training, Bell studied electricity, consulted experts, visited laboratories and picked up ideas from many sources.

The idea of the familiar telephone mouthpiece to concentrate the air waves of the voice on a diaphragm came from a laboratory at the Massachusetts Institute of Technology. Experimentation with a human ear from a dead body came from a Boston doctor. Certain fundamentals on electromagnets came from Joseph Henry, then secretary of the Smithsonian Institution and a leading electrical scientist of the day. Henry was known particularly for his work in electromagnetic induction.

### New Idea

In 1874, while still working on harmonic telegraphy, it occurred to Bell that one of his telegraph reeds, vibrating over its electro-magnet, would induce wave-shaped currents corresponding to its vibrations, and that several vibrating reeds would induce a complex wave-shaped current that would be the result of the vibrations of all.

While working on this idea, the telephone break came. It was on June 2, 1875, that one of the reeds stuck to its electromagnet and, when plucked to free it, sent through the wire the twang of a plucked reed, a tone with overtones. Bell, fortunately, was on the receiving end and immediately recognized the significance of what he heard.

"The first Bell telephone" was the result of this experience. It did not come immediately, but was far enough advanced so that Bell applied for a patent early in 1876, and received it on March 10 that year. It was actually three days after the patent was issued that the first spoken sentence was transmitted by wire. By early June, however, improved instruments were developed and placed on display at the Philadelphia Centennial Exposition.

There the discovery was quickly appreciated. Included among the judges of scientific apparatus were Sir William Thompson of England, Joseph Henry of the Smithsonian, and several outstanding university physicists. Sir William Thompson, England's leading authority on electricity, went to Boston with Bell to learn more about the discovery. He pronounced it "the most wonderful thing in America." Four years later, nearly 50,000 Bell telephones were in use in the United States.

*Science News Letter, March 1, 1947*

CHEMISTRY

## Enzyme Frees Phosphorus For Embryo Development

➤ A CHEMICAL "workhorse" which makes phosphorus available to the growing embryo has been discovered in research at the University of California.

This agent is an enzyme which liberates phosphorus from protein in the eggs of frogs, so that the embryo can use it in its development.

This is the first time such an enzyme has been reported. Now that the mechanism is known, scientists may find similar enzymes in higher animal forms, including man.

The research was done by Dr. Daniel Harris, formerly of the department of biochemistry at Berkeley and now at California Institute of Technology, who was studying the enzyme make-up of protoplasm. Using frog eggs, he noticed a big increase in the inorganic phosphorus content when the eggs were ground up. He traced the cause to the new enzyme, which is called phosphoprotein phosphatase.

The find may prove of immense value, in that phosphorus is essential to normal growth in all living tissue. Phosphorus is found in the nucleo-proteins, the basic substances of the cell nucleus; probably in chromosomes, heredity-determining units; and even in viruses.

The ovum is a storehouse of phosphorus, and the new research indicates that when the embryo is in need of phosphorus the enzyme pries it loose from the protein substances in which it is locked.

*Science News Letter, March 1, 1947*

AERONAUTICS

## Small Airports to Benefit Flying of Private Planes

➤ PRIVATE FLYING will benefit particularly by the construction of 800 smaller airports in the United States for which federal aid has been allotted by the Civil Aeronautics Administration.

With them, flying farmers will be able to go to town by air, and city business men will be able to utilize their planes in reaching smaller centers.

During the past year some 35,000 private planes have been added by the American aircraft industry to the number already in use. Many of these will be used for business purposes, and many for family flying. The growth of private flying, for which air-minded America is now ready, depends upon the availability of local airports suitable for their use.

***BELL'S BRAINCHILD—An important part of the telephone system, the main switching system at the Bell Telephone Laboratories duplicates every type of switching circuit in use in the telephone system today.***

The federal government will contribute nearly $33,900,000 for the construction or improvement of these 800 airports. Local state or other sponsors will contribute about $37,693,000. Ports will be built in all states except Alabama. None is planned for the District of Columbia. Seventy are planned for Texas, 46 for Montana, 41 for Minnesota, 35 for Kansas, and 33 for California. In only a relatively few cases will the federal contribution per port exceed $100,000, and in some cases it will be but a few thousand.

*Science News Letter, March 1, 1947*