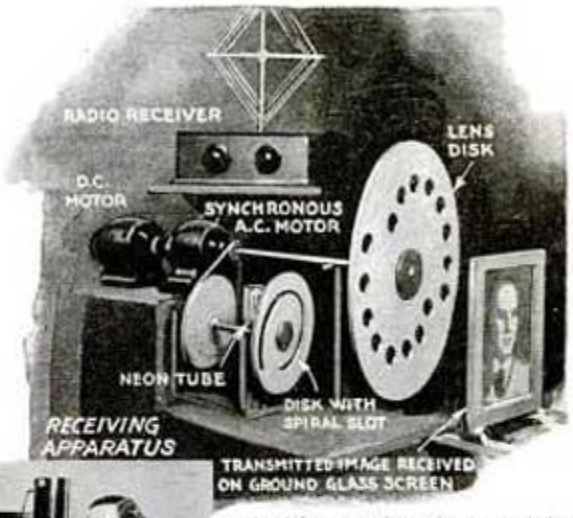
Next We'll *See* to Paris

So Says John Baird, Who Brings His New Television System to America to Prove He Can Do It

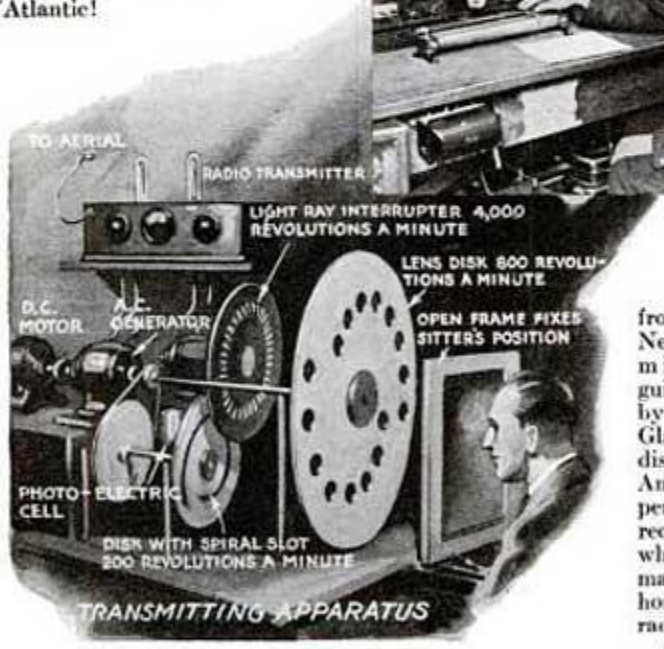
By GEORGE LEE DOWD, JR.

LESS than five years ago John L. Baird, a young Scotch inventor, labored in an attic room in the Soho district of London, with few possessions save the dream of achieving electrical vision at a distance. His experimental apparatus he had made with his own hands from derelict odds and ends — old bicycle sprockets, lenses from bicycle lamps, tin cans—mounted on a framework of old sugar boxes, and tied together with string and sealing wax.

Now, this same young inventor is coming to the United States to demonstrate the first transmission of human faces and other moving images by radio across the Atlantic!



Right: The Baird radio vision receiving apparatus. Light from a neon tube, controlled by incoming signals, passes through lenses in a rotating disk, reproducing the transmitted image on a ground glass screen. Below: The inventor of the apparatus, J. L. Baird, in his workshop in London



In the transmitter rotating disks divide the face into patches of light of varying intensity. These the photo-electric cell translates into correspondingly fluctuating electric current

While engineers of the Bell Telephone Laboratories have been astonishing America with the first practical demonstrations of distant vision by wire and radio, as described recently in POPULAR SCIENCE MONTHLY, Baird, in England, has been achieving similar wonders. He has established what has been called the world's first television transmitting station—Station 2TV, licensed by the British Post Office. A few weeks ago he surpassed the American 200-mile record of television from Washington to New York, by transmitting distinguishable moving faces by wire from London to Glasgow, Scotland, a distance of 438 miles. And he is reported to be perfecting a television receiving apparatus which, at moderate cost, may be installed in a home like an ordinary radio receiver.

Already he has succeeded in sending the "sound of a face" some three thousand miles across the Atlantic. Recently, as he sat before his "televisor" in London, scratchy sounds produced by signals carrying the image of his face were recorded in New York.

A year ago so poor that an attic bedroom-laboratory was his only available stage for a demonstration before members of the Royal Institution in London, he comes to this country with the backing of a $625,000 company—which, it is reported, plans to establish a number of television stations here and in Europe.

Baird is one of the remarkable figures in invention today. For, working virtually single handed, he has solved an enormous problem which elsewhere has required the elaborate apparatus of great research laboratories and the coöperation of hundreds of expert minds. And in basic principle, the television system which he has worked out is strikingly like that which required the services of nearly a thousand men in the recent Washington-New York demonstration.

In fact, he has made use of the same general theory which has been followed, with varying success, by virtually every recent experimenter in television, including such men as C. Francis Jenkins, of Washington, D. C.; Dr. E. F. W. Alexanderson of the General Electric Company research laboratories, and Edouard Belin of France. Like them, he has developed his own method of using the light-sensitive photo-electric cell to scan the face or scene to be transmitted. The face is divided into tiny patches of varying light and shade. The light of each of these, in turn, is translated by the photo-electric cell into corresponding electric impulses, and these impulses in succession are sent by wire or through the ether. At the receiving end they are translated back into light and patched together into a mosaic likeness of the original.

The problem of television always has been to speed up this process to the point where, to human eyes, it will give a truthful effect of motion. This requires the scanning and transmission of an entire face or scene at least sixteen times a second—the speed of motion pictures.

In this, Baird has gained success first, by the invention of an extremely sensitive photo-electric cell, the exact nature of which he has kept a guarded secret; second, by an (*Continued on page 135*)

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ingenious and original method of scanning.

You will recall that in the method employed to send the face of Herbert Hoover from Washington to New York, the face was scanned by an arc light beam, which swept across it in a series of fifty parallel lines. This was accomplished by means of a whirling disk punctured with a spiral of fifty holes, through which the beam passed.

BAIRD employs not one, but three rotating disks. Instead of sweeping a narrow beam across the face in a succession of lines, he illuminates the entire face with filament lamps of 300 candlepower. The first of his disks, turning 800 revolutions a minute, contains sixteen lenses placed in staggered arrangement so that each focuses on the photo-electric cell a different section or strip of the face. The lenses are arranged in two sets of eight, dividing the face into eight strips. But interposed between the lens disk and the photo-electric cell is a second disk punctured with numerous apertures and turning 4,000 revolutions a minute. These swiftly moving slots interrupt the light rays from the lenses, and thus have the effect of breaking the image into smaller fragments. To give a still finer grain to the image, a third disk with a single spiral slot rotates at 200 revolutions a minute between the second disk and the light-sensitive cell.

The combined effect of this complicated arrangement of revolving disks is to cause the image of the face to fall upon the photo-electric cell in a succession of tiny squares of light of varying intensity. Instantly the cell translates them into a fluctuating electric current of corresponding intensity. This changing current then is amplified and transmitted.

Picked up at the receiving station, the current is amplified again and led to a tube filled with neon gas, causing it to glow with varying intensity, corresponding to the fluctuations of the current. The light from the tube passes first through a disk with a spiral slot, then through lenses in a second rotating disk. Both disks are exact duplicates and rotate at precisely the same speed as the corresponding disks in the transmitting station. The lenses focus the successive patches of light on a ground glass screen, thus building up and reproducing complete images of the original face. All this is done so rapidly that to human eyes not only does the succession of light patches become a complete image instantaneously, but the successive images themselves blend together into lifelike motion.

AS IN the Bell Laboratories television system, the entire success of this method depends on the perfect timing, one with the other, of the rotating disks in the transmitting and receiving stations. This demands that the motors which drive the disks in both stations be perfectly synchronized. Baird accomplishes this by coupling to the transmitting apparatus an alternating current generator, from which current is transmitted to the receiving station. There it is amplified and controls the speed of a synchronous alternating current motor.

Baird is confident that television service over the sea soon will be established on a commercial basis. Faces, he says, will be flashed across the Atlantic on a wave length of forty-five meters. Of his visit to America, Baird said recently:

"This will be almost the last phase in the development for world-wide broadcast purposes. All that will remain will be the actual perfection of a seen image, which is approaching completion. Improvements which I have effected make it mainly a question of greater power to be able to see a person or scene thousands of miles distant."

Popular Science, September 1927