captivity on white bread or Indian corn. They can remain for a considerable time without food, and this without materially diminishing the rate of their development. *Stegomyia* breed well in ships, and are occasionally found in one part only of the ship, such as the engine-room or cook's galley, where the conditions seem to be most favourable to their development. Thus it comes about that at times certain quarters of a ship provide the greatest percentage of yellow fever cases.

A CASE OF BANTI'S DISEASE WITH ENLARGED HAEMOLYMPH GLANDS.

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CONSIDERING the paucity of the literature on haemolymph glands we have thought it worth while to record the clinical and pathological details of the case here described.

S. C., aged 57, had felt fit and able to perform his ordinary work as an agricultural labourer up to November 6th, 1914. On the following day he was attacked for the first time with aching and swelling of the feet and legs. The swelling extended above the knees, and he had to keep in bed on account of the aching, which he described as fearful. He was very positive as to the abrupt commencement of his illness. His sister stated, however, that he had been getting thinner during the past year, and that twelve months previously he had fallen off a ladder on to his stomach. On account of this he was a fortnight in bed, but did not see a doctor. He was a habitual beer drinker, taking at times up to ten pints in the day. The only previous illness he could remember was an attack of influenza in 1884.

Condition on Admission.

The patient is a small man of spare build and, from the looseness of his skin, has evidently lost flesh recently. His present weight is 8 st. 10 lb. His normal weight, according to himself, was 10 st. The skin of the face is slightly bronzed, there is a well marked malar flush, and the venules of the face are dilated. There is no general pigmentation of the skin, but the forearms and the inner sides of the legs below the knees show some brownish discoloration. There is no conjunctival icterus and the skin is not jaundiced. There is slight oedema of both legs. The muscles of the limbs and trunk are wasted to such a degree that it is surprising how he could have so recently been able to perform hard physical work. The appetite is very poor, the tongue is furred, and the bowels are constipated. The teeth are few in number and are free from pyorrhoëa. There has been no vomiting. The abdomen is tense, but moves well with respiration. The left side bulges forward. The veins on both sides of the abdomen and thorax are distended, and the skin of the abdomen has a stretched appearance.

A large mass can be felt occupying nearly the whole of the left side of the abdomen. It extends from the left costal margin downwards, forwards and to the right. Just to the left of the umbilicus it makes an angle forwards, reaching to a point 1 in. to the right of the middle line and then passes down to Poupart's ligament. The tumour feels smooth and hard, it moves well with respiration, and is quite dull on percussion. No friction rub is audible over it. There is no tenderness of the abdomen except at the notch felt in the region of the umbilicus. This point is acutely tender. Ascites is indicated by the presence in the right flank of dullness, which shifts with change of position. The liver dullness extends from the third rib to 1 in. below the costal margin.

No irregularities can be felt on the surface of the liver. The heart appears normal and the lungs yield the ordinary signs of emphysema. There is nothing else to note in the thorax. The condition of the blood on November 20th was: Red blood corpuscles 2,740,000, haemoglobin 60 per cent., leucocytes 6,000. There was some poikilocytosis, but no nucleated red corpuscles nor marrow cells were found. Differential leucocyte count showed a slight relative lymphocytosis.

The Wassermann reaction was negative, and there was no reaction to von Pirquet's skin test for tuberculosis.

After-History.

The patient steadily lost weight and became weaker. He was always very cheery, and his only complaint was of a constant thirst. On December 7th, when he got up to be weighed, he knocked the back of his wrist lightly against a button; but the injury was so trivial that he did not allude to it at the time. On the 9th there was a tender red swelling over the right wrist, oozing pus. Cellulitis spread up the arm; the patient rapidly sank, became comatose, and died on December 12th. The condition of his blood the day before his death was: Red blood corpuscles 2,368,000, haemoglobin 55 per cent., leucocytes 4,400. It is of interest that the leucopenia increased in spite of the acute infection of the arm. No bile appeared in the urine at any time.

Necropsy.

A post-mortem examination was made twenty-two hours after death. The body was wasted. There was very little subcutaneous fat present, and the muscles were very small. The right arm was swollen from the distal ends of the metacarpals to half-way up the upper arm. The back of the arm was purple and had blebs on it. The legs below the knees were oedematous. The abdomen was not distended. The peritoneal cavity contained 33 oz. of blood-stained fluid. The transverse mesocolon was stained a purple red from extravasated blood. The spleen was seen occupying the left half of the abdomen. There were only some slight adhesions between it and the left abdominal wall. Its lower pole extended below the anterior superior spine of the ilium. The great omentum was very thin, containing very little fat, and was wrapped round the anterior surface of the spleen enveloping and adherent to its lower pole, forming a very definite hammock of support to the huge viscus. The spleen weighed 4 lb. 14½ oz. It measured 15 in. from pole to pole, 5 in. broad and 14½ in. in circumference at the notch. One vein on the posterior surface of the spleen was thrombosed. The capsule of the spleen was ½ in. in thickness and in places almost as hard as cartilage. When cut the spleen pulp was quite firm and did not squeeze out on pressure. It was the usual deep red colour and the Malpighian corpuscles did not stand out clearly. The liver was smooth and weighed 4 lb. 12½ oz. On its anterior surface there was a slightly depressed purple colour patch which proved later on microscopical examination to be an angioma.

The gall bladder was filled with yellow bile and showed no sign of disease. There was no sign of thrombosis in the portal vein nor in its tributaries, with the exception of the one vein on the dorsum of the spleen already mentioned. Macroscopically the portal vein and its tributaries appeared quite healthy. The right kidney weighed 4½ oz.; its capsule was thin and stripped easily. The left kidney weighed 3½ oz. Its cortex was atrophied, and the capsule was also thin and stripped easily. The two suprarenals appeared normal. The stomach and intestines exhibited no abnormality. The pancreas appeared healthy. There was a chain of enlarged lymphatic glands running in front of the lumbar vertebrae on either side of the vena cava. These glands varied in size up to 1½ in. in length and ½ in. across; they had the shape and appearance of lymphatic glands, but for the most part resembled the spleen in colour and firmness when cut across. Some of the glands were a deeper red than others; a few, including one of the largest, were a cream colour; and some showed when cut across, deep red streaks and mottling on a cream ground. Haemolymph glands were also present along the greater curvature of the stomach and near the hilum of the spleen. The pleural cavity was free from adhesions. The lungs were emphysematous, but otherwise showed no disease, and there was no evidence of old or recent tubercle. The left lung weighed 17 oz., the right 20 oz. The pericardial sac contained 1½ oz. of straw-coloured fluid. The heart weighed 8 oz., and was flabby and thin-walled. All the cardiac valves were normal. The aorta had small patches of atheroma above the aortic valve and in the descending aorta.

Microscopic Examination.

The capsule of the spleen is very thick and dense. Large bands of fibrous tissue pass from the capsule into the substance of the spleen, and there is also a great deal of intercellular fibrous tissue. This fibrosis is more advanced in the pulp than in the Malpighian bodies, and involves the periphery of the latter more than the centre. The large bands of fibrous tissue have the appearance of normal organized fibrous tissue and stain red with v. Gieson's stain, but a large part of the intercellular tissue has a peculiar homogeneous glassy appearance, and stains yellow with v. Gieson, suggesting the possibility of effete erythrocytes being contributory to its origin. The endothelial cells and splenic cells are increased in number, and the lymphoid tissue relatively diminished, but the fibrosis is the chief feature of the splenic tissue. There is no excess of eosinophiles, and only a few cells show phagocytosis of red corpuscles.

Haemolymph Glands.

The capsule is composed of the usual fibro-muscular tissue present in normal lymph glands with septa of the same material passing into the substance of the gland. The differentiation between lymph channels and lymph nodes is not distinct, as in normal lymph glands, and what corresponds to the lymph paths are filled with blood corpuscles. There is a great hyperplasia of the endothelial cells, and there is present in small numbers a large cell with a very large single nucleus, almost filling the cell, probably a myelocyte. Numerous cells show phagocytosis of erythrocytes, contrasting in this respect with what obtains in the spleen. There is no excess of eosinophiles. The fibrous tissue is increased, but not to such a degree as in the spleen; there is also hyperplasia of the lymphoid tissue.

It has already been noted that nearly all these enlarged glands, when cut across, were red in colour, like the spleen; a few, including the largest, were a dirty cream colour, and some, on cross section, showed a whitish-cream ground, with red streaks and mottling. Microscopically, the difference between these types lay in the number of red corpuscles present in the lymph paths. This is a very important point. In all there was hyperplasia of the endothelial cells, lymphoid, and fibrous tissues.

Sections of the spleen and lymphatic glands were

searched for tubercle bacilli, but none were found, and the histology did not suggest tuberculous disease. Many investigators have attempted without success to find a bacterial origin for this disease, but Dr. A. G. Gibson¹ of Oxford has described and figured a streptothrix found by him in different cases of splenomegaly, including cases of Banti's disease. We have examined numerous sections of the spleen and haemolymph glands, employing the Wheal² and Chown method of staining, as recommended by Dr. Gibson, for the identification of the organism, but have not met with a streptothrix in any of the tissues examined. We have had more recently the opportunity of examining another spleen successfully removed from a case of Banti's disease by Mr. Howell at the Cheltenham Hospital. Portions of this spleen were placed in culture media immediately after excision, but all the cultures remained sterile. Sections of the spleen were searched for a streptothrix, with negative results.

Considerable controversy has taken place as to whether haemolymph glands are actually separate and distinct organs *sui generis*, or whether they are to be regarded as lymphatic glands into the lymph paths of which blood has come by haemorrhage, diapedesis, or through the convection of extravasated blood from other areas by the lymph channels.

Professor Warthin of Michigan has made a special study of the subject for a considerable number of years and has contributed largely to its literature. He is firmly convinced that the haemolymph node is an organ *sui generis*, and expresses the following opinions:³ "I believe that these minute haemal organs possess distinct functions, and that specific as well as general pathological changes occur in them." "It would therefore appear that the destructive influences of chronic intoxications and infections, as well as altered conditions of the blood, affect the spleen and bone marrow earlier and to a greater degree than they do the haemolymph nodes. The latter may be interpreted consequently as reserve haemal organs. In conclusion, hyperplasia is the most common specific pathological change in the haemolymph nodes, and this hyperplasia may be of four types—lymphoid, endothelial, myeloid, or fibroid, or a combination of these." Saltykow champions the opposite opinion and considers that the presence of the red blood corpuscles stimulates the endothelial cells of the lymphatic glands to intense phagocytic activity. The opposing views are clearly stated by Dr. Dayton⁴ of New York. From the study of enlarged haemolymph glands occurring in a case of exophthalmic goitre, Professor Lorrain Smith⁵ summed up as follows: "The general conclusion to which the study of this case leads us is that the haemolymph gland is in one form at least nothing else than an ordinary lymph gland into the sinuses of which blood has found its way. How far this conclusion is valid for other cases it is at present impossible to say."

In the case here recorded we may say:

1. The lymphatic glands in the abdomen have undergone a hyperplasia of their histological elements similar to what has occurred in the spleen.

2. Blood is present in the lymph sinuses of these lymphatic glands to a variable extent, and the amount of blood present bears no relation to the hypertrophy of the endothelial cells or fibrous tissue of the gland.

3. The haemorrhage into the mesentery and the blood in the ascitic fluid suggest that the blood corpuscles in the sinuses of the lymph glands have been transferred from thence via the ordinary lymph paths. It seems, however, more probable to us that these haemolymph glands represent blood organs *sui generis* in which the same pathological changes have occurred as in the other blood organ, the spleen, than that the great hyperplasia of the endothelial cells and fibrous tissue is simply the result of the presence of red corpuscles in the lymph paths of normal lymphatic glands.

A small angioma was present on the anterior surface of the liver. Areas of fibrosis and collections of small round cells were present about the portal systems, and to a less extent in the intercellular tissue. A certain amount of fatty infiltration was present, more marked near the angioma. The capillaries were distended with blood. The pancreas appeared perfectly normal.

The sections of the lungs showed the presence of emphysema.

A section was made through the origin of the portal

vein, at the junction of the mesenteric and splenic veins, as the site most likely to be diseased. The walls of the vein were quite healthy. A portion of the splenic artery exhibited early atheroma.

Sections of the suprarenal glands exhibited no abnormality.

The kidneys exhibited the histological changes of chronic interstitial nephritis, the left kidney being considerably more fibrosed than the right.

REFERENCES.

- ¹ A. G. Gibson, *Quarterly Journal of Medicine*, vol. vii, No. 26.
- ² Wheal and Chown, *Journal of Path. and Bact.*, 1911, xvi, p. 146.
- ³ A. S. Warthin, *Trans. Assoc. American Phys.*, vol. xiv, p. 282 and p. 289.
- ⁴ Hughes Dayton, *Amer. Journ. Med. Sciences*, New Series, vol. cxxvii, p. 448.
- ⁵ J. Lorrain Smith, *Dreschfeld Memorial Volume*, p. 208.

EXOPHTHALMIC GOITRE.

AN ABSTRACT OF THE RESULTS OBTAINED FROM THE
INVESTIGATION OF 93 CASES.

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THE 93 cases of exophthalmic goitre investigated were all in-patients of the Royal Victoria Infirmary between 1903 and 1914. They were examined with especial reference to the etiology and prognosis, and the following conclusions were arrived at:

A.—ETIOLOGY.

1. *Heredity*.—In 10.7 per cent. of these patients near relatives had suffered from simple goitre; in 3 per cent. from exophthalmic goitre. In one case a mother and six daughters all had simple goitres, which in two daughters appeared accompanied by exophthalmos.

2. *Sex*.—92.5 per cent. were females.

3. *Age at Onset*.—This varied from early childhood to 50 years.

In 4 patients it appeared before 10 years of age.	
In 28 " " " between 10 and 20 years of age.	
In 35 " " " 20 and 30 " "	
In 14 " " " 30 and 40 " "	
In 13 " " " 40 and 50 " "	

4. *Duration of Illness*.—This included all periods from a few weeks to twenty years.

5. *History*.—(a) Antecedents: 39 per cent. gave histories indicating some preceding throat trouble and suggesting the possibility of infection through the tonsils.

(b) Exciting cause: Emotional in 20 per cent.; disturbance of generative organs in 9 per cent.; other illnesses in 8 per cent.; operation in 3 per cent.

B.—DEVELOPMENT OF SYMPTOMS AND SIGNS.

(a) *Primary*.—Goitre appeared first in 62 per cent., exophthalmos in 21 per cent. In those cases which followed emotional disturbance exophthalmos was the first symptom in 80 per cent. It should be noted that in almost every case there was a vague history of nervousness, as shown by palpitation and various subjective phenomena, before any local signs appeared.

(b) *Secondary*.—In addition to the cardinal signs of exophthalmic goitre, various secondary points were investigated.

Contrary to expectation, the prognosis was not markedly influenced by the presence of hallucinations (7 cases), organic or functional disturbances of the cardio-vascular system (in 43 per cent.), severe diarrhoea (which occurred in 36 per cent., of which number 20 per cent. died), or considerable disturbance of the integumentary system.

Bronchitis and other diseases of the respiratory system were found in 11 per cent., and of this number 80 per cent. died.

Amenorrhoea occurred in 15 per cent. In some cases it appeared before the disease and improved when the goitre developed. In 6 cases miscarriages preceded the disease. The effect of menstruation on exophthalmic goitre is not constant; sometimes the goitre diminishes in size, and sometimes it is increased during the period.

C.—PROGNOSIS.

The prognosis is markedly influenced by:

1. *The Age of the Patient at the Onset*.—The death-rate is 25 per cent. in cases beginning between 10 and 15 years