than mouths of non-agricultural workers and residents of the larger towns. Such information might be helpful in revealing factors which have so far not been taken into account in working out the epidemiology of this disease.

Although it has been found that male agricultural workers are more liable to actinomycosis than male workers in non-agricultural occupations it does not mean that we must connect this disease with the aerobic actinomycetes found in grains or grasses or even with the presence of the anaerobic *Actinomyces bovis* of lumpy jaw in cattle. Erikson (1940) made a detailed study of 20 strains of micro-aerophilic actinomycetes, 15 of which were of human origin and 5 of bovine origin. She showed that there were certain morphological, physiological, and serological differences between the human and bovine strains. Slack *et al.* (1951), however, in an examination of 11 human strains and 5 bovine strains isolated from cases of actinomycosis showed that they were serologically related. There is little information available concerning the frequency of actinomycosis in cattle and no evidence as yet to warrant connecting bovine with human cases of the disease. The lack of knowledge of the epidemiology of the disease in cattle would appear to be as great as it is in the case of the human subject.

Summary

A survey of the occurrence of actinomycosis in Scotland during the 13 years from 1936 to 1948 revealed 186 cases. All had bacteriological or pathological confirmation of the clinical diagnosis.

The commonest site of infection was the cervico-facial region, and males were more often affected than females.

Male agricultural workers were found to be more liable to this disease than those in other occupations. There was no significant difference in the attack rate of the residents of the larger towns and rural areas in the north-east of Scotland, but the residents of the larger towns in the rest of Scotland were found to be much less frequently the subjects of this disease than those living in essentially rural areas.

I wish to thank the medical superintendents of the various hospitals in Scotland and their records staff for help in obtaining the information on which this paper is based. For advice and assistance on statistics I am grateful to Mr. H. Campbell, Nuffield Department of Industrial Health, King's College, Newcastle-upon-Tyne.

REFERENCES

- Christian, H. A. (1947). *Principles and Practice of Medicine*, 16th ed., p. 318. New York.
- Cope, V. Z. (1949). *British Medical Journal*, 2, 1311.
- Emmons, C. W. (1937). *Mycologia*, 39, 377.
- Erikson, D. (1940). Spec. Rep. Ser. med. Res. Coun., Lond., No. 240.
- Hoeden, J. van der (1939). Quoted by Topley and Wilson, p. 1270.
- Lord, F. T., and Trevett, L. D. (1936). *J. infect. Dis.*, 58, 115.
- Porter, I. A. (1951). *British Medical Journal*, 1, 1360.
- Slack, J. M., Ludwig, E. H., Bird, H. H., and Canby, C. M. (1951). *J. Bact.*, 61, 721.
- Sullivan, H. R., and Goldsworthy, N. E. (1940). *J. Path. Bact.*, 51, 253.
- Topley, W. W. C., and Wilson, G. S. (1946). *Principles of Bacteriology and Immunity*, 3rd ed., p. 1270.
- Wolff, M., and Israel, J. (1891). *Virchows Arch. path. Anat.*, 126, 11.

The City Council of Nottingham has recently published an attractive handbook describing the facilities available in the city for users of the National Health Service. The book opens with a brief summary of the medical services during the last hundred years up till 1948. It then describes in simple terms what maternal and child welfare facilities there are in Nottingham, and gives a detailed account of the work of the health visitors, midwives, district nurses, and home helps. In a chapter entitled "Care Service" the book tells of the services for the prevention of illness, by immunization and vaccination, and the control of the spread of tuberculosis and other infectious diseases. There is also a short description of the sanitary services and of the council's efforts to promote smoke abatement and slum clearance. The handbook concludes with the addresses of hospitals and clinics in and around Nottingham where different kinds of treatment may be obtained.

SPECIFIC BACTERIOLYSIN IN SUBACUTE BACTERIAL ENDOCARDITIS CAUSED BY A HAEMOLYTIC STAPHYLOCOCCUS ALBUS

BY

MARGARET M. O'HARE, F.R.F.P.S., M.R.C.P.
Assistant Physician, Southern General Hospital, Glasgow

AND

JOHN S. STEVENSON, M.D.
Assistant Pathologist, Stobhill General Hospital, Glasgow

This report records a case of subacute bacterial endocarditis (S.B.E.) in which there was serological evidence that the causal organism was a haemolytic coagulase-negative strain of *Staphylococcus albus*. So far as can be ascertained, serological evidence of infection in S.B.E. has not been recorded previously. The particular interest in this case was the presence of a specific bacteriolysin in the serum.

Between 1945 and 1952 British and American literature recorded over 30 cases of S.B.E. due to coagulase-negative white staphylococci, and it has been suggested (Dowling *et al.*, 1952) that this type of endocarditis may be increasing in frequency. Out of a total of 2,100 cases of S.B.E. reported in five reviews (Thayer, 1931; Perry, 1936; White *et al.*, 1945; Priest *et al.*, 1947; Cates and Christie, 1951), *Staph. albus* was the causal organism in 20 instances—that is, about 1%. Individual cases are reported from time to time (for example, Cunliffe *et al.*, 1943; Matthew, 1951; Cobb, 1952), and serve to emphasize the fact that *Staph. albus* should not be regarded invariably as a contaminant when found in the blood cultures from these cases.

Case Report

The patient, a married woman aged 33, had a long "rheumatic" history, having had three attacks of acute rheumatism at 14, 27, and 29 years. Between 1947 and 1950 she was admitted to hospital on four occasions, suffering from various degrees of cardiac failure, with mitral stenosis and fibrillation. In 1947 and 1948 she was in hospital for some weeks; rapid improvement was brought about with rest and digoxin therapy.

On April 13, 1949, she was admitted to hospital for the third time, again with severe fibrillation; as before, this was treated with digoxin. Improvement was rapid, but on May 9 it was found that the spleen was enlarged to one and a half fingerbreadths below the costal margin. A persistent anaemia (Hb, 7 g.), very marked clubbing of the fingers, and prominent nodules over the elbows were also found. It was thought possible that an early subacute bacterial endocarditis was present, despite the fact that the patient was afebrile, and a series of blood cultures gave the following results:—May 10: a few colonies of a haemolytic coagulase-negative *Staph. albus*; May 12: no growth; May 16 and 17: a heavy growth of a haemolytic coagulase-negative *Staph. albus*.

In vitro tests showed that the organisms isolated (presumably all the same strain) were sensitive to penicillin; 1,000,000 units of penicillin daily was given when the second positive culture was reported—this was continued for five weeks. The patient's condition improved dramatically with penicillin therapy. The haemoglobin rose to 11.9 g., her weight increased, and symptoms of tiredness and malaise disappeared. Nine blood cultures taken between May 25 and July 30 were sterile. She was discharged on August 20.

For some months she continued well, but in February, 1950, she was readmitted to hospital with severe decompensation. During the next few weeks her condition gradually worsened; blood cultures were sterile. Gross cardiac failure developed on May 15, 1950, and death occurred the next day. Permission for necropsy was refused.

Bacteriology

When the staphylococcus was first isolated (May 10, 1950) it was thought to be a skin contaminant, as it is generally accepted that most albus strains isolated from blood cultures fall into this category. The striking feature of the organism, however, was the degree of haemolysis produced on blood agar; the zone of clearing round each colony was almost as great as that found with a haemolytic streptococcus. In other respects the organism appeared to be an ordinary albus strain; the coagulase test was negative. When similar organisms were isolated from further blood cultures (May 16 and 17) contamination seemed unlikely, and the patient's serum was investigated for antibody content.

The results of the various tests showed that the serum did not contain any agglutinins but that a bacteriolysin was present. This bacteriolysin was evidently specific for the staphylococcus isolated from the blood cultures (see Table).

Bacteriolytic Effect of the Patient's Serum on a Range of Organisms

Organism	Serum Dilutions—Reciprocals										C
	2	5	8	10	20	40	100	200	500	750	
<i>Staph. albus</i> A	+	+	+	+	+	+	+	+	±	—	—
" " B	+	+	+	+	+	+	+	+	—	—	—
" " C	+	+	+	+	+	+	+	+	—	—	—
" " 1	+	—	—	—	—	—	—	—	—	—	—
" " 2	+	±	—	—	—	—	—	—	—	—	—
" " 3	—	—	—	—	—	—	—	—	—	—	—
" " 4	—	—	—	—	—	—	—	—	—	—	—
<i>Staph. aureus</i> Oxford	+	—	—	—	—	—	—	—	—	—	—
<i>Str. pyogenes</i>	—	—	—	—	—	—	—	—	—	—	—
" <i>viridans</i>	—	—	—	—	—	—	—	—	—	—	—
<i>Bact. coli</i>	—	—	—	—	—	—	—	—	—	—	—
<i>B. friedländeri</i>	—	—	—	—	—	—	—	—	—	—	—

Staph. albus A, B, and C=the organisms isolated from the three positive blood cultures.

Staph. albus 1, 2, 3, and 4=four strains isolated from other patients' blood cultures and classed as contaminants. All non-haemolytic.

+ = Clearing of the suspension. — = No change. ± = Partial clearing.

Similar tests were carried out with sera from 12 other patients, including two known cases of S.B.E. due to *Streptococcus viridans*, with negative results. The bacteriolysin was still present in the patient's serum several weeks later, but the lytic titre had fallen to 1:4 within three months. The haemolytic activity of the organism gradually diminished after several months' storage on Dorset's egg medium, and had almost disappeared when examined three years after isolation.

Comment

The anaemia in this case was no doubt due to the haemolytic activity of the staphylococcus: the occurrence of a haemolytic strain of *Staph. albus* in S.B.E. has been noted previously by Allen and Riecker (1949). The development of specific bacteriolysin does not appear to have been reported in other similar cases, and may be a purely isolated finding. Absence of post-mortem data makes it difficult to assess the effect of the septicaemia on the course of the patient's illness, but the degree of cardiac damage was so great that it is feasible to assume that early death was inevitable, irrespective of the blood infection.

We wish to thank Dr. E. Oastler, in whose wards this case occurred, for permission to make use of clinical notes.

REFERENCES

- Allen, A. W., and Riecker, H. H. (1949). *J. Mich. med. Soc.*, **48**, 1461.
 Gates, J. E., and Christie, R. V. (1951). *Quart. J. Med.*, **20**, 93.
 Cobb, C. C. (1952). *British Medical Journal*, **1**, 90.
 Cunliffe, A. C., Gillan, G. G., and Williams, R. (1943). *Lancet*, **2**, 355.
 Dowling, H. F., Lepper, M., Caldwell, E. R., and Spies, H. W. (1952). *Medicine, Baltimore*, **31**, 155.
 Matthew, H. (1951). *Lancet*, **1**, 146.
 Perry, C. B. (1936). *Bacterial Endocarditis*. Bristol.
 Priest, W. S., Smith, J. M., and McGee, C. J. (1947). *Arch. intern. Med.*, **79**, 333.
 Thayer, W. S. (1931). *Edinb. med. J.*, **38**, 237.
 White, P. D., Mathews, M. W., and Evans, E. (1945). *Ann. intern. Med.*, **22**, 61.

Medical Memorandum

Amoeboma of the Caecum

A male clerk aged 34 was admitted to hospital on November 20, 1949, with a three-days history of right-sided abdominal pain.

On examination he had a normal temperature and pulse, there was a tender mass palpable in the right iliac fossa, and the white blood cell count was 11,000. The case was thought to be an appendix abscess, and was treated with antibiotics. As there was no diminution of the mass after twenty days, an exploratory operation was performed.

Operation.—On December 9 a Rutherford Morison incision was made and a firm, rather inflamed mass was found occupying the caecum and ascending colon. This was thought to be a neoplasm or a non-specific granuloma, and the affected bowel was exteriorized after suturing the ileum to the transverse colon preparatory to a double-barrelled colostomy. Three days later the affected loop was removed and the intervening spur was crushed soon after. Within three weeks there was considerable excoriation of skin around the colostomy, and this rapidly developed into spreading infection with sloughing of the abdominal wall, which increased steadily until *Entamoeba histolytica* was identified in the skin edge and appropriate treatment given.

The condition improved gradually and sloughs separated, but a large granulating area resulted with a faecal fistula in the middle of it. Closure was effected after the third attempt some eight and a half months from the original operation. Tantalum mesh proved useful in bridging the gap in the abdominal musculature, and the skin defect was made good by sliding and grafting. Bowel action has been regular and normal ever since, but two small sinuses developed which discharged sero-sanguineous fluid but no faeces. Part of the mesh had been extruded and cut off, but it was thought best not to interfere further.

When last seen the patient was enjoying excellent health and going to business as usual.

COMMENT

This case illustrates the importance of excluding amoebiasis when doubtful masses are found in the bowel, especially in view of the relatively large number of persons who have been abroad in recent years. Amoebic ulceration of the abdominal wall seems to be more frequent in the United States—often coming on after appendicectomy in an infected case (Hunter, 1951). Hawe (1945) writes on the surgical aspects of intestinal amoebiasis, and refers particularly to the need of excluding acute caecal amoebiasis before operation for appendicitis in endemic areas. Donald (1940) describes two cases simulating carcinoma of the rectum. It would seem that the cases most likely to cause confusion in endemic areas are those of acute caecal or appendiceal amoebiasis, while the presence of unusual masses in the rectum or elsewhere in the bowel may call for a search for *E. histolytica* in the stools before proceeding to surgery.

Acknowledgments are due to my colleagues at Ashford Hospital, Middlesex, particularly Dr. K. D. Keele, for advice on treatment, and to Drs. W. J. Hamilton and C. F. Ross for pathological reports.

Epsom.

E. N. CALLUM, F.R.C.S.Ed.

REFERENCES

- Donald, C. J. (1940). *Proc. Mayo Clin.*, **15**, 321.
 Hawe, P. (1945). *Surg. Gynec. Obstet.*, **81**, 387.
 Hunter, O. B. (1951). *Programme of International Congress of Clinical Pathology*, p. 17.