DISINTERMENT OF A GIANT

Exhibits of giant sloths, great lumbering beasts that lived in the Americas up till a few thousand years ago, are becoming fairly common in museums. The Field Museum in Chicago, however, has a sloth exhibit that is really unique. It not only displays the huge skeleton itself, but also reproduces exactly the washed gully-side in which it was found, only a few feet under the grass roots. Exhibits of this kind will be very useful in giving the public some notion of what paleontologists must contend with, before the "restored" skeleton, all nicely put together, can be proudly erected on its iron frame.

PHYSICS

With Electron Microscopes We May Observe the Unseen

Electrons Have Wavelengths Like Light But About One Thousandth That of Ultraviolet, Physicist Explains

BY USING electrons, particles of electricity, instead of light there is the possibility of building microscopes that will "see" minute objects several thousandths of the smallest size that can possibly be viewed by means of light detectable by our eyes.

The development of electron optics is one of the important achievements of modern physics. In this country and abroad considerable success has been achieved in using magnetic and electric fields in vacuums to bring to a focus electrons in much the same way that mirrors and lenses are used to reflect and refract light.

Dr. C. J. Davisson of the Bell Telephone Laboratories, New York, is a pioneer in this work. In a statement prepared for Science Service and broadcast over the Columbia Broadcasting System he gives one reason why scientists are going to the trouble of building intricate apparatus for producing electron images when perfectly good light images can be produced so much more easily.

"The highest magnifying power worked with microscopes is about 3500," Dr. Davisson explained. "This isn't because microscopes of higher magnifying power can not be made. We could just put one microscope above another if we liked and have a magnifying power of 3500 times 3500.

"Why isn't this done? It is a matter of resolution. The light from a point in the object does not appear as a point in the field of the microscope—it appears as a spot—a very small spot but nevertheless a spot. So that two points in the object, if they are very close together, will produce two spots which overlap and so appear to the observer as one spot. The points in the object are not resolved, as we say, in the field of the microscope. And if we added a second microscope to the first they wouldn't be any better resolved in the field of the second—they wouldn't be as well resolved, in fact. Now the size of these spots, and so the resolving power of the microscope, are determined in part by the wavelength of the light. The greater the wavelength the larger the spot and the lower the resolving power.

"This is why some microscopes are made to operate with ultraviolet light; the wavelength is less and the resolving power higher. Now electrons, strangely enough, have wavelengths like light—only they are very much less—of the order of one one-thousandth that of ultraviolet light. The situation is then that the ultimate limit of resolving power for an electron microscope is about a thousand times higher than for a light microscope.

"We are a long way from attaining this limit but we are on our way."

Science News Letter, May 19, 1934

PHYSIOLOGY-AVIATION

Aviators Need Carbon Dioxide at High Altitudes

AVIATORS need to take along carbon dioxide gas as well as oxygen when they fly at high altitudes, it appears from studies carried on at the Eppindorfer Hospital, Hamburg, Germany, by Prof. Hans Winterstein of the University of Istanbul.

The chief effects of high altitude are increase in the pulse rate, in the breathing rate, in the blood pressure, and enlargement of the heart; a decrease in capacity for exertion; and a decrease in the carbon dioxide in the blood which causes a subdued breathing. This last effect continues for some time after the normal air pressure is reestablished.

Of all these, only the high pulse rate and fast breathing are due to lack of oxygen, Prof. Winterstein found. They alone were eliminated when the oxygen supply was increased without increasing the atmospheric pressure.

Prof. Winterstein therefore concludes that the lack of carbon dioxide, while not the cause of all the symptoms experienced at high altitudes, is nevertheless an important factor that should not be neglected.

His experiments were carried out with a compartment specially constructed inside another compartment so that the composition of the air in the inner compartment could be changed in any desired way without changing the air pressure inside this compartment. The studies have just been reported to the German scientific publication, *Forschungen und Fortschritte.*

Science News Letter, May 19, 1934

The Smithsonian Institution has placed on exhibit one of the first automobile self-starters, a huge affair that cost $350 when it was made in 1912.