

## MISTAKES THAT PAID DIVIDENDS

Some of the world's greatest discoveries that permit you to get more pleasure and value out of modern life — were really mistakes or accidents. They were made by men who realized that while they had failed to attain a sought-for goal, they had nevertheless produced something worthwhile.

Scientists give the name "serendipity" to such mistakes. The word dates back to fairy-tale days when the Three Wise Princes of Serendip "always made discoveries, by accident or sagacity, of things they were not in quest of."

In an eighteen-year-old boy in 1856 had not failed in his ambitious task of making synthetic quinine and had not analyzed the black crystals which formed in his test tube, the coal-tar dye industry would not have been born. But William Henry Perkin was curious. He found that the crystals, dissolved in

boiling water, produced a beautiful purple liquid. He dipped strips of silk into his purple liquid and they sopped it up. When the color did not wash out and did not bleach when exposed to sun, Perkin knew he had produced the world's first aniline dye, forerunner of the colors that make our clothes beautiful today.

While printing and photography owe much to the research of a French painter and physicist, Louis Daguerre, they owe considerably more to his carelessness. In the 19th century, there was no photography as we know it today: plates had to be exposed for hours in order to secure a picture. One day Daguerre stored an underexposed plate in a closet where he had absent-mindedly left an uncovered saucer of mercury. The mercury vaporized becoming a reagent. It brought out the image on the discarded plate.

Daguerre's accidental discovery resulted in the first commercially successful form of photography. Today it is known as the Daguerreotype.

Similarly we owe the colored advertising plates in our magazines to the accidental observance one day by a Swedish apothecary Karl Scheele, of the action of light on silver chloride.

Charles Goodyear conducted rubber experiments for years, yet not until he accidentally spilled a rubber and sulphur mixture onto a hot stove did he get the result he was seeking. While the inside of this patch of rubber was seared by too much heat, the outer edges were firm, soft and pliable.

Further tests showed that Goodyear's process, which he called "vulcanizing" in honor of Vulcan, Roman god of fire, produced sheet rubber which had lost its stickiness. As a result, the sap of the hevia rubber tree today yields overshoes, raincoats, hot-water bottles, tires, insulation materials and thousands of other useful articles which do not crack in winter or melt in summer.

The Discovery — or rather the rediscovery — of blotting paper was also an accident. While blotting paper was known as early as 1460, it was virtually unused until the early 19th century when an Englishman in a Berkshire mill forgot to add sizing materials to a vat of paper. The entire run was unsalable. The frugal mill proprietor tried to salvage some of the soft paper for his own use, but the ink from his pen spread so rapidly through the fibers that he gave up trying to write.

As he surveyed the messy sheets, it flashed through his mind that this paper would absorb ink, thus replacing the dry sand then in use. He advertised his discovery as "blotting paper," and not only sold the entire lot but continued to receive orders for more.

Although the beautiful colors of marble seen in modern buildings are natural, more than six hundred different hues are permanently imparted to the stone by dyes. The idea of coloring marble was accidentally discovered in an experiment to

make barrel staves impervious to petroleum. The experimenter used a piece of marble to hold in place the barrel he was working on. When through, he pulled out the marble wedge and, although he noticed it was stained a beautiful color, he threw it in scrap heap. A month later he picked up the wedge again. Upon breaking it into pieces he found that the color had penetrated. That accident was the beginning of experiments which have given us the beautifully tinted stones we know today.

In our own time there is the wonder of shatterproof glass, discovered accidentally when a French scientist, Edouard Benedictus, dropped a bottle on the floor. The glass broke into fragments, but did not scatter. M. Benedictus wondered why. He found that the bottle had contained collodion, which when evaporating had left on the inside a thin skin strong enough to hold the broken pieces together. From this accident he conceived the idea of making a "sandwich" of two pieces of glass

with a sheet of nitro-cellulose between.

Our American planes owe much of their superiority to another accident. George W. Lee of Binghamton, New York, a collar-button manufacturer, decided to make aluminum snap buttons. In adjusting his machinery to the new device Lee made the punch longer than he had intended. To his surprise his machine produced a long aluminum tube instead of a flat button, for the soft metal was forced by pressure through the narrow opening between the punch and the die. By accident, Lee thus invented the process of fashioning seamless tubes from thin metal, one of the greatest discoveries in metal working.

When Lee could find no immediate practical application for his invention, he sold it to a bicycle manufacturer, Leslie Hooker, who used it to make such things as guards for women's hat pins, cases for physicians' thermometers, and automatic pencils. Then one day he was asked to make a radiator with a maximum of cooling surface and

a minimum of air resistance for a racing car.

Hooker borrowed an idea from the bees. He laid hundreds of small seamless copper tubes horizontally into brass shell. The tubes had six sided ends so that they fitted together closely and could be soldered into a single unit. The open ends of the tubes faced the onrushing air. In contrast to the ordinary radiator, the water did not flow through the tubes but around them, and Hooker's invention made automobile history.

Penicillin was discovered by accident. So were many of our new lightweight metals and our plastics. Hundreds of similar mistakes are contributing to greater safety

and comfort in our lives.

Industry, realizing the value of such accidental discoveries, is spending 200 million dollars annually to unearth more of them. Chemists and research workers are not given a definite problem: instead they are told to find out everything they can about a particular material. Usually when they have finished they have found new uses for the basic product.

That is why American industry is "serendipity"-minded today, searching constantly for the secret of making bigger and better things at a price low enough to put them within reach of millions. — *by Josephine M. Opsahl, from Coronet.*

## KNIVES AND FORKS

An American missionary who had spent some time in Borneo and vicinity was asked whether he had been able to get the natives to give up cannibalism.

"No," he admitted, "I did not quite succeed in that, but I did persuade them to start using knives and forks." — *Carol Long.*