

horizon marking his tail. A quadrilateral of fainter stars above marks his body and still higher is his neck and head. In the neck you may now be able to see the star Mira, but if you had looked at this same part of the sky a few months ago no star would have been visible. Mira is a famous long period variable star, usually too faint to be seen without a telescope, but every eleven months increasing to naked eye visibility. Directly west appear the four stars that outline the corners of the Great Square in Pegasus.

The upper one is Alpheratz, in Andromeda, and the three lowest ones are part of the winged horse, Pegasus. Just north of Andromeda is the W-shaped group representing her mother, the queen Cassiopeia. Low in the northwest can be seen Deneb, all that remains of Cygnus, the swan, visible for the past few months.

The maps picture the January skies as seen at 10 p. m. on the first of the month, 9 p. m. on the fifteenth, 8 p. m. on the thirty-first.

*Science News Letter, December 29, 1934*

## PHYSICS

## Revolutionary Method of Power Transmission Urged

### Chairman of Science Advisory Board Proposes Use Of Electrostatic Generator With Vacuum "Pipes"

**E**LECTRICITY generated by enormous disks spinning in vacuum and "piped" unlimited distances along vacuum surrounded rods, carrying cheap energy from great water power developments or coal and oil fields to the centers of population, is the possibility held out by Dr. Karl T. Compton, chairman of the Science Advisory Board, in a research project recommended to President Roosevelt for federal financing.

This revolution in both the making and the transporting of electricity has been in the making for the last five years. Young Dr. Robert J. Van de Graaff is the scientist mainly responsible. The 10,000,000 volt electrostatic generator built by the Massachusetts Institute of Technology at Round Hill, Mass., is the first step toward an electrostatic generator suitable for commercial power production. The transmis-

sion system proposed, an airless pipe with a rod running through it, has probably been tested but no experimental results have been announced.

Dr. Compton in a description originally prepared over a year ago and just made available as a part of the Science Advisory Board report proposed "a radically new scheme for electric power transmission" because present methods of transmitting electrical power are limited by practical reasons of efficiency, complexity and cost to about 250 miles.

The new system should be "cheaper to install than present systems and should be capable of transmitting power to unlimited distances without appreciable loss."

It is known that there is some hope that the Tennessee Valley Authority with its large power developments may benefit from this radically new development. Several hundred thousands of dollars would finance a serious effort to develop the new scheme to the stage of useful application. The project is described as "planned and ready to start under competent supervision on short notice."

Instead of alternating current that the now-standard electromagnetic generators produce at high voltage, the new proposed generators would give out direct current at about a million volts.

The giant disks of the electrostatic machines would be surrounded by

vacuum because of the necessity of preventing tremendous sparks that might wreck the whole equipment if they were allowed to occur. The great progress that physicists have made in recent years in producing high vacuum in large spaces will contribute materially to the success of the new scheme.

If this new power production dream is realized, it will be a case of progress turning the clock back, in a sense. For the electrical machines that were used in the eighteenth-century by Benjamin Franklin and others were of the electrostatic type. They generated electricity by friction on large disks. All modern electrical generators and motors employ the principle of electromagnetics instead of electrostatics.

In the experiments with the ten million volt electrostatic generator already built, the accent has been upon its usefulness for producing artificial lightning to smash atoms and conduct research in physics. The commercial application of the scheme has been an objective about which there has been little discussion and still less definite announcement.

*Science News Letter, December 29, 1934*

## ARCHAEOLOGY

## Unearth Gold Mill of Ancient Mexican Indians

**W**HERE did the ancient Mexican Indians get their huge supply of gold?

Millions of dollars' worth of bars and jewels left America for Spain right upon the heels of the Conquest. Yet little is known of its production.

The wealthy Aztec monarch, Montezuma, told Cortez that most of his supply came from Oaxaca and other parts of southern Mexico. The Conquistadores immediately investigated his story to find Indians busy panning gold in river sands there.

Practically all of the important gold mines in Mexico today, abandoned or producing, have traditions of having been exploited by Indians in pre-Spanish times. Stone tools are even found as evidence, some hundreds of feet in the mines.

Rock was apparently broken by heating and throwing on water, fire-marks being plentifully encountered. There also appears evidence that the ancient miners used burned lime, packing it into cracks and then expanding it by slacking with water. (Turn to page 409)

## VITALISM and MECHANISM A DISCUSSION

between

HERBERT V. NEAL  
Professor of Zoology, Tufts College

and

JAMES F. PORTER

Being a survey of these opposing theories from the point of view of a scientist and a layman.

50 Cents

SHERMAN M. GOBLE  
105 W. Adams St. Chicago, Ill.

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

**C**HROMOSOMES, 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 "wafers-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

# ● RADIO

Tuesday, January 8, 4:30 p. m.

STELLAR GUESTS, by Dr. Fritz Zwicky, of the California Institute of Technology.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.