there was a positive tuberculin reaction to 1 in 100 O.T. He found that on testing with increasing strengths of tuberculin the skin sensitivity of erythema nodosum patients increases rapidly after the initial threshold had been passed. This may account for the marked reaction to 1 in 100 O.T. in Case 2. This effect does not appear to be due to sensitization produced by the serial testing, as others using stronger test dilutions in much greater number have not produced Mantoux conversion by this means. Löfgren classed all his six cases with bilateral hilar glandular swellings with miliary infiltrations as sarcoidosis, and a further nine with bilateral glandular enlargement and negative reactions or reaction to 1 in 1,000 or 1 in 100 O.T. as probable sarcoids. Most estimates of the incidence of negative reactors to tuberculin in sarcoidosis give figures of 60-70%, the remaining positives tending to be weak reactors. In the case described by Bjerkelund there were a negative reaction to 1 in 100 tuberculin, bilateral hilar glandular enlargement, and only two small pea-sized infiltrations near the hilum.

In sarcoidosis one-quarter to one-half of the cases show an eosinophilia, rarely over 10-15%, and the findings in Case 1 may be significant. In the active phase an increase in serum proteins is often noted and may exceed 9 g. %, the result in Case 3 being possibly a little further supporting evidence.

Whilst it may be regretted that histological proof of the diagnosis could not be obtained, it was not considered justifiable to ask the patients to submit to the inconvenience of the necessary investigations, but on the above criteria the three cases could be regarded as sarcoidosis.

Summary

The many different causes to be considered in the differential diagnosis of erythema nodosum are discussed and three cases are described in which the cause appears to be sarcoidosis.

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A new approach to Shakespeare's plays is being made in the United States. In an experimental course sponsored by the Institute of Arts and Sciences at Columbia University in New York modern psychiatric techniques are applied in studying the characters in nine Shakespearian plays: *Othello*, *Hamlet*, *Macbeth*, *Romeo and Juliet*, *A Midsummer Night's Dream*, *Antony and Cleopatra*, *Julius Caesar*, *King Lear*, and *The Tempest*. The aim of the course, according to Dr. Russell Potter, director of the institute, is to utilize applied science to gain a "more sympathetic comprehension" of some of Shakespeare's great character studies. Five psychiatrists, all of them Shakespearean scholars, will co-operate with Dr. Maurice Valency, professor of English at Columbia, in conducting the course. Dr. Daniel E. Schneider, one of the psychiatrists, emphasizes that the course does not seek to psycho-analyse any particular character in the play. "Rather," he says, "we will try to judge the relationship of one character to another to achieve an understanding of the entire outline of the play." It is his opinion that much of modern psycho-analysis derives some of its roots from the great poets and dramatists of the past. "Shakespeare was the greatest analyst of them all," he believes.

CARDIOLOGICAL CASE FINDING BY MEANS OF MASS MINIATURE RADIOGRAPHY

BY

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The main object of mass miniature radiography surveys is to identify patients with minimal asymptomatic pulmonary tuberculosis. In carrying out such a survey many non-tuberculous lesions are met with, and these include a fair number of cardiac examples. The following is a description of the methods used in such a survey, and a discussion of the results obtained.

Method

Survey 1 was carried out in an industrial town in the North of England, and Survey 2 in a hospital for mental defectives closely adjoining this town. In the former the material consisted of 11,929 subjects, of whom 3,931 were females and 7,998 were males, with ages varying between 14 and 75 years. The great bulk of the group consisted of 10,306 industrial workers in factories. In the same group there were 1,255 school-children, all 14-15 years old; they were particularly chosen for x-ray examination as they were at the age when their school careers terminated. The remaining small group of 368 subjects consisted of those other than factory workers who volunteered for mass miniature radiography. In the mental hospital group of 244 subjects all were women, their ages ranging from 18 to 66 years.

The apparatus used was the standard type as supplied by the Ministry of Health for mass radiography surveys. This has a camera attachment so that the x-ray picture is photographed on to a 35-mm. film; after development the miniatures are projected through a Pullin projector on to a specially prepared white screen, the distance of the projector from the screen being so arranged that an enlargement of the miniature to 6½ in. (16.7 cm.) square can be satisfactorily carried out. If the enlargement is increased to greater than these dimensions there is a larger area for the eyes to cover and the strain of reading numerous miniature films is thereby increased.

Any patients who showed evidence of cardiac abnormalities were recalled for a routine history and physical examination, followed by screening and a barium swallow if thought necessary. At the same time large films were taken in the standard postero-anterior and oblique positions.

In making the diagnosis of cardiac abnormality by means of a miniature film, the following criteria were adopted: enlargement of the cardiac shadow; undue prominence of the pulmonary artery; changes in the contour of the aortic arch and cardiac shadow; changes in the lung fields. There are certain difficulties in using miniature films which are not found in large films, quite apart from the reduced size of the negatives. In the taking of miniatures the x-ray tube is situated 36 in. (91.4 cm.) from the fluorescent screen, so that there is bound to be some distortion of the cardiac shadow, which will appear larger than normal. Adiposity also causes broadening of the cardiac shadow, by consequent elevation of the diaphragm. I have found that all subjects with a maximum postero-anterior diameter of the chest of over 10½ in. (26.7 cm.) have a diaphragm that is higher than one would normally expect, so that the heart

outline is broadened. A considerable number of such persons were recalled for clinical examination, but were found to be perfectly normal.

An abnormally prominent pulmonary artery was of considerable value as a signpost to cardiac pathology. It was of less importance in young adults, in many of whom a prominent pulmonary artery was a normal feature of their cardiac outline (Parkinson, 1949). Many young adults showing this feature were recalled for clinical examination without any evidence of abnormality being found clinically, and on screening the heart was normal except for a slight to moderate prominence of the pulmonary artery. A very similar picture was produced if the patient was slightly rotated, or if a moderate degree of thoracic scoliosis was present; both of these abnormalities are usually evident on inspection of the miniature, and do not give rise to undue difficulty in diagnosis. Unfolding of the aorta secondary to arteriosclerosis with or without hypertension was particularly difficult to estimate. Considerable variation in the shape of the aortic arch can be brought about by moderate elevation of the diaphragm; thus the same factors are important here as in apparent broadening of the cardiac shadow.

With these many difficulties it is not surprising that a considerable number of those recalled for clinical examination and screening show no evidence of cardiac abnormality. Vascular shadows are much more obvious on the miniature films than they are on large films: evidence of pulmonary congestion if present is usually clearly seen. An additional feature in miniature radiography which tends to obscure the picture is the effect of secondary radiation; it is especially troublesome in obese people, and tends to cast a blur over the cardiac shadow and the pulmonary vascular shadows.

Results

In the two surveys 33 cases of rheumatic heart disease were discovered (see Table). There were 22 cases in Survey 1 (Chart 1) and 11 cases in Survey 2. Although

Cases of Rheumatic Heart Disease in Surveys 1 and 2

Type of Lesion	Sex	Average Age (Years)	No. of Cases
Mitral stenosis	Male	30.75	8
	Female	37.28	7
Mitral stenosis with aortic incompetence	Male	34.0	3
	Female	34.5	2
Mitral stenosis with aortic stenosis	Male	30.0	1
	Female	—	0
Aortic incompetence ..	Male	50.0	2
	Female	27.3	3
Mitral incompetence with aortic incompetence	Male	—	0
	Female	14.0	1
Aortic stenosis	Male	50.0	1
	Female	—	0
Mitral incompetence ..	Male	—	0
	Female	38.0	4
Mitral incompetence with aortic stenosis	Male	—	0
	Female	47.0	1
Total ..	—	—	33

in Survey 1 all the 22 cases were identified through the use of mass miniature radiography, 17 of them had already been diagnosed by other means prior to the survey. In Survey 2 only two cases were diagnosed radiologically, though all 11 cases had been previously diagnosed on clinical grounds. There were 14 instances of hypertensive heart disease discovered in Survey 1, none of which had been diagnosed before the mass miniature radiography survey (see Chart 1). The group consisted of nine males with

ages ranging from 33 to 61 years, and five females, the youngest of whom was aged 45 and the oldest 51. Those subjects who had a systolic blood pressure at the high level of normal had a diastolic pressure above normal. There were also subjects who had a diastolic pressure situated at a high level of normal but whose systolic pressure was well above normal (Chart 2). The latter group showed a considerable degree of arteriosclerosis, so that an abnormally rigid aorta may well have been the causal factor in a marked raising of the systolic blood pressure.

In regard to Survey 2, four cases of hypertensive heart disease were discovered, of which only one was diagnosed by means of mass miniature radiography—a female aged 62 with a blood pressure of 180/100. The remainder of the group were aged 45, 49, and 66. The lowest systolic blood pressure was 150 mm. Hg and the highest 180 mm.; the diastolic pressure was 100 mm. in all three subjects.

In Survey 1 there were eight cases of congenital heart disease which were diagnosed by means of mass miniature

CHART 1.—Cases of heart disease diagnosed in Survey 1.

CHART 2.—Blood pressure in 14 cases of hypertensive heart disease occurring in Survey 1.

radiography. Seven of these had been previously diagnosed (Chart 1), usually on a routine school examination, though two had been diagnosed in their pre-school days. All these cases were asymptomatic, and none of them showed any sign of cyanosis or clubbing. The group consisted of two cases of patent interventricular septum (both males, aged 16 and 32) and four cases of patent interauricular septum (all males—two aged 22, one aged 31, and one aged 33). There were also two cases of dextrocardia with situs inversus, both males, aged 42 and 52. Considering the ages of the patients in relation to Campbell's observations that only one in two "blue babies" will survive to the seventh year and less than one in ten will reach the age of 10 years (Campbell, 1948), it is not surprising that cases of congenital heart disease with cyanosis were not present in this particular group.

Discussion

It has been suggested by the earlier pioneers in mass miniature radiography that it might be used for identifying cardiac abnormalities (M.R.C., 1945). No one so far has attempted to assess the potentialities of this method for disclosing the presence of cardiac abnormalities.

In the first survey we were dealing with a population containing an unknown number of cardiac cases, so that it is not possible to estimate how many were missed by the radiological screening. Of those rheumatic cases discovered, over half had already come under the supervision of their doctor on account of symptoms of varying degrees of severity. Subdividing the group into those cases diagnosed prior to mass miniature radiography and those diagnosed primarily by that means, we find that 12 of the former had symptoms, while this was true of only three of the latter.

All the cases in the hypertensive group of Survey 1 were identified from the cardiac enlargement on the miniature film; five had symptoms, and none had been diagnosed previously.

In these two groups the survey was of some value in that it identified 19 cardiac cases not previously diagnosed which would benefit from medical supervision.

None of the cases of congenital heart disease had any symptoms, nor had they any signs of cyanosis or clubbing. With the exception of the two cases of dextrocardia, all would benefit from medical supervision on account of the potential danger of subacute bacterial endocarditis. However, seven of these cases were already known to their medical advisers, so that benefit was brought to only one case by means of mass miniature radiography. There were no cases of congenital heart disease amenable to surgery.

Considering all three groups together, there were 44 cardiac cases in Survey 1, equivalent to 3.68 per 1,000. In the M.R.C. series a total of 21,178 subjects, consisting of office and factory workers in equal proportions, were x-rayed. In that survey 32 cardiac cases were discovered, equivalent to 1.51 per 1,000. The considerable difference in the two series is due to the fact that in the latter survey only those young cardiac patients in whom "some benefit was thought to be possible" were recalled for medical interview.

In Survey 2 all the subjects were females. The average age of this group was considerably higher than that of Survey 1; also there were a known number of cardiac cases, as all the patients had been examined on admission to hospital. In the primary radiological survey only three cases were identified by means of mass miniature radiography. Following this, all these known cardiac cases were

examined personally and the clinical diagnoses checked. The relevant miniature films were looked at again to see whether any cases had been missed radiologically on the first inspection of the films. Even with the additional knowledge of the clinical condition of these patients, no further cases could be diagnosed radiologically. It appears, therefore, that mass miniature radiography is of some, though limited, value in the diagnosis of cardiac abnormalities, and that by its means some cases of cardiac disease with few or no symptoms may be revealed. It is obvious that in every survey a large number of cardiac cases must be missed, because they have not reached the stage where there are radiological abnormalities, or because the thickness of the chest wall, with or without excessive adiposity, produces such a poor miniature that it is useless for diagnostic purposes.

Summary

In two mass miniature radiography surveys 12,173 subjects were x-rayed; 47 cases of cardiac disease were diagnosed radiologically and checked by clinical examination.

Seventeen cases of rheumatic heart disease and seven cases of congenital heart disease had been previously diagnosed in Survey 1 (11,929 cases).

Three cases of cardiac disease were diagnosed out of a known number of 15 occurring among the 244 cases in Survey 2.

The difficulties met with in the reading of miniature films are described.

It is considered that mass miniature radiography is of value in identifying some cases of cardiac disease, though in any survey a large number are bound to be missed for technical reasons and through lack of radiological change.

It gives me pleasure to record my appreciation of the criticism and encouragement given to me by Dr. Robert Coope in the preparation of this paper. In Survey No. 2 I am indebted to Dr. MacKenzie and the staff of Newchurch Hospital for their very willing co-operation.

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The Women's Advisory Council on Solid Fuel (18, South Molton Street, London, W.1) took occasion at a conference on November 9 to draw attention to the need for effective safety appliances for kitchen ranges and open coal-fires. The seriousness of the need was pointed out by Mrs. Vera Colebrook, who said that over 100,000 cases of burns and scalds required hospital treatment in England and Wales every year. This represented a financial drain on the National Health Service of over £2m., and 300,000 bed-days could be saved if burns were prevented. Of the cases of burns 70% were caused in the home and 30% in industrial establishments, but while there were safety precautions in industry nothing was done about the domestic fire. Mrs. Colebrook criticized the rule whereby a fireguard when sold separately was not subject to purchase tax, but the tax was chargeable if the guard was incorporated in the heating appliance. Gas and electric fires with fixed guards were being exported to countries like Sweden and Iceland, where the incorporation of the guard with the fire was compulsory, but in this country a tax was imposed on the incorporated device. Two new types of guards were exhibited at the conference. One was for fixing in front of the fire when it was opened in a special type of solid fuel range. The other was an adaptation of the "cage" type of guard for the open fire, having a special door in front so that the guard need not be put aside when more fuel was added, and there was a device for fixing it firmly so that it could not be easily knocked over.