

many years before the first glimmering of a practical method would be developed. We were therefore agreeably surprised on making a visit to Mr. J. L. Baird, at Motograph House in Upper St. Martin's Lane, London, W.C., to find that he had installed there a transmitter and a receiver which prove that he has made great progress in solving the problem. We saw the transmission by television of living human faces, the proper gradation of light and shade, and all movements of the head, of the lips and mouth and of a cigarette and its smoke were faithfully portrayed on a screen in the theatre, the transmitter being in a room in the top of the building. Naturally the results are far from perfect. The image cannot be compared with that produced by a good kinematograph film. The likeness, however, was unmistakable and all the motions are reproduced with absolute fidelity.

The general principle utilised by Mr. Baird is not difficult to understand. The image of the object to be transmitted is made to traverse a cell sensitive to light. This cell modulates an electric current. When the light on the cell is intense the current is large and when the cell is in shadow it is weak. At the receiving station the current controls a source of light which traverses a ground glass screen which moves in exact synchronism with the image at the transmitter. The spot of light is therefore bright when the light on the transmitter is intense and dark when it is in shadow. The light from the image moves over the screen about ten times a second. Hence, owing to the persistence of vision, a complete image is obtained.

Just as in the early kinematograph films, there is a

constant flicker, but this will doubtless be got rid of in whole or in part in the new Baird 'televisor.' This is the first time we have seen real television, and, so far as we know, Mr. Baird is the first to have accomplished this marvellous feat. He had the first inkling of the method two years ago when he successfully transmitted shadows by electricity. We were told that a similar method of transmitting shadows has been independently devised in America. But his present method is as superior to the shadow method as a photograph is to a skiagraph.

It is natural that Mr. Baird and his partner, Capt. Hutchinson, should contemplate a great future for television. They are taking steps in the direction of having a broadcasting system of television for London. Every possessor of a 'televisor' will be in a position to see on his screen the performers in operas and plays as well as hearing them. They expect to make a start in this new system of broadcasting next year. The new discovery will in no way interfere with the ordinary British broadcasting. The Post Office officials, seeing the probable advent of a new British industry, regard the scheme with benevolent neutrality.

Those of us who remember the advent of the telephone in 1876, and remember also how little its importance was then realised, will hesitate to criticise this new invention. There is endless scope for improvement. Mr. Baird, who, like Graham Bell, is a Scotchman, has been so extraordinarily and so rapidly successful in the past that we have great hopes that he will soon perfect his invention to the commercial stage. We wish him every success.

A. R.

Solar Surveys.

OUR Supplement this week will be read with great interest by specialists in solar research, and also by a considerable number of other readers to whom Dr. Hale's name is closely associated with the Mount Wilson Observatory and the progress of astrophysics. Since 1923 Dr. Hale has been engaged in perfecting an instrument for *visual* observation of the sun in monochromatic light; and the spectrohelioscope, as he calls it, is now permanently installed at his new solar laboratory at Pasadena. The recent increase of solar activity shown by sunspots, flocculi, and prominences has afforded him ample opportunity for testing the capabilities of the instrument. Its performance appears to have exceeded all expectations, and a rich harvest of results may be anticipated, especially with respect to observations of the sun's upper atmosphere and the hydrogen vortices registered in the light of $H\alpha$. These hydrogen vortices, which have been studied almost exclusively since their discovery in 1908 by Dr. Hale and his colleagues at Mount Wilson, are bound up with the problem of the nature of sunspots and their unexplained reversal of magnetic polarity at each spot minimum. The development of the spectrohelioscope, its uses as a powerful instrument of research, and a survey of results obtained to date are reviewed by him in this week's Supplement.

It is a matter for comment that the development of the spectrohelioscope was delayed by slight circumstances for more than fifty years. As Dr. Hale reminds us, the pioneers of solar spectroscopy, such as Janssen,

Lockyer, and Young, were fully aware of the principle involved; Young, indeed, constructed a spectrohelioscope for seeing the prominences at the sun's limb, but it was never applied for observing phenomena on the disc. The wide slit method for prominence work, introduced in the meantime by Zöllner and Huggins, was so successful that a narrow oscillating slit—one of the essentials of the spectrohelioscope—was abandoned, and later experiments, then directed to *photographic* registration in monochromatic light, resulted in the spectroheliograph by Hale and the velocity spectrograph by Deslandres. Thus the need for a visual survey of the sun's atmosphere projected against the disc persisted until the construction of Dr. Hale's spectrohelioscope.

Of the many interesting observations, described and beautifully illustrated in Dr. Hale's characteristic manner, attention may be directed to those by which the observer views in rapid succession the ascending and descending portions of the same hydrogen flocculus and the sunspots which may happen to lie beneath. Dr. Hale's enthusiasm and inventive skill are now being directed to the making of a modified form of spectrohelioscope which he hopes may be within the reach of amateurs. If these hopes are realised, the chances of detecting the exact moments of critical outbursts on the sun will, as he says, be greatly multiplied, and such observations should prove most valuable in determining the true relationships between solar eruptions and terrestrial magnetic storms.