Conclusions

Further cases might be quoted, but these serve to illustrate that simple depressed fractures should be elevated to restore the contour and capacity of the skull and to free what may be an anchored brain in the hope of avoiding future complications such as epileptic attacks. Early operation is advisable; not urgently as in compound fractures, but at a time convenient to patient and surgeon. Secondly, in the case of fractures in the temporal region, depression should be suspected and special x-ray examination made to ascertain whether it is present and masked by the temporal muscle and a tense overlying temporal fascia. Lastly, deep depressions in the skulls of the newly born should be pressed out within a few months of birth, if during this time no tendency is observed for natural restoration to take place.

I am indebted to Miss J. M. Williams, of the Welsh National School of Medicine, for the drawings.

TEEPOL IN THE PREPARATION OF SPUTUM FOR TUBERCLE CULTURE

BY

P. BROWNING, M.B., Ch.B.

K. M. CALVER, Ph.D., B.Sc.

AND

E. E. PATERSON, B.Sc.

(From the Bacteriological Service, Hawkhead Laboratory, Paisley)

Demonstration of tubercle bacilli in sputum is necessary for diagnosis and for controlling risks to contacts, and is also, owing to recent developments in chemotherapy, of increasing importance in assessing treatment. Thus identification of this organism constitutes a growing duty of public health laboratories.

Pottenger (1930-1) showed that microscopical examination of a Ziehl-Neelsen film for 10 minutes will reveal less than 88% of positive specimens. The value of selecting a purulent portion of sputum for preparing films has been re-emphasized by Spendlove *et al.* (1949), who clearly demonstrated the superiority of this procedure as compared with concentration by alkali treatment and centrifugation, which seems to reduce the acid-fast properties of the organism. Corper (1928) stated that over 100,000 tubercle bacilli must be present per millilitre of sputum before they can be detected microscopically in a fairly thick film, while according to Cruickshank (1952) the number is from 10,000 to 50,000. Thus adequate direct examination of sputum films is time-consuming, and even when thoroughly carried out some 10% of positive specimens probably escape detection. Culture methods also have their defects, and some microscopically positive sputa fail to yield growths. Cruickshank noted as high as 27% failures with weakly positive sputa in general, and 68% when chemotherapeutic agents had been administered. However, it is clear from the work of Dubos (1946) that the tubercle bacillus is fickle in its reaction to artificial nutrient environments.

Direct examination and culture are complementary, and should be carried out in parallel in order to minimize false-negative results. This is all the more important since the valuable method of guinea-pig inoculation can be performed only on a limited scale and also has its failures. Recently the Public Health Laboratory Service Working

Party on the Diagnosis of Tuberculosis (Report, 1952) described very thorough experiments to determine which of four techniques for homogenization and culture of sputum yielded the greatest proportion of positives, and concluded that "sodium hydroxide proved significantly better than any other methods." We have obtained promising results by a different method which is exceedingly simple and rapid as compared with the alkali technique.

Method

The detergent "teepol," stated by the manufacturers to be a solution of sodium higher alkyl sulphates, was used to homogenize the specimen and kill contaminants. Trial sputa, mainly from sanatorium patients and received after one to three days in transit, consisted of 3-10-ml. specimens in 1-oz. screw-cap universal containers with "blackol" liners. First a direct smear was stained Ziehl-Neelsen and examined for five minutes by each of two people. The number of tubercle bacilli found in positive films during the 10-minute search varied from abundant to only one or two. To each specimen was then added an equal volume of teepol, the mixture being shaken once or twice for a few seconds and kept at room temperature for six hours in the case of a third of the specimens, the others being left for 24 hours. The result was a homogeneous and syrupy mixture. The whole surface of a slope of Löwenstein-Jensen medium in a universal container was inoculated with three small (2-mm.) loopfuls of each mixture and kept at 37° C. for six weeks.

Results

Of 142 specimens, 41 were positive microscopically, and growths of tubercle bacilli were obtained from all but one of the latter. Of the 101 microscopical negatives, eight proved positive on culture, two of which were examined for virulence and found to be virulent to the guinea-pig. Three further specimens, microscopically a positive and two negatives, were discarded because of contamination. Growth was usually observed in the third or fourth week.

It is not yet known whether the shorter exposure will yield a larger proportion of positive results, or whether the carry-over of a small amount of detergent benefits the culture, but apparently it is not harmful. The effect of larger inocula has yet to be tried. A 50% watery dilution of teepol often fails to homogenize and so to sterilize even in 48 hours, coliform organisms and yeasts mainly surviving. The method is apparently applicable to other types of specimen, urines having been successfully cultured.

REFERENCES

- Corper, H. J. (1928). *J. Amer. med. Ass.*, **91**, 371.
- Cruickshank, D. B., Sellors, T. H., and Livingstone, J. L. (1952). *Modern Practice in Tuberculosis*. Butterworth, London.
- Dubos, R. J., and Davis, B. D. (1946). *J. exp. Med.*, **83**, 409.
- Pottenger, J. E. (1930-1). *J. Lab. clin. Med.*, **16**, 985.
- Report (1952). *Monthly Bull. Minist. Hlth, Lond.*, **11**, 187.
- Spendlove, G. A., Cummings, M., and Patnode, R. A. (1949). *Pub. Hlth Rep., Wash.*, **64**, 574.

The seventh annual report of the Institute of Child Health (University of London) includes an account of research undertaken or projected at the Institute during 1952. In January a full-time physiologist was appointed and is at present engaged on investigations of renal function. The Institute has undertaken supervision of the Population Investigation Committee's survey of growth and development being carried out by Dr. J. W. B. Douglas. At the Child Study centre the investigation into normal growth and development is proceeding, and the report of the results of the pilot survey was produced during the summer. Improved techniques of measurement have been introduced; x rays have been used to determine tissue depth, and an accurate method for assessing this has been determined. Dr. A. P. Norman has continued his clinical investigations of fibrocystic disease of the pancreas and (with Dr. L. I. Wolff) of hepatic and renal function in full-term and premature neonates. Dr. J. Dean and Mr. D. I. Williams have continued their work on nocturnal enuresis.