

CHEMISTRY

**Purify "Chunk"
Of Heavy Matter**

► UNIVERSITY of California scientists have made and purified a "chunk" of the heaviest building block of matter ever obtained in weighable and visible quantities.

The "chunk" is one thirty-millionth of an ounce, about one microgram, of element 98, californium, a synthetic form of matter that does not exist naturally on earth and may exist only in supernovae, or exploding stars.

Production of the minute quantity of californium, which may become the most useful heavier-than-uranium element next to plutonium, was made by modern alchemical processes in a nuclear reactor.

Six years ago the scientists put one-fourth of an ounce of plutonium into the Atomic Energy Commission's Arco, Idaho, materials testing reactor. There the plutonium atoms were "fattened up" with neutrons until a reasonable quantity had turned into californium.

Element 98 is especially important because it undergoes spontaneous fission, yielding neutrons. Californium may permit plumbing mysteries of the fission mechanism that have previously been unapproachable.

For example, by cooling californium and aligning the nuclei magnetically, then observing directions of fission products and nuclei, it may be possible to observe new facts about the nucleus at the moment of fission. It can be used also as a general neutron source.

Studies of properties of the element showed it to be colorless and paramagnetic. The element is about 1,000 times "hotter" than radium.

Isolation of californium was reported by Stanley Thompson of the Berkeley laboratory to the Second United Nations International Conference on Peaceful Uses of Atomic Energy meeting in Geneva. His associates in the work were B. B. Cunningham, Ray Gatti and Llad Phillips, all members of the chemistry group directed by Nobel Laureate Dr. Glenn T. Seaborg.

Science News Letter, September 20, 1958

ENGINEERING

**Electric Transmission
Breakthrough Achieved**

► A "MAJOR BREAKTHROUGH" in transmission of extremely high voltages may solve some of the problems involved in the vastly increasing demands for electrical power in the United States.

Announced in Leadville, Colo., by the Westinghouse Electric Corporation, the "breakthrough" was achieved in a "giant outdoor laboratory" where transmissions up to 500,000 volts were maintained for extended periods of time.

Previously, the highest sustained transmissions attained 345,000 volts.

"We are now able to . . . construct transmission lines capable of handling at least 500,000 volts at virtually any altitude up to 12,000 feet," J. K. Dillard, manager of the

Westinghouse electric utility engineering department, Pittsburgh, said. "We consider this feat a major breakthrough in power transmission."

At the Westinghouse plant in Pittsburgh, Bill Lloyd of Mr. Dillard's department said that U. S. electric power production has doubled every ten years for the last several decades and is expected to continue increasing tremendously. "This," he said, "is why the achievement is of far-reaching importance."

It provides "a superior means of moving very large blocks of power over great distances economically," he explained.

Many utility companies are working out power pool networks which require long distance transmissions. With the new equipment, Mr. Lloyd explained, utility companies could trade power in situations where one is overloaded and another has an excess of power available.

The new equipment includes transmission lines which reduce power losses through a corona effect. This is the leakage of electricity through nicks and scratches in the lines producing a visible glow, or corona. It also causes radio interference and degeneration of insulation materials. The corona effect is especially troublesome in thin air at mountain altitudes.

Mr. Lloyd claims that the transmission lines and other newly developed equipment make it possible to send power over fewer lines.

The outdoor laboratory at which the experimental work was done was constructed by the Public Service Company of Colorado.

Science News Letter, September 20, 1958

ENTOMOLOGY

**Mineral Plus DDT Makes
Yard Mosquito-Proof**

► NOW YOU can dust your back yard to make it mosquito-proof.

Prof. William R. Horsfall, a University of Illinois entomologist, reported that a mixture of ten parts granulated vermiculite, a mineral much used in agriculture, to one part DDT will keep an area free from mosquitoes for as long as a week, depending on the weather.

Two pounds will do a good-sized lawn, the scientists said. While the mixture is not dangerous to pets, certain precautions should be used in handling the insecticide. Avoid contamination of food or places where food will be placed. Also avoid dusting growing vegetables and fruits, or using it more than once a week. Do not overdose, Prof. Horsfall warned.

Small quantities of the vermiculite-DDT mixture should be available from commercial insecticide dealers. It has been used only in large quantities by mosquito control districts until now.

Applied one or two hours before your back yard is to be used, the golden colored mixture quickly becomes invisible.

Science News Letter, September 20, 1958

IN SCIEN

BIOLOGY

**"Clock" Tells Mating
Ant When to Leave Nest**

► THERE IS an internal "clock" in two species of ants that apparently tells the male when it is time to take off on a mating flight.

Dr. Elwood S. McCluskey of Stanford University reports on experiments with the ants' "clock" in *Science* (Sept. 5).

Alternating periods of light and dark were used. The fact that increases in activity preceded changes in lighting suggests an internal "clock" is operating, Dr. McCluskey says.

Although the ants' activity coincided with various light periods according to species, their daily rhythm was maintained even in the dark.

With their clocks "set" for emergence from the nest at a particular time, harvester ants were on time for their nuptial flights. Since mating takes place within the nest for Argentine ants, their exit rhythm may be a vestige of a time when they did have a nuptial flight, the scientist suggests.

Science News Letter, September 20, 1958

VIROLOGY

**Throw More Light
On Secrets of Virus**

► MORE LIGHT, literally as well as figuratively, has been thrown on the virus' infectious core and its protein suit of armor by scientists at the University of California at Los Angeles.

Using ultraviolet light as a probe, Dr. Albert Siegel, assistant research botanist, and Dr. Amos Norman, assistant professor of radiology, have found that the tobacco mosaic virus can be inactivated by both short and long ultraviolet wavelengths.

At the short wavelength inactivation is apparently due to damage to the protein armor. This damage prevents the nucleic acid from getting out of its armor, which it must do in order to be infectious.

There is an indication that the nucleic acid is still "alive" or infectious, but as long as it is confined in the protein it is harmless.

At longer wavelengths inactivation of the virus is apparently due to absorption of ultraviolet light by the nucleic acid itself. One strain of the virus is much more resistant to ultraviolet at longer wavelengths than the other. The resistant strain is protected by the way its nucleic acid core is banded to its protein armor.

It is through such painstaking technical procedures that chemical properties of the virus are being more clearly defined and scientists are learning more about the chemical differences between living and non-living matter, Dr. Siegel points out.

Science News Letter, September 20, 1958

CE FIELDS

PHYSICS

Nations Attempt to Make Thermonuclear Power

See Front Cover

► SCIENTISTS in Great Britain, the U.S.S.R. and in the United States are attempting to solve the problems of harnessing the hydrogen bomb. Research results were presented at the Second International Conference on Peaceful Uses of Atomic Energy held in Geneva, Switzerland.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows the Oak Ridge National Laboratory's thermonuclear experimental machine in operation. An intense direct current carbon arc runs through the length of the machine. When a beam of molecular ions passes through the arc, the molecular ions are broken into atomic ions. These atomic ions, held by a magnetic field, circulate in a glowing ring which may be seen through the side window of the machine.

The glowing gas is called the "plasma." (See SNL, May 17, p. 307; Sept. 6, p. 151; Sept. 13, p. 165.)

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MEDICINE

Vaccine Shots Protect Mother-to-Be and Child

► ONLY TWO injections of poliomyelitis vaccine can protect both a pregnant woman and, later, her newborn child against the virus disease, a team of University of Minnesota researchers report.

Pregnant woman are extraordinarily susceptible to paralytic poliomyelitis, scientists have found. Possibly their vulnerability results from the action of endocrine gland secretion. Research with experimental animals shows that cortisone acts to increase their susceptibility to polio and the human reaction may be similar.

Results of this study indicate further ways to protect the mother-to-be.

Examinations of 138 pregnant women showed that almost two-thirds lacked antibodies to one or more of the three types of polio virus. However, after two injections of Salk vaccine, 73% of the women previously without complete antibody protection developed antibodies to all three types.

Along with the increased protection for the mother-to-be during a particularly polio-susceptible period, there was an increase in the amount of polio antibodies present in the newborn infant's blood.

The scientists found that in about five weeks the infants had lost half their passively acquired antibodies. The amount of

antibodies they retained after birth was directly related to the level of antibodies present at birth. Those with high levels had measurable quantities of antibodies as late as nine to 12 months of age.

"Where supplies of poliomyelitis vaccine are limited," the scientists conclude, "assignment of priority to pregnant women therefore seems justified."

In 77 cases of injecting year-old infants with the vaccine, the response was not as good as that obtained with the pregnant women.

Injections of the vaccine by the intradermal route gave results comparable to doses five times larger administered subcutaneously.

Drs. Mauricio Martins da Silva, Konald A. Prem, Eugene A. Johnson, John L. McKelvey and Jerome T. Syverton report their research in *The Journal of the American Medical Association* (Sept. 6).

Science News Letter, September 20, 1958

MEDICINE

New Steroid Helps Treat Rare, Fatal Disease

► A RARE AND sometimes fatal disease has shown response to a new drug, but not without some side effects.

The disease, systemic lupus erythematosus, is a chroniccrippler. Its symptoms are similar to rheumatic fever and rheumatoid arthritis, manifesting itself in fever, sore and swollen joints, face rash and eruptions, and heart damage. In most cases, it is fatal and the exact cause is unknown.

A new steroid, triamcinolone, was administered to 29 patients suffering from lupus, Dr. Edmund L. Dubois, department of internal medicine, University of Southern California, reports in *Journal of the American Medical Association* (July 26).

Many patients are helped more by this steroid than by the older ones, he says. Of 14 patients who had received prior therapy with all of the older anti-inflammatory hormones, seven were better controlled and felt better with triamcinolone than with previously given steroids.

Male patients exhibited none of the Cushingoid features, rounded face, obese neck and trunk, suggesting that in males, this may be the agent of choice.

However, the most serious side effect of the drug in patients with lupus was found to be muscle weakness, and facial hair growth in some women, indicating that this steroid should not be used to initiate therapy on the average patient. The muscle weakness appeared in six of the 29 patients from four to 32 weeks after starting therapy.

The pattern of clinical improvement from the new drug closely paralleled that obtained by previous treatment with older steroids, and all clinical and laboratory abnormalities disappeared, with the exception of long standing renal involvement. In addition, the new steroid, manufactured by Lederle Laboratories under the trade name Aristocort, seemed to induce progressive weight loss in 18 patients, Dr. Dubois concludes.

Science News Letter, September 20, 1958

IMMUNOLOGY

Dormant Antigens May Cause Reactions

► EVIDENCE that substances such as pollen, foreign proteins, and vaccine particles are causing allergic reactions and maybe arthritis has been presented in Pasadena, Calif.

All of these substances, called antigens, induce the body to produce antibodies that fight disease or immunize. In addition, they are suspected of causing reactions such as sneezing, rashes, and digestive disturbances by an investigation team from California Institute of Technology.

These antigens were found in the liver, instead of being completely excreted as was expected, Drs. Dan H. Campbell, professor of immunology, and Justine Garvey, chemist, at Caltech, reported.

Ordinarily, they would be removed from the body within days. However, radioactive tracer experiments on animals lead the scientists to suspect that some of the antigens "hibernated." When stimulated by new antibodies from booster shots, the old antigens may release the antibodies to which they have been attached, and resume their job of producing new antibodies, which can cause reactions, Dr. Campbell hypothesized.

Science News Letter, September 20, 1958

PUBLIC HEALTH

One of Every 80 Americans Is Diabetic

► ONE OUT of every 80 Americans is diabetic, but half of them do not know it. Furthermore, almost 40% more women than men, die from this disease.

Diabetes mellitus, is the eighth leading cause of death in this country, it was reported in the Parke Davis & Company's publication, *Patterns of Disease*.

One of the reasons diabetes remains a serious disease is the high rate of "hidden" diabetics, the report stated. Some of the symptoms of the disease include general weakness or tiredness and a sore, abscess, infection or slow-healing wounds, itching, weight loss and excessive thirst.

The disease is far commoner in older people than in the young, with 40 as the danger age at which concentration of new case findings of diabetes begins. Diabetes is a major cause of disease among elderly people.

Life expectancy of the diabetic has improved greatly because of the use of insulin coupled with a better understanding of the disease mechanism and improved methods of treatment but it is still shorter than that of the general population.

One comprehensive study revealed that for diabetics who have survived 20 to 24 years of the disease, eye damage was the leading single complaint, afflicting 82% of the victims, and hardening of the arteries was second, accounting for 73%. The leading cause of death among diabetics is heart disease that accounts for almost 50% of all diabetic deaths. Vascular lesions of the central nervous system rank second.

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