Gross (1953) stated that the majority of these babies can be tided over their period of embarrassment by medical means, and that the best chance of successful operation will come later, between the ages of 8 and 12 years.

Lang and Nadas (1956), reporting nine cases treated medically, also suggested that most of these infants can be managed satisfactorily by medical means, but added that surgery should be performed early if medical management fails.

Though no classification of cases of coarctation is really satisfactory a certain therapeutic grouping appears reasonable. First there will be cases where there is gross abnormality of the arch, often with other anomalies, sometimes with very extensive endocardial fibroelastosis, and in which the deformity is such as to be incompatible with survival. These patients are likely to die within the first few hours or days. A second group will comprise those who have early and severe cardiac failure which proves difficult to control, and who will need surgery as soon as possible if they are to survive. Thirdly, there are those whose symptoms are less severe and more easily managed, and who have a tendency to marked spontaneous improvement after the first few months. Some of these might well be kept under supervision and operated upon later, after the general improvement has occurred and all signs of failure have disappeared. Finally, there is a fourth group of cases in which the early symptoms are slight or absent, and which are unlikely to be recognized in infancy. Retrospective inquiry into feeding difficulties, choking attacks, and breathlessness in the infancy of adults found to have coarctation would be of doubtful value, and, so far as we are aware, has never been undertaken. This group therefore includes all adult cases.

Until recent years this condition in infancy was not thought to be important; if it was of the infantile type death was inevitable, and if of the adult type no symptoms would occur. Reports of larger series, and the individual study of our four cases, would appear to show the importance of coarctation in babies, and our cases seem specially to show the way in which the successful management of this not uncommon condition depends on care at all levels. Cardiac failure in babies presents as feeding difficulty, often developing quickly, after choking attacks, into a cardio-respiratory illness in which the diagnosis becomes very much more difficult and the prognosis very much worse. Early diagnosis before this occurs can result from alertness to the possibility on the part of the family doctor, the midwife, and the nurse. Confirmation of diagnosis and immediate investigation and treatment can be carried out in the area paediatric department. This will consist essentially in really close ward observation and management of feeding, in x-ray screening, and, generally, in digitalization with serial electrocardiograms. Salt-free milk powder will be helpful in some cases. This period of emergency care is followed by more investigation and more detailed assessment in the specialized unit in which resection may be carried out, either at once or later. Later, care of those operated upon and of those in whom operation is deferred after assessment can again be undertaken by the paediatric department and family doctor, and will usually include the gradual weaning off digitalis. Blood pressures may in some cases not return to normal figures for several months after operation, so that continued recordings are advisable.

There is the possibility, mentioned by Gross (1953) and others, that stenosis may occur at the site of resection. Animal experiments, on the other hand, have suggested that growth of the scar may occur. Only time will show. Of more immediate importance is the inescapable impression that many of these babies must die as cases of bronchopneumonia, the real cause of their illness remaining unrecognized.

Summary

An account is given of four cases of coarctation of the aorta presenting as cardiac failure in early infancy. In each case resection was carried out after medical

treatment. There was one death; the remaining three children have done well. The history and presenting features in each case are described in detail in order to show the importance of the recognition of early symptoms and signs in those babies who may appear to be cases of mechanical feeding difficulty or chest infection.

The management of these and similar cases is presented as a combined responsibility.

We wish to acknowledge the part taken by Dr. R. E. Bonham Carter in the care of these cases, and to thank him for much help. These four babies are to be included in a more extensive review of congenital heart disease in infancy, from Great Ormond Street, which is in course of preparation.

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CAT-SCRATCH DISEASE

BY

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Cat-scratch disease is an illness which is not well known in this country. It usually presents as a mass of inflamed lymph nodes in the groin, axilla, or neck, which commonly proceeds to suppuration, though occasionally it may resolve. Daniels and MacMurray (1954) present a comprehensive account of the disease, based on 160 cases (including 27 personally observed); Brand and Finkel (1956) describe three cases and give a bibliography of all the others reported to date in this country. The former authors write: "Cat-scratch disease may simulate a wide variety of lymph-node lesions such as tularaemia, infectious mononucleosis, lymphosarcoma, Hodgkin's disease, tuberculous adenitis, lymphogranuloma venereum, and both benign and malignant disease." The following cases illustrate some of these diagnostic pitfalls, showing the need to consider all data, clinical and pathological, in order to reach a correct diagnosis. They also include an unusual familial relationship.

Case 1

A boy aged 2 years 2 months was admitted to hospital on September 1, 1954, from the surgical out-patient department. He had been sent there by his family doctor because of a lump which had appeared in his right groin five days previously. It was neither painful nor tender; it was hard and irreducible; there was no impulse on coughing or disturbance in his general health. It was thought that it might be a hernia with impacted omentum.

At operation later that day the mass was found to consist of enlarged lymph nodes, and it was excised. The histological report on the specimen stated: "Marked reticulo-endothelial proliferation in lymph nodes with a few mitotic figures and a suggestion of granulomatous pattern. I cannot

be certain, but I suspect early tuberculosis." However, no primary focus could be detected either on the limb or on the perineum, the x-ray film of his chest was clear, and the Mantoux test (1:1,000 and 1:100) was negative; his white-cell count was 10,000 per c.mm., with polymorphs 65% and lymphocytes 33%. The wound healed by first intention and he was discharged quite well on September 13. At follow-up on October 12, 1954, and April 12, 1955, the scar was soundly healed and no other glands could be felt.

In view of the negative Mantoux test, the diagnosis of tuberculosis was in doubt and cat-scratch disease was suspected. An attempt was made to obtain the specific antigen, but without success; and there the matter rested for a while. However, the possibility of cat-scratch disease was mentioned to his mother, and she decided to have her domestic cat replaced by another.

Case 2

This patient, aged 10 years 9 months, was the brother of the first patient. He was admitted on November 16, 1955, also with a swelling in the right groin for one week. On examination there was a mass of glands in the femoral triangle, below the inguinal ligament, and also some easily palpable glands of the external iliac chain above the ligament. There was no disturbance of his general health, no focus of infection on the limb or perineum, no other enlarged glands, and his spleen was not palpable. The blood count showed: haemoglobin 86%; white cells, 10,500 (normal differential count); sedimentation rate, 10 mm. in the first hour; Wassermann reaction, negative. The chest x-ray picture was clear. The Mantoux test 1:1,000 was doubtful. The glands were neither painful nor tender.

This child had attended the out-patient department in January, 1951, with a vague story of poor health; the only finding then had been general lymph-node enlargement, and a firm diagnosis was not made. He had also been admitted previously, on September 16, 1954, suffering from abdominal pain, for which no cause was found. On that occasion his glands were not abnormal.

To return to his present admission: it was decided to remove the glands below the inguinal ligament for microscopy. This was done. The report stated: "Commencing destruction of gland pattern. Proliferation of reticulum cells in follicles and sinusoids with foci of eosinophils and neutrophil leucocytes. The appearances are those of an early Hodgkin's disease." Because of this report he was referred to the radiotherapy department of the London Hospital. However, when Dr. Boden examined him he was doubtful of the diagnosis, as there were no other manifestations whatever of lymphadenoma. Dr. Boden had the biopsy slide re-examined, and this time the section was considered to indicate cat-scratch disease. Accordingly he arranged for Professor Barwell, of the department of bacteriology, to try the cat-scratch antigen, and this was markedly positive, raising a papule 10 by 8 mm.; the Frei antigen test was negative. On learning this news the biopsy slide from Case 1 was also sent to the London Hospital; the report stated: "Lymph node showing severe chronic inflammatory changes. A few granulomatous foci are present in this node, but the changes are not sufficiently marked for a definite diagnosis of cat-scratch disease." The skin of Case 1 was also tested, and Professor Barwell reported: "Frei antigen and control, no reaction. Cat-scratch antigen: papule 11 mm. in diameter, positive." It will be realized that the cat which infected the first patient could not have infected the second—it was no longer in the house.

Comment.—Other authors have described familial outbreaks. Daniels and MacMurray (1954) mentioned 12 household epidemics, involving 26 patients, mainly children (no other details are given). Clément *et al.* (1951) report the disease in a child aged 13 and in his mother; Blinski and Kaye (1955) found it in a child of 16 months and his mother; and Philpott *et al.* (1955) describe the cases of twins aged 5 who suffered from it. But in all these examples

the household illnesses were roughly concurrent, so that one animal was responsible for all the cases in each outbreak. In the illnesses here reported, this could not be the case; we must postulate two infected cats in the same house, at different times.

Case 3

A girl aged 14 was admitted to hospital on September 20, 1955, from the paediatric out-patient department. She had been quite well till the previous week, when her right eye became inflamed and sticky, and some lumps appeared round her right ear. She had complained of occasional face-ache during the previous few days, but there was no other symptom or any constitutional disturbance. On examination she did not look ill; she had a right conjunctivitis with some sticky discharge, and many enlarged lymphatic nodes—pre- and post-auricular, jugulo-digastric, and in the anterior and posterior triangles of the right side of her neck. The inguinal glands were palpable, but were not unduly large; the epitrochlear and axillary glands were not palpable; the spleen could be just felt; her right tonsil was enlarged. Her mouth temperature was 99° F. (37.2° C.).

She quickly improved in hospital. Her temperature settled, the conjunctivitis cleared up in a few days with chloramphenicol drops, and the glands subsided. All but one, that is: the pre-auricular gland became enlarged still further and then softened as pus formed. The abscess was opened and curetted by Mr. S. G. Nardell, and the contents were sent for examination. The histological report stated: "Chronic purulent inflammation of caseous tuberculous granulation tissue," but bacteriological examination failed to find tubercle bacilli by fluorescence or Ziehl-Neelsen stain, by Löwenstein-Jensen culture, or by guinea-pig inoculation. Finally the Mantoux test (1:1,000 and 1:100) was negative. It seemed that the diagnosis of tuberculous lymphadenitis was excluded. Skin tests were performed by Professor Barwell, who reported: "Complement fixation tests for antibody to the psittacosis-L.G.V. group of viruses, negative. Skin tests: Frei antigen and control, no reaction. Cat-scratch antigen: tender papule, 12 mm. in diameter, positive."

Comment.—This combination of conjunctivitis and pre-auricular adenitis (Parinaud's oculoglandular syndrome) in cat-scratch disease has not previously been reported in this country, though Professor Barwell (personal communication) informs me he has seen one. It is a rare form of the illness; Daniels and MacMurray (1954) found only two such in their series of 160 cases, but they mention six others. In the familial cases reported by Clément *et al.* (1951) the mother's illness was of this type. These latter writers consider that the virus might be carried to the eye by the patient's own fingers, and not introduced directly by the infecting cat.

Two further patients with this disease have been seen at the hospital within the last 12 months; their illness took the usual form.

Case 4

A boy aged 13 was referred by his family doctor because of a lump in the right axilla. When seen at hospital on March 15, 1956, the mass had been present for two weeks, and was already getting smaller; painful at first, it was so no longer and his general health was unimpaired. The lump was an axillary gland, and there were no other abnormal findings. The chest x-ray picture was clear; white blood cells, 5,400 (normal differential count); blood sedimentation rate, 13 mm. in the first hour; Mantoux test (1:1,000) negative. The household included two cats with which the patient frequently played, sustaining several scratches and bites. This suggested cat-scratch disease as a possible diagnosis. He was referred to the bacteriology department at the London Hospital, and Professor Barwell reported: "Frei antigen and control, negative; cat-scratch antigen, red papule 9 mm. in diameter, positive. Complement-fixation test for psittacosis-L.G.V. antibody, negative."

The glands subsided without further treatment. The lad's mother has noticed that his skin "puffs up" when and where the cat scratches him, but this in no way disturbs his general health.

Case 5

A woman aged 58 was seen in the surgical out-patient department on November 9, 1956, because of a lump in the left axilla. It had been present for two weeks, and was not painful or tender; there was no history of injury or discharge from the nipples. She had suffered from an abscess in the other (right) breast three years previously. On examination she was seen to be a very obese woman, with big pendulous breasts; there was a mass the size of a golf-ball in the axillary tail of the left breast, not fixed to the skin but attached deeply. There were no other abnormal physical signs. It was thought probable that the mass was a carcinoma, and admission was arranged for surgical exploration. This was carried out on November 28, when the lump was found to consist of suppurating lymph nodes. The histological report stated: "Chronic purulent inflammation of and granulomatous tuberculosis in axillary glands and adjacent tissue." However, in view of the absence of any other sign of tuberculosis this diagnosis was unacceptable, and cat-scratch disease was considered. The specific antigen was obtained from the Virus Laboratory (Public Health Central Laboratory), Colindale, and on intradermal injection it produced an erythema 12 mm. across, with a papule 5 mm. in diameter—a positive result.

Summary

Five examples of cat-scratch disease are described, four of them in children.

Two of the children are brothers, but they were separately infected with a year's interval in between, by different cats.

The axilla twice was the site of the disease, and the groin twice; one patient presented with conjunctivitis and pre-auricular adenitis.

The histological picture is not clear-cut, and the diagnosis depends upon consideration of all the data, clinical and pathological.

I should like to thank Dr. W. W. Walther, pathologist at the hospital, for his reports; Mr. S. G. Nardell, surgeon, who carried out the biopsies on the first three patients and showed me the fifth; Dr. M. L. Hutchinson, general practitioner at Leyton, for the follow-up note on Case 4; and Dr. G. Boden and Professor C. F. Barwell, of the London Hospital, for their help in establishing the diagnosis of some of the patients.

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Discussing the relation between smoking and lung cancer, Dr. I. HIEGER writes in last week's *Nature* (August 17, p. 308): "The report [of the Tobacco Manufacturers' Standing Committee] brings its heavy guns to bear on the statistical aspect of the problem. It emphasizes that a contingent statistical relation does not guarantee causation. Let us take an example of what could be called contingent. Seaside-sunburn in London schoolchildren, before the motor-car, was always preceded by a railway journey. The railway journey is contingent to the sunburn but is not the cause of the sunburn. To take a strictly practical point of view, the seaside-sunburn could have been avoided by shutting down the railways, and in the same way lung cancer could be largely avoided by closing the cigarette factories, quite independently of whether lung cancer and smoking have a causal or a contingent relationship."

CAT-SCRATCH DISEASE WITH PNEUMONIA

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Since Lee Foshay, in America, recognized cat-scratch disease as an entity (Daniels and MacMurray, 1951) excellent reviews of the condition have appeared in France (Debré *et al.*, 1950), in America (Daniels and MacMurray, 1954), and in Great Britain (Brand and Finkel, 1956). In addition numerous case reports have appeared in the literature. These writers have described the main features of the disorder and its complications. The clinical diagnosis is based on history of contact with a cat, and the appearance of a small local lesion followed by regional adenitis which may suppurate and produce sterile pus and mild general symptoms with fever. Histological examination of an affected node shows reticulo-endothelial hyperplasia with focal granulomata which may undergo central necrosis. An intradermal test (Mollaret *et al.*, 1951a) provides confirmation of the diagnosis. Complications are usually mild, encephalitis (Daniels and MacMurray, 1954) being the most serious so far described. Others include mesenteric adenitis, Parinaud's oculo-glandular syndrome (Daniels and MacMurray, 1954), erythema nodosum, and transient generalized rash.

The disease has been produced in apes, and is thought to be due to a virus of the psittacosis-lymphogranuloma venereum group (Mollaret *et al.*, 1950, 1951b).

We have recently observed a patient who has suffered from typical cat-scratch disease complicated by a severe pneumonia which could not be attributed to any other cause and which responded slowly if at all to antibiotic therapy. The case history is presented in detail, as we can find no previous record of pulmonary complications in this disorder.

Case Report

A housewife and domestic help aged 46 had previously enjoyed good health. She worked as part-time housekeeper for a family who owned an ageing cat. This animal habitually deposited its excreta about the house, and it was the duty of our patient to clean up after it. She was never bitten or scratched by the cat.

In July, 1956, she noticed a small "cyst" on the palm of her left hand. This remained, but she was otherwise quite well until September 1, when she had a severe continuous headache lasting for a week. On September 6 a slightly tender swelling appeared at her left elbow. This was found by Dr. K. R. Hughes, her practitioner, to be an enlarged epitrochlear lymph node. He also noted an enlarged left axillary node, an infected papule on her left palm, and a lymphangitis. The latter proved to be transient, as it was not subsequently observed. He administered 1 mega unit of crystalline penicillin intramuscularly and prescribed "distaquine" V, 2 tablets (120 mg.) four-hourly by mouth.

Two days later Dr. L. DuLake saw her in the absence of Dr. Hughes. She appeared to be more ill, her temperature was 100.4° F. (38° C.), and the epitrochlear node was now the size of a large hen's egg and that in the axilla the size of a tangerine. There was a palmar papule surmounted