

## SALUTE TO LUCK

Some strange stories of great discoveries scientists have made — by happy accident

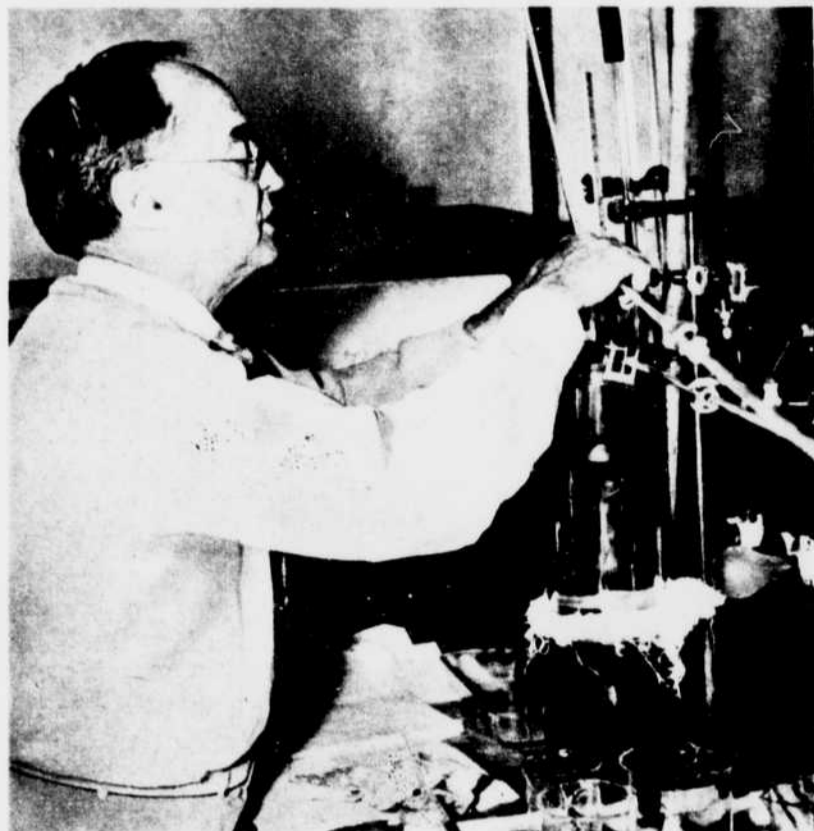
by J. D. Ratcliff

A FEW weeks ago a research man at the Rockefeller Institute announced a new influenza vaccine that may save millions of lives. Only a few weeks before, another investigator in St. Louis reported the synthesis of a new vitamin. It would stop the bleeding into the skull that accounts for more than a fourth of the deaths among the newborn.

Bravo, we say. Splendid accomplishments. The rewards of hard work by brilliant men. And this, of course, is entirely true. But luck played an important role in both of these discoveries. The flu work came only after a ferret *happened* to sneeze into a research worker's face. The vitamin research began when — *for no apparent reason* — a few chicks in a biochemical lab began to have hemorrhages.

Luck has forever been the fickle and elusive ally of the research man. At least ninety per cent of the time research work follows a pattern of deadly monotony, patiently plodding a weary path toward a given goal — and sometimes it triumphs.

But there is always the alluring



A chance headache led Dr. Whitney to his great fever cure

chance that a happy accident may make a short cut across the years — that the worker may blunder upon a fact which opens up entirely new fields. These are the fascinating cases

— the sweepstakes winners of research.

The discovery of synthetic indigo, most widely used of all dyes, is a case in point. For years chemists sought a

cheap substitute for the coloring material extracted from plants grown in India and elsewhere. Then one day a worker was stirring a simmering pot of chemicals with a thermometer. He wanted to keep an accurate temperature record. Heat cracked the thermometer, spilling mercury into the chemical stew. Contents of the pot were instantly changed into a beautiful dark blue! Mercury was the catalyst needed for oxidizing naphthalene — for making synthetic indigo!

Every textbook tells how Watt observed the lifting of a teapot lid and used the phenomenon as a basis for his steam engine; how Galileo derived the laws of the pendulum from chance observation of a swaying chandelier; and how Newton saw a falling apple and discovered the earth's gravitational pull on the moon. These stories may be doubtful, but modern science affords a host of examples about which there is no doubt.

### Suspicious Sandwich

SUCH as the discovery of saccharin. Remsen and Fahlberg were working on some routine chemistry problems at Johns Hopkins, with no thoughts whatsoever of finding a sugar substitute. But one day at lunch Fahlberg noted that his sandwiches were sickeningly sweet. Since when had they started putting sugar in bread? he wanted to know. He took another exploratory bite. This one was all right. Puzzled, he touched his tongue to his fingers. Although he had scrubbed his hands thoroughly, they seemed to be covered with an invisible powder, sweeter than any sugar!

He hurried back to the lab; began searching the beakers with which he had been working. In one of them he found the coal-tar derivative saccharin. The substance, 280 times as sweet as cane sugar, is valuable for diabetics and reducers. Its discovery was pure accident.

Then there was the lecture that Elihu Thomson, who later was to win fame for his work in electricity, gave one day to his chemistry class at Central High School in Philadelphia. Students, unaware that history was about to be made, watched with casual interest while he rapidly whirled a bottle half-filled with liquid. They saw that the centrifugal forces pulled the liquid up the side of the bottle. But they did not see something else that Dr. Thomson was watching excitedly.

By mischance the liquid in the bottle contained some sediment. What amazed Thomson was that the whirling forces separated this sediment from the liquid. Why couldn't this principle be used to separate substances of differing densities? It could. There were scores of applications. The cream separator resulted; and so did the centrifuges used to clarify glues, varnishes and serums. Luck again!

Many of the leaps forward that medicine has taken can be traced to luck. The sneeze of the ferret already mentioned was proof positive that flu in animals and in men was one and the same; for the worker who breathed in that sneeze came down two days later with the disease. Thus it was possible to study the disease in research animals in the laboratory, and eventually to discover a preventive vaccine.

And until Henrik Dam, Danish research man, noticed that his chicks were bleeding to death, for no known reason, no one had suspected that an essential clotting factor in blood might be linked to the presence of a vitamin in the body. Now that this elusive secret has been discovered thousands of lives can be saved.

One of the nicest examples of the intervention of luck occurred a few years ago in the General Electric Laboratory. Two workers, McArthur and Eldridge, were investigating problems of short-wave broadcasting. Day after day, while they tinkered with a new high-frequency tube, they complained of headaches and the usual feverish symptoms of the common cold. Dr. Willis Whitney, director of the lab at the time, investigated. While the tube was turned on he noted that body temperature of the men near it rose to 102!

### Artificial Fever

WHITNEY'S head buzzed with the excitement of this thing. He called in Dr. Charles M. Carpenter, a medical man, and they went over it together. In the first place, what was fever? Simply an effort of the body to throw off infection. They knew that Julius Wagner-Jauregg in Vienna had treated paresis patients by deliberately infecting them with malaria. The malaria-induced fever sometimes killed the heat-sensitive syphilis microbe. The idea worked well in many cases. In others death resulted.

Wouldn't an artificial fever that could be perfectly controlled get better results, Dr. Whitney asked? Tubes were built into cabinets which would shoot warming waves through a sick man. Temperatures could be lifted as high as 106 and held there for any length of time. A chance observation has opened up a whole new field of healing, valuable in the treatment of a number of diseases.

A leaking can helped Alfred Nobel, Swedish chemist, to perfect dynamite. Nobel was working with nitroglycerine and searching for a way to tame this violent but useful stuff. Nobel's brother had died as the result of a laboratory explosion; other blasts had wrecked trains and ships.

One day the chemist saw that some nitroglycerine had leaked out of a can, spilling onto some sand. A jelly-like stuff resulted which was powerful, yet easy to handle. This was the first crude dynamite.

A similar lucky accident gave Charles Goodyear the secret of vulcanizing rubber. For years he had sought a way to make rubber hard, durable and elastic. Then one day a blob of crude latex and some sulphur

(Continued on page 15)

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