Yet modern experts usually deny that Indians were true "hard rock" miners. They claim that the Indians could not have utilized the ore. They had neither mercury nor cyanide with which to free the gold from the rock, it is argued, and were obliged to confine themselves to the river and possibly placer sands. The stone tools are explained as having been dropped in the mines by native workmen employed by the first Spaniards. The fire and lime are thought to have been used for "blasting" by the whites before gunpowder.

But now a "gold mill" has turned up in an old caved-in shaft in Oaxaca which would make the ancient Indians "hard rock" miners, after all. It consists of a 400-pound stone mortar and a 200-pound pestle. The pestle has two holes for inserting wooden handles, and was apparently manned by two operators.

With such implements, Oliver Powers, American mining engineer who found this "mill," points out that the Indians could have freed their gold from the rock by mechanical instead of the chemical means which they lacked. Ground to powder, the ore could have been panned.

Reasoning that if this had actually been the purpose of the mill, traces of rich ore might be found nearby, he searched and found a mass of it several yards away.

In further proof that this was a gold mill is the fact that its counterparts are used in remote parts of Oaxaca now by primitive Zapotec miners. They mill about a ton of ore a month.

As women commonly do all grinding in Mexico, Mr. Powers thought it likely that women also did this work in ancient times. He easily induced a pair of Zapotecan housewives to "man" his newly-found mill and show how it was done.

Science News Letter, December 29, 1934

GRINDING GOLD

GENETICS

Internal Structure of Chromosomes Explored

Scientists Find Net-Like Web or Honeycombed Structure Within the Band-Like Disks

CHROMOSOMES, the heredity-bearing bits of living matter within cells, have had their internal structure explored to a new high point of detailed intimacy by Dr. C. W. Metz and Miss E. H. Gay, members of the research staff of the Carnegie Institution of Washington working in the laboratories of the Johns Hopkins University. They tell (*Science, Dec.* 21) of finding a net-like or honeycombed structure within or between the band-like disks, of which other scientists have recently shown the chromosomes to consist. (*SNL, Sept.* 29, *Oct.* 13, *Nov.* 10).

Dr. Metz and Miss Gay were impelled to undertake their research by observations made by other workers who have within the past few months made astonishing progress in the understanding of chromosomal makeup. Two earlier investigators who had seen these disks claimed that they frequently, if not always, occurred in pairs, with a clear space separating them. Within the past year, two other researchers had suggested that the genes did not lie within the dark disks themselves, but in the interdisk clear spaces. But the two ideas were not correlated; it was not suggested that the genes lay in the clear spaces between paired disks.

With the idea of exploring the problem presented by the existence of the disks in pairs, Dr. Metz and Miss Gay examined chromosomes by a technique slightly different from that in current use among their colleagues in chromosome investigation. They found that what had seemed to be paired, thin, dark disks were really the opposite sides of thicker, "biscuit-like" or "wafer-like" bodies, hollow within and divided up into compartments with a network or honeycomb-like complex of protoplasmic strands or walls.

The cavities or "alveoli" thus formed appear in some of the new-found thick disks to have a more or less regular hexagonal pattern, and the strands which other workers have seen stretched between disks "like strings with beads on them" appear to be really the walls of these honeycomb cavities.

There are regional differences in the makeup of the chromosome substance, Dr. Metz and Miss Gay report. Each region appears to have a definite type

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 stately vaulted baronial halls, are being uncovered by the relief workers.

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

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In Science Fields

PALEONTOLOGY

Idaho Had its Rabbits 5,000,000 Years Ago

JACKRABBITS loped in Idaho five million years ago as they lope 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