

CURIOSITY

DR. SIMON FLEXNER once was talking with the late George Eastman. The Kodak magnate told the Princeton scientist that he meant to devote his great fortune to the promotion of education in *useful* subjects.

Doctor Flexner's eyebrows lifted and he asked whom the manufacturer thought the most useful living worker in science.

"Marconi," said Eastman instantly.

The scientist astonished Eastman by replying that Marconi's share in radio was all but negligible.

"The real credit for everything that has been done in the field of radio belongs," Doctor Flexner told him, "as far as such fundamental credit can be fixed, to Prof. Clerk Maxwell, the Scotch physicist, who, in 1865, carried out certain abstruse and remote calculations in the field of magnetism and electricity. Other discoveries supplemented Maxwell's theoretical work. Finally, in 1887 or 1888, the remaining scientific problem—the detection and demonstration of the electromagnetic waves which are the carriers of sound by wireless—was solved by Heinrich Hertz, a worker in Helmholtz's labora-

tory in Berlin. Neither Maxwell nor Hertz had any concern about the utility of their work; no such thought entered their minds. The inventor in the legal sense was, of course, Marconi, but what did Marconi invent? Merely the last technical detail, the already obsolete receiving device called a coherer."

Doctor Flexner retold this incident recently at the opening of the Squibb Institute for Medical Research at New Brunswick, New Jersey.

Mr. Eastman had wanted to know what Doctor Flexner intended to prove by this.

That curiosity, not utility, was the master key to human knowledge, the doctor said; curiosity which may or may not result in something useful. But the less that curiosity is asked to justify itself day by day, the more likely it is not only to contribute to human welfare but to the equally important satisfaction of the human mind.

"Hertz and Maxwell invented nothing," he said, "but it was their apparently useless theoretical work which was seized upon by a clever technician. Who were the fundamentally useful men? Not Marconi." Other clever techni-

cians with no thought but use would have seized on Maxwell's and Hertz's discoveries if there had been no Marconi. But without Hertz and Maxwell, with no thought of use, the technicians would have had nothing on which to work.

Doctor Flexner told the Rochester manufacturer of other cases in point, including Michael Faraday, son of a blacksmith, who made the fundamental discoveries in electricity, and Paul Ehrlich.

With the return of Alsace-Lorraine to Germany after the war of 1870, the German Government reopened the great university at Strassburg. Its first professor of anatomy was Wilhelm von Waldeyer. In his first class was an inconspicuous youth of seventeen named Ehrlich. Waldeyer noticed that the boy was a bad student, except at the microscope; there he worked overtime. And curious blobs of color of every shade spotted his desk. The professor asked him what he was doing.

In his reminiscences, Waldeyer describes how this student, "in his first semester, supposedly pursuing the regular course in anatomy, looked up at me and blandly remarked: *'Ich probiere,'*" which might be translated as "I am just fooling."

Waldeyer wisely let him fool, and Ehrlich's marks were so poor generally that he prob-

ably would not have been given his degree in medicine if the faculty had not been convinced that he would never practice.

"I do not suppose the idea of use ever crossed Ehrlich's mind," Doctor Flexner went on. "He was interested. He was curious. He kept on fooling. Of course, his fooling was guided by a deep instinct. What resulted? Koch and his associates established the new science of bacteriology. Ehrlich's experiments were now applied by a fellow student, Weigert, to staining bacteria and thereby aiding in telling them apart. Ehrlich himself developed the staining of the blood film with the dyes on which our modern knowledge of the morphology of the blood corpuscles, red and white, is based. Not a day passes but that in thousands of hospitals the world over his technique is employed in the examination of the blood. Thus the apparently aimless fooling in Waldeyer's dissecting room in Strassburg has become—without anyone's suspecting the result—a main factor in the daily practice of medicine."

Doctor Flexner dislikes the word "use"; it shackles the inquiring mind. "What Rutherford and others, like Bohr and Millikan, have done out of sheer curiosity in the effort to understand the construction of

the atom has released forces which may transform human life, but this ultimate and unforeseen and unpredictable practical result is not offered as a plea of justification. Let them alone. The waste, I admit, looks prodigious. It is not really so. All the waste that could be summed up in developing the science of bacteriology is as nothing as compared to the advantages which have accrued from the discoveries of Pasteur, Koch, Ehrlich, Theobald Smith and others."

Kipling's soldier roamed "for to admire an' for to see. . . . It never done no good to me, but I can't drop it if I tried"; and Doctor Flexner would have the scientist do the same. In celebrating curiosity for curiosity's sake, he seems to deny Francis Bacon.

Three hundred years ago, Bacon said: "If many useful discoveries have been made by accident or when men were not seeking for them, no one can doubt that when they make it their business to seek, and that, too, by method and order, they will discover far more."

But there is no disagreement here. Doctor Flexner does not mean that Boss Kettering should not have applied himself to inventing so vulgarly useful

a gadget as the self-starter. He means that universities and institutes should not be endowed by "practical" men to invent self-starters. Their work is to explore all knowledge for its own sake. Given more knowledge, its practical application will take care of itself.

In seeking more knowledge, science does proceed on Bacon's design that men will find more if they look for it diligently and with method. But it is the function of industry, not of learning, to put that knowledge to work. Industry is doing that.

There were only 500 industrial research laboratories in the United States in 1920, employing 6600 persons and spending \$25,000,000 annually. There are nearly 1800 today, employing 32,000 persons and spending \$200,000,000. Many industries maintain research laboratories to solve their common problems.

For \$6000 a man-year, business may hire applied research at the Mellon Institute on a fellowship basis. But if a good five-cent cigar still is America's great need, it is a problem for the industrial-research man, not for the universities. — *Condensed from The Saturday Evening Post, Jan. 21, 1939.*

