the embolic lesions are not found and the patient then has an atypical glomerular nephritis.

In the cases I have recorded, the seven outstanding features noted are those described by Libman as being peculiarly associated with this type of endocarditis. The *post-mortem* appearances of Case I were identical with Libman's description. The type of the vegetations, the involvement of chordae tendineae, the growth of fine vegetations on the wall of the ventricle, the particular features of the splenic infarcts, all are in complete agreement.

Those on the staff of this hospital, who have seen many cases of this type of endocarditis, are convinced of the identity of Cases I to IV. Case V must remain in doubt unless further investigation proves more conclusive. No one case has been proved up to the hilt. Case I lacks the discovery of the particular organism in the blood during life. In all other symptoms and in *post-mortem* appearances it is conclusive. Case II, from its course and from the extraordinary improvement, almost recovery, present to-day, is probably a bacteria-free case with healing processes going on. Case III might have been either bacterial or bacteria-free. Unfortunately no autopsy was permitted. Case IV gave no history of the occurrence of Osler's nodes; and he alone gave a blood culture of a coccus, of a type not specified; subsequent investigation of the blood proved negative. Case V is doubtful. Sections of the kidneys show extensive glomerular nephritis, and in one or two glomeruli suggestive but not conclusive lesions have been found. The same condition was also found in the kidneys of Case I. It will be understood that when a low percentage of glomeruli is involved the necessary examination must be very extensive.

But the main object of this account is to put on record five cases of endocarditis of unusual form and of great interest. It is impossible to affirm that these cases do or do not belong to the group described by Libman, but the evidence, though not conclusive, greatly supports this view.

Postscript.

This report was completed and about to be sent to press when Case IV died very suddenly.

He had recovered from his attack of pneumonia, but on May 5th was attacked by a brief but sharp epidemic which had invaded this ward. For twenty-four hours he had a temperature of 102° to 104°, with increasing dyspnoea and pulse-rate, but died quite suddenly of heart failure.

A partial *post-mortem* examination was made. The heart was slightly larger than normal. The mitral valve was contracted and only just admitted the passage of the forefinger through it. On laying open the mitral valve it was seen to be affected in its whole extent. Its fringes were thickened and contracted and covered with minute vegetations with little calcareous granules interspersed. There were four larger nodules, the size of a large pea, quite hard and calcareous. The vegetations had spread down the chordae tendineae, which were also very shrunken and in many cases broken, the ends lying free. On the wall of the auricle was a sessile patch of what appeared to be a healed ulcerative process. On opening up the ventricle and aorta, the ulcerative process can be seen to have extended to the ventricular aspect of the mitral valve, which appears eaten away, and a small vegetation can be seen on each cusp of the aortic valves. (See special plate, Figs. 3 and 4.)

The spleen was very large, measuring 6 in. by 4 in., but containing only one recent infarct. The kidneys were larger than normal, the surface scattered over with fine petechiae. The capsule, however, stripped easily and there was little sign of acute inflammatory change. The left kidney contained one old infarct, yellow ochre in colour, cheesy in consistency, and about half an inch in diameter, with an appearance very similar to the old infarct in the spleen of Case I.

The right radial artery was dissected out at the site of the old lesion; it was much thickened and stood widely open on section. It was found to be completely occluded for a length of about half an inch.

Cultures were taken from the blood of the heart before it was opened. A Gram-positive coccus was grown therefrom on legumen glucose agar. This coccus was identical to that found in the blood of this case during lifetime. It was Gram-positive, occurred in pairs or in short chains of 6 to 14, but, like its forerunner, all attempts to grow subcultures from it failed, so that any further identification was impossible.

Microscopical sections of the kidney failed to reveal any definite alteration in the glomeruli, nor was there any evidences of inflammatory change save for some cloudy swelling of the cells of the tubules.

In this case the *post-mortem* appearance of the mitral and aortic valves and of the distribution of the vegetations

over the chordae tendineae and the wall of the auricle confirm the diagnosis previously made.

My thanks are due to Captain W. Scott, R.A.M.C., of the Pathological Department, Colchester Military Hospital, for his invaluable assistance in the investigation of Case IV, and also to my colleagues on the staff of the Military Heart Hospital under whose care these cases came on admission and to whose skill the credit of the original diagnosis should be ascribed.

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AN ATTEMPT TO BREED TUBERCLE-IMMUNE CATTLE.

BY

LIONEL JAMES PICTON, M.A., M.B.,
B.CH.Oxon.,

MEDICAL OFFICER OF HEALTH, WINSFORD, CHESHIRE.

(With Special Plate.)

THE best way to get tubercle-free milk is to get it from animals which are not suffering from, and are not prone to suffer from, tuberculosis. If there were, or could be, bred a race of cattle as immune as goats appear to be, that ideal would be realized. The shorthorn cattle, which form the bulk of the beef and milk-producing stock in these islands, are probably about as prone to tuberculosis as are human beings. The proverb "Every one has a little bit of tuberculosis" is as true of the shorthorn cattle as of man.

Kerry cattle are far less prone to the disease. Possibly the conditions of their housing in Ireland have for generations been such that every cow that could die of tuberculosis died of it long ago. Possibly the opposite is true, and it is their hardy life in the mountains that has conferred the relative immunity they enjoy. It is a relative immunity only; but they are believed to be more resistant than any other of our domestic breeds. They are good milkers. The milk, having a finer cream emulsion than the shorthorn's milk, far finer than the Jersey's milk, is very suitable for children. The percentage of cream is usually very good. But the Kerry could never supplant the shorthorn for the double purpose of producing beef and milk. They have not the requisite qualities for conversion into a "big lump of beef," when turned off and fattened for the butcher after several lactations.

The question arose whether these tubercle-resisting Kerrys could be bred with any other race of cattle which would confer the desired qualities of size and beef production, and could that be done in such a way that the type created by the cross could be perpetuated as constant—as a new and permanent breed? Above all, could that be done without weakening their powers of resisting tuberculosis?

The problem is so to mate and cross the Kerry as to produce a tubercle-immune animal of the shorthorn type.

The domestic cattle of this country from which the shorthorns came are believed to have been derived from two primitive breeds—a smaller, black or dark brown kind, and a larger rough-coated white kind. The Kerrys represent the former more closely than any surviving race. The few remaining herds of white park cattle represent the latter; indeed, they are the primitive indigenous white cattle, modified only by the results of inbreeding through many centuries.

These English white park cattle were once of great size. They roamed wild in the forests in the centre of the island from the highlands to Sherwood. The Cadzow herd survives at Hamilton, and the famous Chillingham herd in the border country. The Blackburn herd has been extinct for three centuries, though white wild bulls still support the family coat-of-arms. The Lyme herd forty years ago was reduced to four. The Chartley herd was decimated a little later, by tuberculosis it is said. The Gunton herd in Norfolk was once famous for its enormous bulls. There is a Cadzow bull and also a Chillingham bull at present in the Zoological Gardens. Both are small—about 4 ft. to the chine—useful beef-producing animals, but not big enough to mate with the Kerry to bring that race up to the shorthorn standard.

Probably the largest surviving type is the herd at Somerford Park. That place lies in Cheshire, about midway between Lyme in the same county to the north and Chartley in Staffordshire to the south; each is a few miles westward from the foothills of the Pennine chain. Though such near neighbours of the Chartley herd, the Somerford cattle appear to be highly immune from tuberculosis. The family of butchers which has dealt with the offcasts of this herd for the last sixty years has never known tuberculous disease to be found in the carcass of a slaughtered Somerford beast. Tuberculosis abounds in the shorthorn cattle of the neighbourhood. A further instance of their natural immunity may be mentioned. At the time of the cattle plague (rinderpest) some half-century ago, a farmer near Somerford had acquired a white park cow from his landlord, which stood in the cowsheds amongst forty-seven shorthorns. The plague carried off all the forty-seven shorthorns but left the Somerford cow in their midst unaffected. No cases of the plague occurred in the white park herd itself.

Deep-chested, large, handsome cattle, better milkers than any other known white park herd, the Somerford breed is particularly suitable to mate with the Kerry in the suggested attempt to obtain a type of animal which will show the milk and beef qualities of the shorthorn without its liability to tuberculous disease.

The experiment is being made. The first photograph (Plate, Fig. 1) shows the ingredients of the proposed new breed, Kerry heifers running with a young white park bull from the Somerford herd. The black ears and muzzle of the latter will be noted, and also that he is hornless, a characteristic of this herd. The Hamilton herd once was hornless, but now has acquired horns. Otherwise white park cattle are horned. The second photograph (Plate, Fig. 2) shows a fine bull of the crossed breeds, Somerford-Kerry, aged 2 years and 5 months.

The proposal is to establish the breed by interbreeding first-cross bulls and heifers. The reality or otherwise of their claims to immunity from tuberculosis can only be tested by much experience with great numbers of animals so produced. Meanwhile, this preliminary record of the experimental work which is being attempted may be of interest. The enthusiasm and great stockbreeding experience of Mr. Charles Sproston and the loan of the Somerford bull by Sir Walter Shakerley have made the experiment possible.

On June 26th I heard that the bull of the crossed Somerford-Kerry breed reacts to the tuberculin test. His temperature rose to 104.4°. The test was carefully conducted, the animal having been tied up for two days previously to get him contented in captivity. There is not the slightest other sign of disease; on the contrary, the animal is in magnificent condition.

The following is the view to which I incline as to the difficult fact that the tuberculin reaction is positive sometimes in animals which are otherwise apparently sound, or which, as Mr. Robert Mond has shown, continue in sound health for their full span of life subsequently. Assuming that the test accurately reveals the existence of a tuberculous infection, immunity is shown by the fact that the animal does not succumb to the attack. No animal is immune from attack. What must be sought is a type of animal which shows successful resistance to attack.

A MODIFICATION OF THE STOKES-GRITTI AMPUTATION.

BY

W. A. CHAPPLE, M.D., Ch.B., M.R.C.S., D.P.H.,

MAJOR R.A.M.C.,

SURGICAL SPECIALIST, PAVILION ORTHOPAEDIC HOSPITAL.

(With Special Plate.)

THE human heel is Nature's stump. Every surgeon doing an amputation or a reamputation on the lower limb should try to reproduce it.

Syme's amputation is the nearest reproduction, and the Stokes-Gritti operation comes next.

Every stump should be fashioned where possible in the hope that it will bear upon its end some amount of the body weight; and every stump should be asked by the limb-maker to bear what share it can—it may be the whole weight, as after a Syme or a Stokes-Gritti operation,

or it may be one-half, one-quarter, or one-eighth. As time goes on the share will probably progressively increase. This gives a sense of compactness and stability to the limb, as well as a wider distribution of the burden. But so many failures have attended the Stokes-Gritti operation that it is not much in favour. I have the x-ray plates of five failures before me as I write.

One cause of failure is the displacement of the patella upwards by the pull of the quadriceps extensor. Another is the presence of pegs and other means to fix the patella down in order to resist this pull.

In recent cases I have cut the quadriceps attachment to the upper edge of the patella completely across, and then stitched the margins of the patella with catgut to the edge of the periosteum round the end of the femur. One or two additional deep catgut sutures will usually be sufficient, and a firm "button suture" through the skin flaps will make assurance doubly sure. This course was followed in the case illustrated in Fig. 1 (special plate), while the ordinary method was followed in that shown in Fig. 2.

AN ACID-FAST BACILLUS OBTAINED FROM A PUSTULAR ERUPTION.

BY

LOUIS COBBETT, M.D., F.R.C.S.,

PATHOLOGICAL LABORATORY, CAMBRIDGE.

THE bacillus was cultivated from chronic intractable pustules covering the back, buttocks, and thighs of a soldier returned from France. No micro-organisms were seen in the pus, and none could, at first, be cultivated from it. But subsequently there was grown, on more than one occasion, the acid-fast bacillus which is the subject of this note.

The patient, aged 24, was wounded in the foot; he returned home on a boat which was torpedoed and sunk in the early part of 1917. After being in the sea nearly an hour he was picked up and brought to England. The wound in the foot at first healed, but subsequently broke down again, and two operations had to be performed. For a fortnight he was treated in the 1st Eastern Hospital, Cambridge, by continuous immersion in the bath. It was about a month after this that the eruption was first noticed.

On February 27th, 1918, when first seen by me, the eruption had already been in progress for about eight months. During this period the man had been at a convalescent hospital, for the most part up and about. But he had been far from well, and at times confined to bed with sickness and giddiness. He appeared to me to be in good general condition, but had a somewhat dejected air, and moved slowly.

Back and buttocks were covered with swellings of various sizes and different stages of development; some were simply old red scars, others were just pointing and were much raised and indurated, measuring perhaps as much as an inch at their bases. From one of these was obtained a stringy pus, in quantity larger than one would have expected. What particularly struck me was the exceedingly chronic character of the inflammation and the deep-seated position of some of the lesions; for the most active pustules, though somewhat painful and tender to the touch, caused far less trouble than an ordinary boil, and spots which were watched from time to time seemed to make little appreciable progress. Moreover, there were a few swellings, distinctly fluctuating, which were completely subcutaneous, and over which the skin could be freely picked up.

The patient was sent to me because the pus contained no bacteria visible under the microscope, and no micro-organisms—except a few staphylococci and once a diphtheroid bacillus, thought to be adventitious—could be cultivated from it. It was obvious, therefore, from the first that I had to do with lesions which were not those of ordinary suppuration, and a Wassermann test was carried out to clear the ground. The result was negative.

The pus was examined by me on several occasions, and various methods of staining were used, but no bacteria were ever seen in it, even when the stain was that used

SIR JAMES PURVES STEWART: ISCHAEMIC MYOSITIS.
(See p. 151.)

FIG. 1.—Ischaemic myositis of 10 months' duration, showing contracture of flexor muscles of wrist and fingers, with wasting in their lower two-thirds.

FIG. 3.—Ischaemic myositis of 53 years' duration, showing inability to extend wrist or fingers, also wasting of muscles in lower two-thirds of forearm.

W. A. CHAPPLE: A MODIFIED STOKES-GRITTI AMPUTATION.
(See p. 158.)

FIG. 1.—A Stokes-Gritti in which the quadriceps had been cut and the edges stitched with catgut only.

FIG. 2.—A Stokes-Gritti in which the quadriceps had not been cut.

LIONEL J. PICTON: ATTEMPT TO BREED TUBERCLE-
IMMUNE CATTLE.
(See p. 157.)

FIG. 1.

FIG. 2.