



**DAWN CACTUS**—This fossil imprint in Eocene rocks of eastern Utah, 50,000,000 or more years old, shows that prickly-pear cactus grew in the region then, as it grows there today. Less spiny than its modern successor, it is still very definitely a cactus. The flat-ended structure at upper right is a crushed flower.

## PALEBOTANY

## Dawn Cactus Found

Fossil imprints in Eocene shale of eastern Utah show ancestor of the prickly pear cactus. Attached are remains of a flower.

➤ CACTUS grew on Utah hillsides 50 or 60 million years ago, and it was very much like the cactus that grows there today.

First information on this new chapter on ancient American plant life was imprinted on a split slab of Eocene shale found in the Green river valley in eastern Utah by Earl Douglas, veteran collector of fossils. First description of the species is given by Prof. Ralph W. Chaney of the University of California, in a detailed report to the *American Journal of Botany*.

The type specimen of this oldest of all known cacti consists of the fossil traces of three flattened, more or less oval stem joints, unmistakably similar to those of the present-day prickly-pear cactus. Attached to the uppermost joint are the crushed remains of a flower; although

poorly preserved, the petals still show the kind of venation they had in life.

From the second joint arises another crushed structure that may have been either a bud or an immature fruit—it is now hard to tell which. In addition to this largest and most complete specimen, there are also fossils of three separate stem-joints of the same species.

Although the ancient plant was unmistakably a cactus of the prickly-pear group, it has characters that indicate its position nearer the primitive base of the cactus family tree. Thus, it is not as thickly beset with spines as most present-day prickly-pears, and the spines it has are relatively short and weak.

Other plant fossils found closely associated with the cactus remains indicate a climate in the region, at the time it grew there, somewhat like that of the

Louisiana coast, or of parts of Mexico on the opposite side of the Gulf of Mexico. The fossil leaves and twigs include such species as willow, chestnut, oak, sweetgum, mimosa and bittersweet.

Prof. Chaney has given the ancient plant the botanical name *Eopuntia douglassii*. The first or generic name means "dawn cactus"; the second or specific name is bestowed in honor of the original collector.

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## MEDICINE

## American Apparatus To Process Soviet Blood

➤ SOVIET blood will soon be prepared for fighting shock in Russian wounded through use of four complete plasma processing units given to the Union of U. S. S. R. Red Cross and Red Crescent Societies by the American counterpart of this organization, the American Red Cross.

Prof. Peter G. Strelkov of the U.S.S.R. Academy of Sciences flew to the United States to arrange for its use in Russia and Capt. John Reichel, Jr., of the Office of the Surgeon General of the U. S. Army, will accompany the apparatus to Russia to aid in its installation and use.

Prof. Vladimir Lebedenko, Washington representative of the Soviet Red Cross, in receiving the apparatus in presentation ceremonies stated that the 4,000 pints of blood daily that will be processed by the four units will supply the Russian armies and civilians in reoccupied areas as well. The equipment was paid for from war relief funds given the Red Cross by Congress.

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## ENGINEERING

## Rayon and Nylon Tire Cord Much Stronger Than Cotton

➤ RAYON CORD in synthetic tires for trucks, used instead of cotton, has more than tripled the performance of the tires, and nylon cord in airplane tires has doubled their strength without increasing their size. These are two of the many results of scientific research by rubber chemists pointed out at a recent meeting of the American Society of Mechanical Engineers by Dr. Sidney M. Cadwell of the U. S. Rubber Company, who predicted a continued use of synthetic rubber in postwar days.

Rubber chemists, he said, have achieved as much knowledge of synthetic rubber

in three years as had been acquired in 30 years with the natural product. A multiplicity of new materials, combined with new and better types of synthetic rubber make improved tires a virtual certainty of the future.

Butyl, one of the types of newer synthetic rubbers, is proving itself superior to natural rubber for use in inner tubes, Dr. Cadwell stated. One reason is that it has excellent resistance to high temperature; another is that it has superior tear resistance. Its most spectacular advantage, he declared, is the fact that it will hold air three times as well as

natural rubber, making it unnecessary to inflate the tires as frequently.

As for the immediate postwar tire, this will doubtless consist of a synthetic rubber casing with a synthetic tread, he predicted. Present day synthetic tires made of GR-S (government rubber, styrene) give tread wear nearly as good as that of natural rubber, he said. They are not as safe against blowouts at excessively high speeds, but they are now reasonably safe and will be improved substantially. Later, he added, synthetic and natural rubber will probably be used together.

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#### MEDICINE

## Functional Rehabilitation

Seen as this war's great contribution to the treatment of broken bones. The last war established the principle of skeletal traction.

►THE GREAT contribution of this war to the treatment of broken bones will be functional rehabilitation, Dr. Edward Harlan Wilson, of Ohio State University Medical School, predicted at the meeting of the American Congress of Physical Therapy in Cleveland.

The last war, he pointed out, established the principle of skeletal traction as a permanent treatment for fractures of the shafts of the long bones. The traction splints developed for this purpose became familiar to many who took first aid courses at the beginning of the present war.

When the present war began, methods of efficient treatment of shock and infection as well as of the broken bone were ready for use, Dr. Wilson continued. As a result, lives have been saved and wounds healed quickly. The consequence has been the fixation of interest on rehabilitation.

In this physiotherapy has a very important place, Dr. Wilson declared.

"It is largely a psycho-therapeutic method," he said, "in that the patient is educated to begin the use of his own muscles in the region of a fracture and is taught how to do it without pain or injury to himself."

When he has definitely learned to move his limb and place weight on it, however, physiotherapy has accomplished all it can. If prolonged further, it will retard the patient's progress because his condition is a mixture of local weakness and stiffness plus general weakness from

the prolonged period of rest. British experience and that of our own Army have shown the importance of extremely active physical exercise at this stage of recovery.

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### Physical Medicine

►NEWSPAPER and magazine articles about physical medicine, pictures of whirlpool baths, of technicians giving massage and of other treatment procedures have created a popular demand for this kind of treatment, Dr. Miland E. Knapp, of the University of Minnesota Medical School, told members of the Congress of Physical Therapy on his induction as president of the organization.

Very few doctors, however, have had enough training in physical medicine to be able to prescribe the treatment their patients may need, Dr. Knapp said. Although the Baruch report states that the preeminent need is for more teachers of physical medicine, it will be impossible to correct the situation by employing more teachers, Dr. Knapp said, because there are not enough of them.

"The most feasible solution at the present time," he said, "is to interest one or more members of each clinical department in the phases of physical medicine pertaining to his specialty, prevail upon him to study the possibilities and practice them until he becomes sufficiently familiar with them to assist in the teaching of the subject to others."

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**SPECIAL GAS MASK**—The U. S. soldier shown in this Signal Corps photograph, wears the gas mask especially designed for hospital patients with head wounds.

#### CHEMISTRY

### Galacturonic Acid Prepared from Beet Pulp

►VITAMIN C can be obtained by a new process developed at the National Bureau of Standards by Horace S. Isbell and Harriet L. Frush, who have found that an important source of the vitamin, galacturonic acid in the form of a salt, can be separated from solutions containing substantial amounts of impurities. Thus, a source of the acid is made available for the synthesis of the vitamin.

In the process, beet pulp was hydrolyzed by a commercial pectic enzyme, after which the resulting galacturonic acid was separated from the residue in the form of a salt.

The Bureau of Standards scientists find that the double salt, sodium strontium galacturonate, crystallizes from the hydrolyzates of beet pulp in the highest yield, but two other salts are of value in separating galacturonic acid from the hydrolyzates of pectic substances.

The commercial use of beet pulp for the preparation of galacturonic acid presupposes a cheap source of pectic enzyme. Since these are produced in the growth of numerous molds, and occur in the culture media, they might be obtained economically as by-products in certain industries. Possible sources, the Bureau states, are the aqueous solution remaining after the separation of penicillin, or the culture media of food molds.

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