

of protoplasmic structure, which usually extends across the chromosome at that level. The type may change abruptly in passing from one region to another. In some places the protoplasm appears to have a smooth, undifferentiated structure, in others it is full of large or small cavities.

The two Carnegie Institution workers suggest that there may be qualitative chemical differences associated with the differences in structure.

Some months ago, one of the other investigators likened the disk-like structures to "temples of destiny" on the "streets" of heredity which are the chromosomes. If the analogy is to be pursued further, the inter-disk cavities found by Dr. Metz and Miss Gay might be called the rooms within the temples.

But as yet nobody has actually seen the powerful controlling goddesses who dwell in these rooms, the modern Fates, otherwise the Genes.

Science News Letter, December 29, 1934

ARCHAEOLOGY

Swedish Unemployed Rebuild Castle

WITH funds provided by the Swedish government, unemployed workers of Sweden are busily raising the walls and towers of historic Bohus Castle, of medieval fame.

Ruins of the castle have long been a landmark to travelers approaching Gothenburg from the sea. That the ancient stronghold was a center of Scandinavian military history from the time of the Middle Ages, has been familiar fact. Now the secrets of the castle, its dungeons, powerful fortifications, and state-vaulted baronial halls, are being uncovered by the relief workers.

In one tower, a small museum has been improvised by the archaeologists.

Science News Letter, December 29, 1934

In Science Fields

PALEONTOLOGY

Idaho Had its Rabbits 5,000,000 Years Ago

JACKRABBITS loped in Idaho five million years ago as they loped there today. Evidence to this end is presented by Dr. C. Lewis Gazin, in a new technical publication of the U. S. National Museum. Dr. Gazin describes four fossil hare species, three of them new, from the late pliocene, the geologic period preceding the last ice age.

Science News Letter, December 29, 1934

GEOLOGY

Oregon's Famous Crater Lake Not 1,000 Years Old

See Front Cover

BLUE Crater Lake, in the national park of that name, at last has divulged the secret of its age. Not all at once, however. A few facts it revealed to the geologist, a few more to the student of tree rings, others to the engineer. Putting two and two together, these various specialists have come to the conclusion that Crater Lake is young, not yet a thousand years old.

Crater Lake lies in a great volcanic crater, and from the floor of this crater rise two islands, results of the last puffs of volcanic action. One of these, Wizard Island, is a small volcano. On its shoulders it bears a mantle of tree life, the first that ever grew there, according to scientists. By counting the annual rings on cores of wood bored out of these trees, Dr. W. G. Vinal has found some of them to be nearly 800 years old.

Since observations by scientists and others of various volcanoes show that only a few years elapse between the

cessation of eruptions and the growth of plant life on volcanic slopes, it is estimated that the probable cessation of volcanic activity on Wizard Island occurred some 900 to 1,200 years ago. Since the rocks of the island do not show the characteristics of lava that has flowed into or through water, it is believed that the lake is younger than the island, or well under 1,000 years.

It is estimated that the lake, which now has an average depth of 1,500 feet, was built up to its present level over a period of 730 years. This estimate is based on the average annual precipitation of 70 inches at Crater Lake, an average evaporation of 50 inches a year, and an average of ten inches of precipitation lost through seepage. These figures are based on an average of rainfall and evaporation equaling the average of the past 50 years.

At present a balance appears to have been reached between precipitation on the one hand and evaporation and seepage on the other.

The lake, which has a diameter of six miles, lies 1,000 feet below the level of its volcanic rim.

Science News Letter, December 29, 1934

CHEMISTRY

Chemists Honor Discoverer Of Artificial Rubber

FATHER Julius A. Nieuwland, professor of organic chemistry at the University of Notre Dame, has been awarded the William H. Nichols medal of the New York section of the American Chemical Society. The honor, it is announced by the award committee, is for his "basic work on syntheses from unsaturated hydrocarbons." This means simply, Father Nieuwland's decade of research on artificial rubber.

Working on reactions possible with acetylene—the gas used in welding torches and in old-fashioned automobile headlights—Father Nieuwland made discoveries which subsequent research utilized in making the synthetic rubber known as duprene.

Duprene, while having the elastic properties of natural rubber, is highly resistant to the action of gasoline and other rubber solvents as the natural product is not.

While artificial rubber cannot be



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made as cheaply, at present, as natural rubber can be produced, the synthetic rubber products of the duprene type serve as a valuable check to control the price.

During wartime and by means of special cartels rubber has often sold as high as \$1.25 a pound. Now it is said that the cartels dare not raise the price of natural rubber above 20 cents a pound.

Based on America's annual consumption of rubber, it is estimated that 375 million dollars a year is saved due to the difference in the present price of rubber and what it might be if there were no artificial competitor at hand to serve as a check against price-rising.

Science News Letter, December 29, 1934

ZOOLOGY

German Breeders "Rebuild" Lost Wild Horse Species

BREEDING experiments conducted at the Munich Zoological Garden have succeeded in producing a young horse resembling in every respect one of the two extinct horse species that roamed Germany when the country was still a wilderness. (*Die Umschau* Dec. 9).

The Munich animal is a cross between the still-existing brown wild horse of the Siberian steppes and a descendant of the gray "tarpan" of southern Russia, extinct in its pure line since 1879. In both juvenile and adult coat colors and markings the "rebuilt" wild horse is said to be an exact counterpart of its vanished forebears.

At the same zoological park, success is announced in "rebuilding" the aurochs, a species of wild cattle abundant in Europe during ancient and medieval times, but extinct since the seventeenth century.

The results of these breeding experiments are discussed by Dr. H. W. Frickhinger of Berlin.

Science News Letter, December 29, 1934

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Phenology

GET SET to add another word to your vocabulary: Phenology.

Don't object that it is a "big word." It is no tougher than a lot of other scientific terms that are already part of your unconscious, fluent talking equipment, like distillation, crystallize, nebula, electron and chromosome. The first dozen times are the hardest.

Phenology is a gift of science's partnership with the New Deal. It has nothing to do with phrenology, which is a thoroughly exploded Old Deal word, nor with penology, which has to do with the prison-fate of public enemies under both the New Deal and the Old. Phenology is a convenient word meaning the study of when the flowers bloom in springtime and the fruits get ripe in fall. We have all been informal practitioners of this science all our lives; only we are now to have a handy name for it.

Phenology is given a good deal of attention in the just-published report of the Land-Use Committee of President Roosevelt's Science Advisory Board. It is of especial importance in the rehabilitation of the now depleted grasslands of the West, which must be better managed in future if we are to have beefsteaks to eat and woollen overcoats to wear.

For one of the reasons why the grasslands have been worn dangerously thin is that cattle and sheep have been grazed on them in unscientific disregard of the seasons. If they are eaten down when they are in bloom, or while the seed is still green and unshed, the animals are apt to eat not only this year's pasture but next year's unborn

grass. Their present hunger may bring them future starvation.

Phenology, in the hands of competent practical botanists, can do much to abate this danger. Such scientists will be able to say, for a given region, when the stock may be turned out to graze unrestricted, and when they should be held in the corrals yet a while, to give their dinner a chance to get ripe. They will be able to tell the stockmen when to look out for the ripening of poisonous seeds or the hardening of irritating thorns and prickles on the range-land weeds. They will know which grasses are perennials, not so much dependent on seeds, and which are annuals, which absolutely must be allowed to propagate year by year. They will have the answers to many questions which in the past have cost the livestock industry many millions because men guessed instead of knowing.

Phenology is not a new word. It has been in technical use for a long time, and even now is in popular use in British agricultural publications. It comes from the Greek, meaning the study of appearance—in this case the appearance of the flowers, fruits and seeds.

The same Greek root is in one of our familiar Christmas-season words, Epiphany, the feast commemorating the visit of the Three Wise Men. "Phaeno" in Greek means to show: Epiphany was the "showing" of the Child of Bethlehem to the world at large, as represented by Caspar, Melchior and Balthazar.

Science News Letter, December 29, 1934

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