MASS RADIOGRAPHY SERVICE IN DUBLIN.

By M. G. MAGAN.

Mass radiography has come to infer the examination of the chests of large groups of people by means of the x-ray. Its field of investigation is the population at large, pursuing its ordinary occupations and presumed healthy.

The Dublin Corporation X-Ray Centre was opened last year with a staff consisting of a Medical Director, three radiographers and four clerks. It was equipped with a Kodak fluorographic unit, a Newton and Wright four-valve transformer unit, and a Dynamex rotating anode tube. This apparatus is at present being used part-time for mass radiography and part-time for taking the routine full size radiographs for the Corporation clinics; two days in each week are devoted to the latter work, the remaining days to mass radiography.

Any Dublin citizen can have a miniature chest x-ray, as a preliminary diagnostic measure, free of charge. Surveys of groups of persons from factories, shops, technical schools and other educational establishments are being constantly carried out. There are also open sessions which any individual may attend, whether he is sent by a doctor or comes on his own initiative. If an abnormality suggesting the need for further investigation is detected the examinee can have the benefit of clinical examination by a chest physician.

The immediate aims of any scheme of mass radiography may be summarised under three headings:

I. The diagnosis of early tuberculosis, if possible, before the advent of definite symptoms and physical signs, at a stage when prompt and co-operative treatment will greatly expedite rapid recovery; this mainly applies to the young adult population.

II. The revelation of cases of long-standing pulmonary tuberculosis: Such patients often masquerade as chronic bronchitics and must be a strong factor in spreading the disease. Many individuals have been found in our surveys suffering from fibrotic phthisis in their 40's and 50's. A considerable percentage of them are sputum-positive. Though it may not be possible to do much for these individuals themselves, at least they can be instructed in proper hygienic measures so as to avoid spreading the disease, and their contacts can be examined and as far as possible removed from danger.

III. The detection of miscellaneous significant chest conditions: these include unresolved pneumonias, neoplasms of the mediastinum and lung. Early diagnosis by mass radiography, coupled with the great advance of chest surgery, should render the latter more amenable to cure than was hitherto the case.

The extension of such a service with these aims to the country at large would be one of the greatest measures of preventive medicine ever envisaged. If everyone were x-rayed once a year, apart from the personal benefit to each individual, the Health Authorities would at least be able to take adequate measure of the disease they are fighting.
The practical principles underlying the apparatus and methods of mass radiography as in use today are not new. The idea of taking a photograph of the screen image was developed by Bleyer in 1897. The great advances in the diagnosis of pulmonary lesions brought about by simple radiography had set thoughtful physicians speculating early on its possible use to exclude chest disease in large groups. By 1912 Calwell had not only foreseen mass radiography on a national scale, but had forecast the means by which it could be carried out. It required, however, some twenty more years of technical improvement in lenses, screen and films before mass radiography became a practical method of diagnosis.

The first big surveys, using 35 mm. film, were made by D'Abreu in Brazil in 1936. During 1937 and 1938 Danish and English workers were trying out 35 mm. methods. Very remarkable from the point of view of numbers and organisation were the surveys carried out in Germany about this time, when as many as 640,000 persons were examined within a period of three months.

It was not until 1943 that the British Civilian National Scheme began to operate. To-day there are some 26 civilian units functioning. Those of us who have had the privilege of working in that service can testify to the efficiency of its organisation and high technical and diagnostic ability. Dr. Peter Kerley, Air Commodore Traill, Miss K. C. Clarke, Dr. Courtney Gage, and Dr. D'Arcy Hart have been the chief architects of its success.

Since 1939 we have had in operation in Éire a special 35 mm. miniature radiography apparatus, adapted by Dr. McDonagh; this has been in continuous use for the routine chest work of Sir Patrick Dun's Hospital, and I understand that its economy in film was of the greatest value during the years of short supply. It was not, however, intended for and has not been used for ordinary mass surveys.

Here it might be well to consider briefly the methods of accomplishing mass radiography, with their attendant advantages and disadvantages:

I. **Radiography with ordinary full-size plates**: This would be the most accurate way, but cost (approximately 3/6 per head for plates alone) and slowness (20 to 30 an hour as a maximum speed) rule it out. Some surveys have been done with sensitized paper instead of film, which reduced the film cost to about 1/-, but the method is still slow and the plates are bulky to process and store.

II. **Direct Fluoroscopy**: Large scale screening examinations are easy and cheap to conduct. They have been carried out extensively in France. One such survey has been carried out in Cork. The method has two serious disadvantages: (i) that minimal tuberculous lesions may be overlooked, and (ii) that there is no permanent record. Furthermore, it is wearying and perhaps dangerous for the radiologist.

III. **Photofluorography**: Taking a miniature photograph of the screen image of the chest has become the usual method of choice. It is the method employed under the Dublin Corporation Scheme. It is cheap, the film cost being only about one farthing per plate, and it is rapid, with a working speed of from 100 to 200 cases per hour. Processed in strips of 40 exposures, its small bulk makes it suitable for storing.