John L. Baird with his sending apparatus in London sending a dummy by television to America just before he sent a living face. Left: Receiving the image, seen in left side of cabinet

Attic Inventor's Magic Eye Sees Across the Ocean

By H. C. Davis

TELEVISION sets for the home went on sale in London recently at $32.50 each. Back of that fact lies one of the most inspiring stories in the annals of modern invention.

Less than three years ago John L. Baird, a young Scotch inventor, working on a system of television, was walking the streets of London, sick and almost penniless. His home and workshop was a cold little attic; his laboratory apparatus consisted of soap boxes and tin cans tied together, and old bicycle parts. Desperate need of equipment to continue his experiments had driven him to sell a half interest in his invention for a few pounds.

That money went quickly. With but two pounds left and no prospect of more, he happened to meet a long-lost friend. That chance meeting saved Baird's invention. The friend was Captain O. G. Hutchinson who, in Hartsdale, N. Y., a few weeks ago, was on the receiving end when Baird, from his London laboratory, sent the first television picture of a living image flashing across the Atlantic. Now he is arranging for the introduction of the Baird television set into American homes.

Baird, now in his late thirties, was born in Scotland, the son of a Presbyterian minister. When twelve years old he saw his first motion picture show and left the theater with his boyish mind whirling.

If one mechanical invention made photographs move, why couldn't another, he asked himself, make them talk? He set himself to work on a "talking movie." It led him, through a score of heartbreaking years, to television.

The boy, never robust, spent long hours convincing himself that in the development of light-sensitive cells lay the secret of talking films. He improvised a laboratory and began experimenting, first with selenium cells.

His hands were terribly burned in handling an acid substance, and necessity forced him to work in an engineer's drafting room. The job paid his tuition in the night school of engineering in the University of Glasgow.

DURING the World War the young engineer, rejected for military service because of ill health, invented the "Baird Under-Sock," made of chemically treated cloth, for the relief of trench-foot. With his first working capital he was about to set up a laboratory when he fell seriously ill from overwork. Seeking health, he went to Trinidad in the West Indies, and lost all his money in a jam factory.

Back in London, he rented an attic in the Soho district and assembled his contraption of soap boxes and biscuit tins, and so forth. There he lived and labored, starving himself to buy equipment. One day, just as his experiments seemed to promise success, he learned that a German inventor had beaten him by years to the secret he sought, and held all existing patents on the speaking movie!

A staggering blow, but it failed to daunt him. His experiments with light-sensitive cells had led him into the possibilities of "seeing in darkness," and on that he concentrated his toil and study. One evening, sitting on the roof of his attic, watching the sun set over London, he remarked to a friend:

"I wonder if the infra-red rays, the invisible rays which lie just beyond the red that we see, could not be used to bring about sight in darkness? We may be able to find some way to use those rays."

He went into his laboratory, ate his usual meal of a bun and tea—then went to bed for a week! Partly from the necessity of conserving his strength, partly to keep warm, he did all his heavy thinking in bed in those days. At the end of the week his friend returned. Baird greeted him with a slow, cautious statement that he had "something interesting to show." A man on the floor below was a ventriloquist. From him Baird borrowed a papier-mâché dummy and stood it in the pitch-black laboratory. Then in an

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adjoining room he threw a switch and the dummy's face appeared on a screen before the visitor's surprised eyes! The first step in television had been accomplished. As a result of this experiment the inventor likewise produced his so-called "noctovision," by which a beam of light can penetrate fog.

Baird continued working feverishly until, late in 1925, he almost reached the end of his string. Then it was that he encountered Captain Hutchinson. The Captain recalls:

"I was shocked at his condition. His clothes were patched and worn; his shoes were full of holes. His hair hung to his shoulders. He was weak from exhaustion, and hadn't eaten a full meal in months."

AIDED by Hutchinson and with new equipment, Baird had a television apparatus ready for demonstration in six weeks! British scientists had been skeptical, so when Baird, in January, 1926, invited members of the British Royal Institution to his first demonstration, he hoped for only a few.

Actually forty distinguished scientists and engineers crowded, by relays, his little attic and saw their own faces transmitted.

The scientists marveled at his contraption of soap boxes and biscuit tins, bicycle chains and sprockets, lamps and lenses, as shown in last September's POPULAR SCIENCE MONTHLY. He had made a set of rapidly revolving disks to focus the light from a face into the transmitting apparatus. One disk fitted with lenses revolved 500 times a minute in front of the subject's face. A second disk, revolving 5 000 times a minute, caused an interruption of the light traveling from the lenses, and the interrupted rays where led into a colloidal cell. The light impulses passing through the disks were converted into electrical impulses which were led into a radio transmitting apparatus. The receiving set was in effect the transmitting device in reverse.

Baird's next step was to devise a cell that would be sensitive to a very weak reflected light. But how? Hear him tell it:

"Dissatisfaction with the selenium cell and lens made me feel that television demanded something more refined. The most sensitive optical substance known is the nerve of the eye, called the visual purple.

"I made the rounds of the hospitals. Finally I learned that a surgeon had removed the unimpaired eye of a boy. I pleaded until I got it. Then I jumped into a taxicab, went to my laboratory, and in a few minutes had the eye in my machine. The essential image for television passed through the eye within half an hour after the operation."

The eye was "dead" a few hours later, but the study of it enabled Baird to produce an extremely sensitive photo-electric cell, the composition of which he has kept secret.

EARLY in February of this year, Baird sent the first television pictures of a living, moving face from his London laboratories (not an attic) to the home of R. M. Hart, a radio amateur of Hartsdale, N. Y. History was made. The soap box contraption was placed with ceremony in the British Science Museum, between the first steam railroad engine and the Wright brothers' first airplane.

Baird's success has brought him at least one luxury—an office boy whose sole duty is to retrieve his spectacles, without which he practically is blind, from wherever the absent-minded inventor leaves them. And now he is setting himself to tackle a new problem. He firmly believes that the Einstein theory of relativity is "a fallacy and based on a fallacy." He hopes to prove it!