the workers. It is this appearance of the larvae that sustains the army ant migrations through a period of predictable duration, Dr. Schneirla said.

He pointed out that this excitation by larvae may be true only among the members of the marauding ant sub-family *Dorylinae*, that live above ground, like his *Eciton* species.

Others, like the driver ants of Africa that live under ground much of the time, may need only the emergence of the callow young from cocoons to carry through their migratory period.

What ends the nomadic phase of the *Ecitons*? As the cyclic period draws to a close, the larvae cease to feed and stimulate the workers, and begin to spin cocoons. Army ants seem to find cocoons uninteresting, and they usually heap them carelessly about the bivouac area. There is a sharp reduction of worker activity outside the nests and raids fall off.

Thus with the decrease of stimulation by larvae, the once nomadic army ant colony suddenly loses interest in travel, and the next day is quietly settled down until the cocoons break open again.

Science News Letter, November 19, 1955

PSYCHOLOGY

Public Does Care About Mental Illness

➤ THE PUBLIC does care about mental illness, Jane Stafford, SCIENCE SERVICE'S prize-winning medical writer, told members of the National Association for Mental Health meeting in Indianapolis, Ind.

"You can hardly pick up a daily newspaper today," she said, "or a national magazine, without reading somewhere in it about mental illness."

The public has passed the stage of shunning thoughts about mental illness, Miss Stafford stated, and it has now reached the stage of "wanting to read about it, wanting to know more about what it is and what can be done about it."

Science News Letter, November 19, 1955

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 805. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

SPOT CONTROL of small liquid, gas or electrical fires is offered with a push-button, dry powder extinguisher. Using a specially treated bicarbonate of soda, the non-reusable 12-ounce aerosol container can extinguish small Class B and C fires. Food dashed with the agent need only be washed off to be edible.

Science News Letter, November 19, 1955

TELEPHONE AMPLIFIER powered by dime-sized batteries is available for those who use phones in noisy places or are hard of hearing. The pocket-sized amplifier clips to any style telephone receiver and will also increase the loudness of long distance calls.

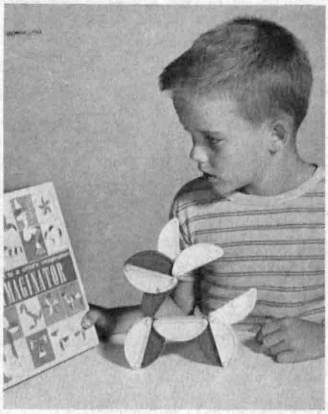
Science News Letter, November 19, 1955

ANTI-GLARE WINDOW also controls heat and distributes light evenly. A one-piece louvered panel of molded Plexiglas, the window resembles a washing board. Each louver combines a clear with an opaque surface. The windows can be installed either horizontally or vertically.

Science News Letter, November 19, 1955

PLASTIC PITCHER with a lock-lid also features a molded handle. Unbreakable and easy to clean, the plastic one and one-half quart pitcher is available in frost-white with a red, yellow or white top.

Science News Letter, November 19, 1955



CHILDREN'S TOY to tease and please the imagination can be made into an endless variety of animals, objects or designs. It consists of linked pieces of virtually unbreakable plastic molded into bright colors. Each link turns in a complete circle and can be set at any angle, as shown in the photograph.

Science News Letter, November 19, 1955

GOLF CLUBS made of a high-impact moldable material are impervious to moisture, can be molded to specification and retain all the qualities of wood. Irons are made of an alloy described as 30% stronger than steel and rust-proof.

Science News Letter, November 19, 1955

INSULATION PANELING is described as tough wearing and more efficient than cork. Made of solid foam insulation sandwiched between two sheets of plastic reinforced with glass fabric, the panel is light, rot-proof and vermin resistant. Individual panels can be joined together.

Science News Letter, November 19, 1955

BOAT LOCATOR is designed to make small craft highly conspicuous to the searching eye of radar from larger vessels. A folding device made of sheet aluminum, it can be opened like an umbrella. Raised to the top of the mast or tied to an oar the radar reflector acts as an "electronic red flag," returning a strong pip to a radar screen.

Science News Letter, November 19, 1955

Do You Know?

Eli Whitney made his first *cotton gin* with wires from a bird cage.

Parks are one of the foremost responsibilities of the U. S. Department of Interior.

Rain clouds can interfere with *radar* operations.

A shock wave from an *explosion* can bend light rays.

For each pound of *milk* a cow produces, her heart pumps 400 pounds of blood through her udder.

Use of electric lights to provide a 12- to 14-hour working day for laying *hens* will result in increased fall and winter egg production.

A broken clay tablet bearing part of the *Gilgamesh Epic*, the famous Babylonian myth written about 1500 B.C., was recently discovered by a shepherd near Megiddo in Israel.

Total world consumption of *energy* since the year 1 A.D. has been estimated as equivalent to the energy available from 400,000,000,000 to 520,000,000,000 tons of coal.