

## PHYSICS

## Took 63 Scientists To Prove Einstein Right

► THE FIRST direct experimental proof of an equation Einstein published in 1905 has been obtained by a group of 63 scientists working at the Transistor Teachers Summer School of Bell Telephone Laboratories, Murray Hill, N. J.

The equation shows that electrical conductivity takes place as a diffusion process. The scientists verified Einstein's relationship for electrons and holes. Electrons are small, negatively charged particles; holes are places where electrons should be but are missing, thus they act like positive charges.

To show the relationship, the scientists injected electrical pulses into single crystal rods of very pure germanium, then measured changes in the current. The way in which the current varied was observed with an oscilloscope, a television-like instrument.

According to Einstein's theory, the relationship between the diffusion constant and mobility of charged particles depends upon the temperature, a physical constant known as the Boltzmann constant, and the magnitude of the particle's charge. The Einstein relationship has been verified previously using colloidal particles and ions, the scientists state in the *Physical Review* (Dec. 15, 1952).

Science News Letter, January 17, 1953

## ASTRONOMY

## Most Bright Comets Are Two to Three Miles Across

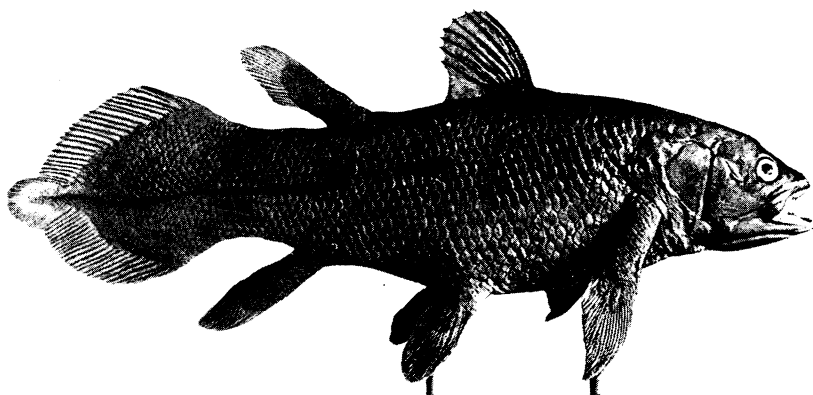
► BRIGHT COMETS that take hundreds and even thousands of years to complete their trips into the outer reaches of the solar system and return to the vicinity of the sun usually are two to three miles across, estimate Drs. Salah El-Din Hamid of Helwan Observatory, Egypt, and Fred L. Whipple of Harvard College Observatory.

These comets, with hearts of ice and frozen gases such as ammonia and methane, lose about one-half percent of their mass each time they swing near the fiery sun, Drs. Hamid and Whipple told members of the American Astronomical Society meeting in Amherst, Mass.

It was Dr. Whipple who, several years ago, suggested that the solid nucleus or heart of a comet is turned by the sun's heat into the huge cloud of gas which makes up the head of a comet. The fan-like tail, by which a comet is most easily spotted, is caused by the sun's radiation that forces the gases and dust back from the comet's head.

It is the jet action of the vaporized ices on the comets that accounts for the observed deviations of the comets from the motions expected of inactive comet nuclei, the astronomers stated. From the way in which a comet actually wanders from its proper path, Drs. Hamid and Whipple can calculate how much the comet reduces its waistline each time it visits the solar system.

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**ANCIENT FISH**—Shown here is a photograph, taken from a cast at the South African Museum, of a five-foot coelacanth, a "living fossil" fish believed extinct until its capture in 1938 and again recently.

## MARINE BIOLOGY

## Capture "Living Fossil" Fish

South African finds a coelacanth, "missing link" specimen that allows glimpse of life in the past. Strange fish scale at Smithsonian shows Gulf of Mexico may hide unknown fishes.

► THE RECENT capture in African waters of a coelacanth, a primitive lobe-finned fish of a family thought extinct for at least 50,000,000 years, has reopened a mystery buried in files at the U. S. National Museum in Washington since 1949.

Are there coelacanths or other "extinct" fishes hidden in the depths of American seas? On the evidence of a single fish scale sent to the museum from Tampa, Fla., in 1949, fish specialist Dr. Isaac Ginsburg believes that a large, primitive-type fish, unknown to science in the region, dwells in the Gulf of Mexico.

"This scale is like no other fish scale I have ever seen," Dr. Ginsburg said. It is not the scale of any of the several hundred known fish species of the Gulf of Mexico, he stated, and it is apparently of primitive structure.

It is not impossible that this is the scale of a coelacanth, Dr. Ginsburg said, but added that the real significance of the unique fish scale is that—coelacanth or not—it shows the existence of creatures beneath American waters unseen and unknown to science.

How Dr. Ginsburg obtained the mystery scale is an absorbing account in itself. A woman from Tampa, Fla., buys fish scales from fishermen to use for making ornaments. One day in 1949, she bought a gallon of scales like none she had ever seen before, about one and a half inches in diameter, the size of tarpon scales but of a different structure entirely.

She was so intrigued by her purchase that she sent one of the scales to the National Museum for identification, where it came into Dr. Ginsburg's hands.

Dr. Ginsburg and other fish specialists at the museum were mystified by the enigmatic scale. What it was from, no one knew. He wrote the woman, asking for more scales and information about the man that brought them in, what the fish looked like and where it was caught.

This letter was never answered. The woman did not realize the possible value of her "ornamental scales" to science. And so, if any of that precious gallon of scales exist today, they probably lie forgotten along with other "souvenirs of Florida" sold to tourists the country over.

Though America may or may not be the home of coelacanths, the recent capture of a five-foot, 120-pound specimen in the Indian Ocean near Madagascar does mark the second actual specimen recovered by scientists.

The first coelacanth ever brought to the attention of science was caught in 1938 near East London, South Africa, in a commercial fisheries trawl. (See SNL, April 1, 1939, p. 195.) This discovery excited the attention of scientists the world over, because the whole family of lobe-finned (crossopterygian) fish to which it belongs had supposedly been extinct for more than 50,000,000 years. The family of lobe-finned fishes are thought to have given rise to amphibians, the first true four-legged, partly terrestrial animals, of which frogs and newts are examples.

It was known from fossil remains that lobe-finned fishes had central bones in their fins, which could have given rise to true terrestrial limbs. They had functional lungs, their teeth were almost identical with those of primitive amphibians, and in other ways