that other radio-active substances will be discovered in time, and it is quite possible that they will reveal a variety of peculiarities as regard both their physiological and therapeutic actions, and their selective behaviour. A wide field of activity lies in front of us, and there is urgent need of a special institute which will deal exclusively with these therapeutic biological investigations.

But I must return from the hopes of the future to the actual subject of my discourse. I hope that I have convinced you that in radium and its emanation we possess, not a panacea for all ills, which would restore suppleness and power in the most severe and incurable cases, as by magic, but an extremely valuable and indispensable means of treatment—a means which, in combination with the already known methods of treatment, enables us to achieve highly satisfactory and gratifying results in two groups of disease, which have in the past been a trial of patience both to the practitioner and to the patient, on account of their obstinacy and their persistence.

A FURTHER NOTE UPON THE MECHANICAL EFFECTS OF A RIGHT-SIDED PLEURAL EFFUSION.

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In the BRITISH MEDICAL JOURNAL of June 11th, 1910, a note upon the mechanical effects of a massive right-sided pleural effusion was published by the present writer.

More recently, further opportunities of studying the mechanical effects of the accumulation of fluid in the right pleural cavity have presented themselves. In the new case the subject was a male of middle age whose body had been preserved by the injection of 15 per cent. formalin which had firmly fixed all the tissues.

The amount of the effusion had been by no means so great as in the case formerly reported, and though the displacements discovered on section and dissection are less striking than those described by Professor Elliot Smith[1] or by the present writer in cases of massive effusion, they are sufficiently well marked to show clearly the general lines along which the effects of abnormal distension of the right pleural sac manifest themselves. Indeed for purposes of clinical work they are of greater value than those formerly described; for, in this case, the accumulation of fluid had not been so great that it might not well have been met with in normal practice.

GENERAL DESCRIPTION OF THE CONDITION FOUND.

1. The right pleural cavity is full of coagulated fluid. Its capacity is considerably increased. This is due to:

(*a*) The fixation of the ribs in the position of forced inspiration (see Figs. 1 and 2).

(*b*) The displacement of the mediastinal structures towards the left (see Figs. 1 and 2). The displacement is most marked at the mid level and least marked at the top and bottom of the mediastinum. In other words the mediastinum is bowed towards the right.

(*c*) The opening up, to an abnormal degree, of the normal pleural recesses which extend in behind the oesophagus and trachea and in front of the superior vena cava and aorta (see Figs. 1 and 2).

(*d*) The downward displacement of the diaphragm (see Fig. 4).

2. The right lung is not collapsed and is not adherent to the chest wall nor is there adhesion between the lobes (see Fig. 2).

3. The horizontal curvature of the aorta is somewhat flattened out so that the ascending portion lies almost entirely to the left of the median plane (see Figs. 1 and 2).

4. The trachea is displaced slightly towards the left and is rotated on a vertical axis so that the right bronchus has passed forward (see Fig. 2).

5. The oesophagus is curiously crumpled by the pressure of the distended right pleura, and is slightly displaced to the left (see Figs. 1 and 2).

6. The left lung is compressed, and is, in its lower part, adherent to the chest wall.

7. The superior vena cava is somewhat compressed laterally, and is displaced towards the left. Its lumen is seriously reduced by the pressure exerted upon it, from behind forwards, by the right pulmonary artery, which has in turn been pushed forward by the right bronchus (see Figs. 2 and 3).

8. The ascending portion of the vena azygos major is pushed into the median plane; the portion which normally arches over the root of the right lung is pulled out to lie in a horizontal plane, and is bent very sharply against the right postero-lateral edge of the trachea at the level of its bifurcation. At the point of bending the lumen is entirely occluded (see Fig. 2).

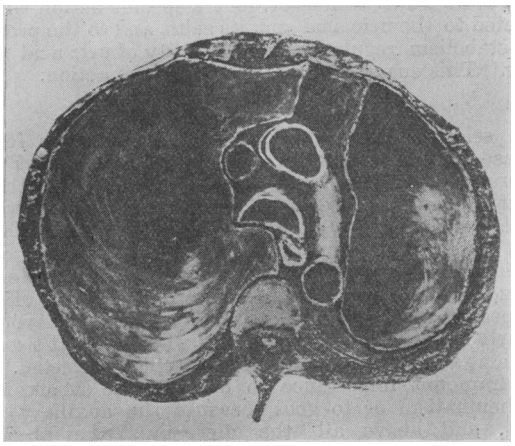

Fig. 1.—Horizontal section of the thorax at the level of the manubrio-sternal articulation: looking upwards. *To show* the increased size of the pleural cavity, the flattening out of the transverse arch of the aorta, the crumpling of the oesophagus, and the partial rotation of the trachea.

9. The inferior vena cava is much dragged upon; the caval opening in the diaphragm shows the effects of this by its distortion into a pear-shaped orifice (see Fig. 4). The intrapericardial part is sharply kinked, and its lumen is almost entirely occluded (see Fig. 3).

10. The heart is rotated clockwise round an antero-posterior axis passing through the caval orifice in the diaphragm, so that its apex descends and forces down the cardiac area of the diaphragm (see Figs. 3 and 4). The

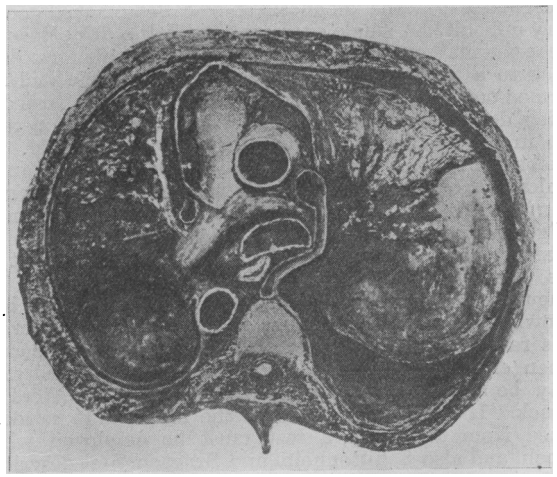

Fig. 2.—Dissection of the superior surface of the lower portion of the thorax removed by the section through the manubrio-sternal articulation. On the right side the superior surfaces of the middle and inferior lobes of the right lung are exposed. *To show* the pushing forward of the right lung root, the rotation of the trachea, the crumpling of the oesophagus, the kinking of the vena azygos major against the right posterior margin of the trachea at its bifurcation, and the pushing over of the superior surface of the heart towards the left.

posterior wall of the right auricle is pushed forward by the lung root and overhangs the opening of the inferior vena cava. The cavity of the right auricle is further reduced by the direct pressure upon its right lateral wall. The left ventricle is fixed in a position of diastole.

11. In the abdomen the liver is depressed and flattened, and the superior aspect of its left lobe is deeply indented by the cardiac depression of the diaphragm; the kidneys, more especially the right, are depressed and deformed by pressure; the suprarenals are also depressed.

The points of greatest interest demonstrated in this dissection are undoubtedly those connected with the

distortions and compressions of the great veins as they approach the heart. Rotation of the trachea round a vertical axis and carrying forward of the right lung root, which are the result of the opening up of a retrotracheal pleural recess, have not apparently been recognized as changes likely to lead to the partial or complete occlusion of the lumen of the superior vena cava. The mechanism of the occlusion of the vena azygos major, as demonstrated

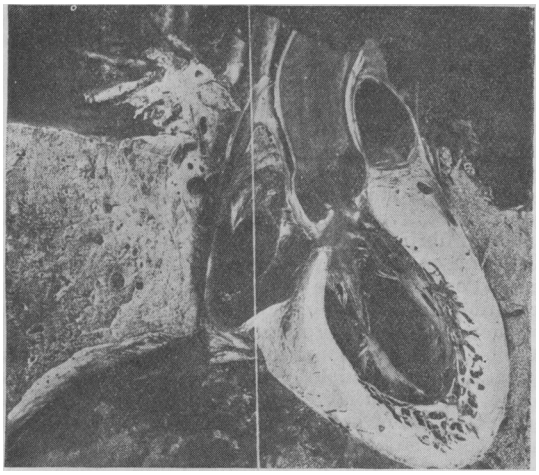

Fig. 3.—Coronal section through the heart on a plane ½ in. anterior to the anterior lip of the inferior vena caval opening. *To show* the kinking of the inferior vena cava, the downward rotation of the apex of the heart (slightly exaggerated in the photograph), and the bowing of the mediastinal structures. The white line is vertical, but on a plane a short distance to the right of the middle of the body of the last dorsal vertebra. It passes through the left margin of the inferior vena caval opening, round which point the rotation of the heart occurs. (See Fig. 4.)

in the dissection described above, is interesting, though possibly not of great clinical importance. The almost complete occlusion of the inferior vena cava resulting from the downward rotation of the apex of the heart

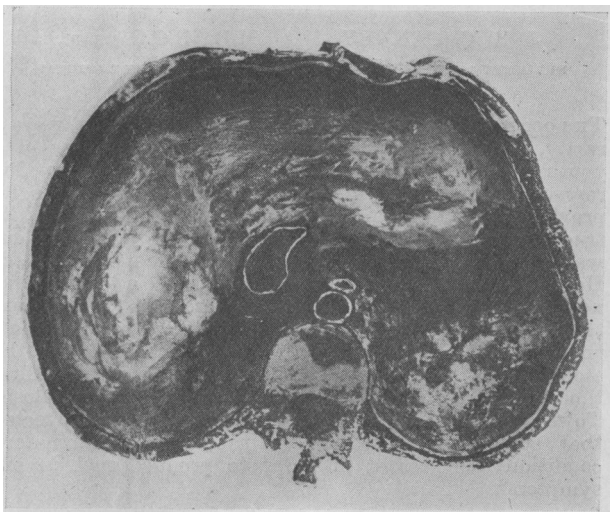

Fig. 4.—The inferior surface of the diaphragm. *To show* the flattening out of the right cupola and the depression of the cardiac area of the diaphragm and the distortion of the inferior vena caval orifice, which has been dragged out towards the left.

and the great diminution in the capacity of the right auricle under the influence of pressure are facts of clinical importance.

As a result of the consideration of the cases now and formerly described the present writer is confirmed in his opinion that one cause of sudden death in cases of right-sided pleural effusion may well be occlusion of the great veins as they approach the heart, and more especially occlusion of the inferior vena cava. This matter was referred to more fully in the short paper published on June 11th, 1910. The suggestion is not a new one, although it has not received general acceptance at the hands of the physicians.

A further point of interest is well brought out in Figs. 1 and 2. In these the descending thoracic aorta is seen to have been pushed clear of the left side of the vertebral bodies. This fact may provide a partial explanation of the "area of dullness" which exists on the left side of the vertebral column in cases of right-sided pleural effusion.

My thanks are due to Mr. William Gill for the photographs from which the illustrations are taken and for assistance in the dissection.

REFERENCE.

[1] Elliot Smith, On the Displacements produced by Pleural Effusion, *Lancet*, September 28th, 1907.

THE TREATMENT OF THREE HUNDRED NAEVI BY FREEZING.

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EXCELLENT as are some of the final results of treating naevi by means of radium, the method is, nevertheless, far from rapid and is beyond the means of many patients. For naevi in certain positions, such as those of the eyelids which involve the conjunctiva, radium has perhaps some advantages over other methods of treatment, and will still be used; but in the vast majority of cases equally good results can be obtained far more quickly, certainly, and cheaply by the application of solid carbon dioxide. Where the naevus is superficial a single application for a few seconds will effect a cure, and the resulting scar is so inconspicuous that it is difficult even to detect. The great majority of the cases which I have treated have been, naturally, children, many of them only a few weeks old, and in such patients the painlessness and rapidity of any method of treatment is of great importance. The application is, of course, cold, and a tiny baby will probably cry, but I doubt if it feels any pain, and older children will talk and laugh while they are having several naevi, warts, or lupus nodules treated by this method. They say there is some feeling of burning or smarting while the tissues are thawing, but this very soon passes off. When a well marked, definitely raised and circumscribed angioma has to be treated, a single application is seldom sufficient, and I very much prefer to do too little at the first application rather than too much, especially if the buccal mucous membrane or an eyelid is involved. But even if several applications are necessary, it must be remembered that the inconvenience to the patient is very slight, no anaesthetic is necessary, and no dressings beyond some boracic powder or boracic ointment are required. For naevi on the face there is no question that this method is far preferable to any surgical operation; for naevi on the trunk it might be said that excision was equally good and that the scar does not matter; but I have seen a considerable number of such scars in which naevoid tissue has been left or has recurred, and where either a further excision or treatment by solid carbon dioxide was necessary.

I have successfully treated with carbon dioxide 300 naevi of various extent and size. Most of these naevi were a source of disfigurement, many of them being on the face; but some of them were in positions where only a sentimental feeling on the part of the parents, and no cosmetic necessity, seemed to make their removal desirable. Such were naevi of the vulva, of the penis, and of the margin of the anus, and they were interesting from the point of view of the possibility of sepsis; but I have not seen one in these positions which gave any trouble or failed to react in the ordinary way or heal up normally. Most of these cases were treated by me at the Queen's Hospital for Children, and included capillary, stellate, cavernous and pigmented naevi, some small and some several inches in diameter, flat, or markedly raised above the adjacent healthy skin forming prominent red or purple swellings. For all such cases treatment by solid carbon dioxide cannot be improved upon, but for large port-wine stains, involving part or the whole of one side of the face, where a considerable area has to be treated at a single application, I prefer to employ liquid air. In the liquid state air occupies $\frac{1}{800}$ part of its ordinary volume; in other words, if liquid air be vaporized it will expand 800 times, and as the more