SCIENCE NEWS

Science Service, Washington, D. C.

ELEMENT 61

A FORM of element 61, believed to be the only element of the 92 in the chemist's periodic table not found in nature and never before produced artificially, made a brief appearance as a result of bombardment of other elements with atomic fragments whirled at them by the University of California's cyclotron. The new substance stayed just long enough to show by its radioactivity that it was here and then disappeared completely by disintegration.

The experiments were made by Dr. Emilio Segre, research associate in the Radiation Laboratory, and Dr. Chien Shiung-Wu, research fellow. The rare earths bombarded were sent to Dr. Segre a year ago by an Italian chemist, Dr. Luigi Rolla.

Element 61 belongs to the group of rare earths, of which there are 15. The atomic number 61 means that the nucleus or central core of its atom has a positive charge 61 times that on the nucleus of a hydrogen atom, and this is neutralized by 61 negative electrons revolving about it like planets around a central sun. Each chemical element has various forms, known as isotopes, and one of these of element 61 is believed to have been discovered.

From its position in the periodic table, it is known that the atomic weight of element 61 should be about 148, and its principal chemical and physical properties can be predicted fairly accurately. But unless and until a fairly stable form is found, one that will at least stay long enough to be measured, these predictions can not be verified.

In 1926, Professor B. Smith Hopkins, of the University of Illinois, believed he had captured a stable form of element 61 which he recognized by its x-ray spectrum. It was named illinium. In 1933 Maurice Curie believed that he had isolated an isotope of illinium and noted its radioactivity. Three other elements, numbers 43, 85 and 87, are considered in the same doubtful class.

Albarmine, element 85, and virginium, element 87, were claimed by Professor Fred Allison, of the Alabama Polytechnic Institute. Because of their position among the radioactive elements in the periodic table (radium is element 88), these elements are probably radioactive with short life periods and may have consequently disappeared from the earth. It may be the only way to find them would be to create them artificially by atomic bombardment of neighboring elements.

The case for masurium, element 43, is somewhat stronger. Its discovery was reported almost simultaneously by scientific men in England and in Germany. Also its position in the periodic table is among the stable elements. It should be a metal resembling manganese.

THE PRODUCTION OF ALCOHOL

ALCOHOL can be produced in many ways besides by the fermentation of grains and molasses. With the government taking over 60 per cent. of the output of our distilleries, perhaps some of these alternative methods will come into use. In any case, no serious shortage threatens.

Alcohol can be produced from cornstarch, potatoes, wood, in fact from any plants containing starch, sugar or glucose. The Germans have long produced cheap alcohol for fuel purposes from potatoes. It can be used in specially designed engines, or a small amount can be mixed with gasoline for the usual internal combustion engine. This has been done quite extensively in European countries. As with everything that depends on a crop, we should have to wait for the plants to grow before we could replenish our stocks in this way. It is doubtful if the acreage could be spared, or the men and machinery quickly found to gather, ferment and distill the harvest.

Alcohol can also be produced synthetically from the waste gases of petroleum refineries. But these gases, which a few years ago were allowed to escape into the air or were burned in great flares to avoid hazard, are now much in demand for the manufacture of explosives, synthetic rubber and plastics, as well as a whole series of chemicals required in the war industries. Alcohol is made from them, but only as a step in the manufacture of explosives. To make the smokeless powder for a single 12-inch shell requires a barrel of alcohol. It is not likely that alcohol from this source will be available for civilian use.

For industrial purposes, methyl or wood alcohol is to a large extent used in place of ethyl or beverage alcohol, except for such things as perfumes, flavoring extracts and cosmetics. Without much hardship, less use can be made of products requiring ethyl alcohol. And if a shortage does come, some use of the alternative methods can be made.

SULFA DRUGS AND THE TREATMENT OF WOUNDS

PEARL HARBOR was a sweeping victory for the new sulfa drugs and our soldiers who fight disease and repair human bodies. The Army medical corps was alert, ready, and it scored the world's greatest success in any war in the fight against battle wounds, infections and death.

The story can now be told. It is detailed in a report made to the Surgeon-General of the Army, James C. Magee, by Dr. Perrin Long, of the Johns Hopkins Medical School, who is responsible for introducing the sulfa drugs into America. Dr. Long was accompanied on a mission to Hawaii by Dr. I. S. Ravdin, professor of surgery at the University of Pennsylvania.

In the Army hospitals there were badly wounded men who looked and felt well. They were "amazed" at what they saw. Men who by all past standards should have died were recovering, eager to get back in the fight. There was absence of pus in the men's wounds, mildness of post-operative reactions, and swift, clean healing of wounds. Sulfa drugs plus good organization that gave the wounded prompt attention performed this wonder.

Even among men whose wounds had been contaminated with the fertilizer-dirty soil of Hickam and Wheeler

Fields, and who had not had their wounds cleaned out by debridement for 24 hours, not a single massive infection was found 10 days later.

Infection, which in World War I killed 80 per cent. of the men with abdominal wounds alone, hardly occurred in Hawaii. Compound fractures of bones and injury of the flesh, for instance, showed that less than four per cent. of such injuries became infected. Not a single loss of arm or leg was necessary because of infection. The only amputations reported were those made by the shell splinter or other missile.

Credit for this remarkable record is shared by the sulfa drugs and the efficient preparations of Colonel Edgar L. King, surgeon-in-charge. In the spring of 1941, when most people thought Hawaii safe and such extensive preparations foolish, Colonel King organized all civilian, Navy and Army medical forces to meet possible disaster.

After the attack when the wounded men arrived, their wounds were first debrided, that is, every bit of dead or dying flesh that could give food for germs was cut away. Then sulfanilamide was dusted into the wounds, 68 grams (more than two ounces) at a time. Then each man was given sulfanilamide by mouth, as a further aid in stopping invading germs before they could do any damage. When the first alarm sounded, 14 pounds of sulfa drugs had been brought up from the basement of Tripler Hospital, in readiness for the doctors.

There was no shortage of supplies. Blood plasma banks had been prepared in advance. On December 4, Colonel King had withdrawn 58,000 surgical dressings from the warehouses and put them into the storehouses of the hospitals.

The medical epic of Pearl Harbor ends with two letters, received by General Magee from General Wallace DeWitt and Colonel Emerson, of the Letterman Hospital in San Francisco, where the first contingent of wounded from Hawii have arrived. All the men were in excellent shape. Colonel Emerson emphasized the high morale and cheerfulness of these wounded men, concluding: "They are in the best condition of any war casualties I have ever observed."—JANE STAFFORD.

FREE-TUITION COURSES IN ENGINEERING FOR WOMEN

STEVENS Institute of Technology has announced a twelve-weeks, free-tuition course in engineering, beginning on February 2, for college women with training in mathematics, physics and chemistry. The course is believed to be the first emergency training program to equip college women for technical positions in war industries. It is part of the engineering war training program of the U. S. Office of Education.

The course will qualify women for positions as draftsmen, inspectors, supervisors of women operatives, engine testing, computation and a wide range of precision work.

President Harvey N. Davis, of the institute, pointed out that "Many women whose war service might otherwise be limited to Red Cross, . . . and canteen work, will welcome the opportunity to serve in . . . capacities requiring technical qualifications."

He stated that the course is full-time, serious work—eight hours per day, five and a half days a week.

One or more sections, possibly five, of 25 women each will be immediately organized. Summer courses may be offered later to as many as 200 women. They will be given the same type of training as men in the short engineering courses. Following the three-months training, women will be expected to qualify for employment in war industries. The training is not intended merely to train women as machine operatives and bench workers, but to enable college women with a knowledge of science to use their ability in armament production. Students will provide their own text-books (not more than $5), and suitable clothing for the shop. Tuition and cost of instruments and slide rules will be paid.

ATHLETE'S FOOT

DR. EDWARD FRANCIS, U. S. Public Health Service medical director (retired), stands by his remedy for athlete's foot of one part camphor, three parts phenol, despite expressed fears it will harm users.

To test the preparation, this writer tried the mixture as prepared for him personally by Dr. Francis. The writer applied the mixture first to the back of his hand, then his feet. No harmful results of any kind were noted. However, since this writer happens not to have athlete's foot, this was not a test of the mixture as a remedy.

Dr. Francis reported his research in the *Journal* of the American Medical Association for December 6. His directions are:

"Melt U. S. P. phenol and measure out 3 cc into a mortar; weigh 3 gm of U. S. P. camphor, break into small pieces and add to the melted phenol. Rub until the entire mass is liquefied. Transfer into a vial with a stopper suitable for use as a dauber. Keep stoppered when not in use. Experiments indicate that the ingredients may be mixed in the proportion of 3 parts phenol and 1 part camphor.

"The mixture is nonirritating to the skin and may be painted between the toes several times a day, the small rubber stopper of the vial being used as a dauber. The sock may be replaced immediately without danger of corrosion. There is no discoloration of the clothing. Relief from itching is immediate. It should be pointed out, however, that the phenol-camphor preparation should not be applied to the wet skin, since water causes a breakdown of the preparation, with the result that it becomes caustic."—EDWIN NEFF.

THE STUDY OF EPILEPSY

THAT chronic fits, like epilepsy, have been produced in animals for the first time, was announced by Dr. L. M. Kopeloff, Dr. S. E. Barrera and Dr. N. Kopeloff, of the New York State Psychiatric Institution, at the Baltimore meeting of the Society of American Bacteriologists. Better knowledge of what causes epilepsy in humans will, it is hoped, result from these experiments although the work is too recent to say whether it will lead to means of preventing epilepsy or to better treatment.

The animals, monkeys, rabbits and guinea pigs, de-

veloped epileptic-like fits as a result of a little alum applied to the motor area of the brain. Heretofore fits in animals have been produced by various means, but only one attack resulted. In the animals treated, attacks occurred not just once but continued to occur, for a period of nine months, whenever a loud noise or other stimulus was used to bring on an attack.

Apparently the single alum treatment permanently altered the brain cells so that they reacted abnormally, although they were not structurally damaged or changed.

The animals could be "cured" by medicine such as dilantin now used successfully in treating epilepsy in humans. Brain waves were typical of those seen in epilepsy. Unlike the single attacks of fits previously induced in animals, the chronic state of having fits whenever stimulated did not develop until after an "incubation" period of about four to six weeks after the alum had been put on the brain.—JANE STAFFORD.

THE DUTCH ELM DISEASE

CHEMICAL injections may some day conquer the deadly Dutch elm disease, now extensively ravaging the elm of the northern Atlantic coast states. Hope of bringing this to pass is held out by experiments performed by Dr. George Zentmyer, of the Connecticut Agricultural Experiment Station.

Wilting of leaves, the first noticeable symptom of Dutch elm disease, had long been believed due to simple drought, provoked by the choking up of the sap ducts. Dr. Zentmyer suspected that the wilting might possibly be caused by a toxin secreted by the fungus. This is known to be the case in certain other plant diseases, like tomato and cotton wilts.

He grew a quantity of the elm disease fungus under laboratory conditions and made a filtered extract from it. He dipped cuttings of various plants—snapdragon, tomato, elm, etc.—into the extract. The characteristic wilt developed. The same reaction, as well as the staining of the wood which is another symptom of the elm disease, was observed when injections of the filtrate were made into small trees growing out-of-doors. These tests demonstrated rather definitely that the wilting is due to a toxin, rather than to simple mechanical clogging of the sap channels.

Preliminary tests have been made with a number of counteracting chemicals, and some signs of benefit have been obtained with a few of them, including benzoic acid, hydroquinone and 8-hydroxyquinoline benzoate. Much further research, however, is considered necessary before recommendations for general use can be safely made.

ITEMS

DRILLING a hole through a piece of hard steel with nothing more substantial than a tiny jet of salt water sounds fantastic. Yet this is just what Dr. Charles F. Burgess, former professor of chemical engineering at the University of Wisconsin, demonstrated before a meeting of the Electrochemical Society of Chicago. The hardest of metals, he said, can be drilled in this way, even tungsten carbide which can otherwise only be cut with a diamond. The jet of salt water issued from a glass nozzle directed toward the steel plate. This nozzle was connected by a sealed in wire with the negative pole of a battery, the positive pole of which was connected to the plate. Thus an electrical circuit was established from the battery to the plate, up through the jet and back to the battery. The salt in the water made it a good conductor of electricity.

AMERICA'S first winter sportsmen crossed from Asia to Alaska some 2,000 years ago, bringing with them the bow and arrow, snowshoe and toboggan. They constituted the last great aboriginal invasion of North America, preceding the Christian era by only a short time. This is the theory of Dr. Diamond Jenness, of the National Museum of Canada, described in the latest annual report of the Smithsonian Institution. These latest invaders, called Athapascans, chased the Eskimos from the Mackenzie River basin to the northeastern coast of Canada, eventually Greenland. From these Eskimos descended the Algonquin Indians, who greeted the first English settlers on the Atlantic seaboard. Only about a thousand years ago, the Athapascan descendants reached the southwestern part of this continent, and from them descended the Navajo Indians of to-day. Dr. Jenness reconstructed this picture from archeological remains and from linguistic evidence.

CONSTRUCTION of the first "shoe sterilizer" on Sheppard Field, the newest and largest air corps technical school of the Army, was ordered recently by Captain Morton Hack, commanding officer of the 408th School Squadron, Air Corps Replacement Training Center, at Sheppard Field, Texas. This instrument designed by Captain Hack is designed to sterilize forty-five pairs of shoes at one time, and it is hoped to prevent and eliminate any cases of ringworm among members of the squadron. The wooden cabinet, now being built by Private First Class Bill Jenkins, carpenter of the squadron, will be airtight and built on wheels. When finished it will be 5 feet high, 2 to 3 feet wide and 2 to 3 feet deep. It will have partitions in the interior built to contain forty-five pairs of shoes at one time with the contained air circulating freely throughout the interior. On the bottom of the container will be a metal dish for chemicals. The shoes will remain in the sterilizer with chemical vapor overnight.

THAT long, dull ache remaining in the jaw after a tooth has been pulled can be mercifully reduced by drug, para-nitrobenzoic acid, which is allied to the sulfa drugs. It is also the most deadly of all its relatives against the germ found most frequently in infected tooth sockets—*streptococcus viridans*. This is reported by Drs. C. A. Griffith, A. D. Hirschfelder and W. J. Simon, of the division of oral surgery, University of Minnesota Dental School, published in the *Journal* of the American Dental Association. In routine extractions (not impacted teeth), the dentists found that with use of the para-nitrobenzoic acid, pain occurred in only three, or .6 per cent. of 528 cases. Of 7,060 cases not given the acid, 353, or 5 per cent., had pain following the extraction. While the acid treatment did not reduce pain following surgical extraction of impacted teeth, it did reduce the number of treatments needed after extraction.