child. This is because appreciable amounts of the agent will not be absorbed from the infant's gastrointestinal tract—for example, the aminoglycosides and injectable cephalosporins—or, if the agents are absorbed, the concentrations reached in the infant are extremely low—for example, ampicillins. Concern has been expressed, however, over a few agents.

Chloramphenicol—Although grey baby syndrome is most unlikely (as concentrations are too low), the possibility of infant marrow toxicity necessitates either avoiding this agent or stopping breast feeding.

Tetracyclines—Tetracyclines should be avoided because of the theoretical, rather than real, risk of teeth discoloration. Chelation of the tetracycline by the calcium ions in milk probably overcomes this problem.

Sulphonamides (including co-trimoxazole)—Although the risk of kernicterus is low, it should be borne in mind especially if a highly protein bound sulphonamide—for example, sulphadimethoxine—is being used. In glucose-6-phosphate dehydrogenase deficiency there is the risk of haemolytic anaemia.

Isoniazid—There is a theoretical risk of convulsions with isoniazid. Both mother and baby should be given pyridoxine.

Metronidazole—Mothers who start taking metronidazole after they have started breast feeding may find that it has an adverse effect on the taste of the milk.

Conclusion

A wide range of antimicrobial agents are now available and harmful effects on the fetus have been proved in relatively few. Infection in pregnant women usually requires treatment and the choice of agent should not be a major problem.

I thank Dr C Ellis for his advice on the treatment of parasitic infections.

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Portraits from Memory

1—Fifty years of microbiology: first steps

JAMES HOWIE

John Cruickshank, first professor of bacteriology in the University of Aberdeen, stimulated my interest in the subject when I attended his class in 1928. He was then a bright lecturer, expert at selecting the newsworthy parts of bacteriology—how the plague commission, for example, not only proved the route of transmission from rat to man by way of the flea, but also devised simple, humorous, and convincing experiments to prove the point with such clarity that even the hard-headed owners of slum property in Bombay reluctantly came to accept that the rat infested hovels had to be burned down. Previously they had argued for a selective capture and killing of enough female rats to create a situation of polyandry in the rat population. This, they argued with feeling, would inevitably so enfeeble the species that rats would soon

Professor John Cruickshank.

This is the first of a series of short articles by Sir James Howie. The complete collection will be published as a book.

become extinct by reason of the fighting among males for an ever diminishing number of females.

John did not weary us with details of the technical methods used to identify microbial species but showed us by good examples how bacteria established themselves, spread around, and could be interrupted by measures of hygiene and immunisation. At that time successful generalised chemotherapy was only an aspiration and a dream in spite of the work of Ehrlich. John Cruickshank also saw to it that his practical classes were supported by a large enough team of demonstrators to ensure that every student really saw what was being handled, so that bacteria and bacteriological diagnostic methods became realities and not mere textbook abstractions. We were not taught actually to become practical bacteriologists but we certainly saw and came to know how bacteriologists worked and thought. During the practical classes demonstrators, and the professor himself, regularly and provocatively challenged individual students by embroiling them in argument for and against current clinical dogmas and popular beliefs. Attendance at lectures was voluntary; absences from the practicals were easily noticed in a class of only 50 students and were firmly discouraged on the basis that you cannot think sensibly about bacteria if you have never even seen them.

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Enter Davidson

Nevertheless, I was still thinking about how to become a physician during my year (1930-1) as a resident when the phenomenon of Stanley Davidson of Edinburgh struck the Aberdeen medical school. The reputation of the school was well maintained by a good degree of excellence and research among most of the preclinical and paraclinical departments and by the general soundness of Aberdeen graduates as good family doctors. The relationships between the Royal Infirmary consultants and the general practitioners of Aberdeen and of the northeast area as a whole were both close and cordial, setting a good example to the students. But the reputation of the clinical departments for research was exactly nothing. They gave sound service in the light of existing knowledge but they never thought of adding to it or questioning it. Pressure from the preclinical heads of departments and encouragement from the Medical Research Council led to a resolve to stir up the clinical departments by appointing new outside professors. In the early 1930s the appointments as professors of Stanley Davidson, James Learmonth, and Dugald Baird made this resolve for reformation into a reality.

In my resident year as houseman to the senior physician at Aberdeen Royal Infirmary I met Stanley Davidson. He came to our

Professor Stanley Davidson.

ward, as he said, to learn clinical medicine: "Heart sounds and all that." The senior physician was a willing tutor and Stanley a diligent pupil—so diligent that after the grand ward rounds of the morning he would come back in the afternoon and ask me to take him over the patients again "to be sure that I know enough to be a credible examiner in the finals." Stanley also made it clear to me personally that if I hoped for a good career in medicine I should not follow the current advice.

In my case this was, "Go to Vienna for a year, learn to speak German and enjoy Wagner, attend a good clinic, come home, put up your plate, apply for a post as a dispensary physician, don't get married to the wrong sort of girl, and use a bicycle until you can afford a car." I applied instead for a two year research scholarship which was then available, and I was fortunate enough to secure it. It was a really generous one: £250 a year tax free, plus any extra interest the trustees might have available from their invested capital; this came to £20 in each of the two years.

I decided to have a go at laying the proper basis for a progressive general consultant physician by doing a year's pathology with Sir Robert Muir of Glasgow, and the obvious way to that objective was first to do a year with John Cruickshank, who had been one of Muir's pupils and assistants. During my year with Cruickshank I was soundly trained in bacteriological methods by the chief technician and introduced to visitors to the laboratory, including Fleming, who told us what he clearly saw in 1932 as the future possibilities of penicillin if only the active material could be extracted and purified without destroying it—an accomplishment which required the later work of Chain.

The year with John Cruickshank was a lively and stimulating as well as argumentative one. John had a reputation, thoroughly deserved, for being an exacting critic of published work, and would be authors often sought his criticism of their drafts. Stanley Davidson was one and he brought John Cruickshank a manuscript which contained a general statement about the inevitability of iron deficiency anaemia among the Aberdeen poor because a dietary survey by Orr at the Rowett Research Institute showed a low intake of iron—lower than that accepted at that time as necessary on the basis of American work. Cruickshank criticised this general statement for lack of direct evidence that was surely available and

urged Stanley to close that important gap. I was in attendance during this debate with Stanley and I saw a possible way of easily collecting the necessary evidence. In short my colleague John Croll and I gained permission to examine routinely the haemoglobin levels of people attending the free dispensary. They included many on very low incomes. We found that there was anaemia but only among the women of childbearing age. We gave our findings to Stanley Davidson, who arranged for further work on the subject, which confirmed our observations. I forgot about this until, a year later, Croll and I found ourselves coauthors of a paper with Stanley and others, of which we saw a final proof only a few days before publication.¹ This was a generous action by Stanley and a demonstration of modest self criticism, which was not by any means a widespread virtue among top clinicians as we then knew them.

On the spot analysis

In due course I set out for an interview with Muir, who had agreed to see me on Cruickshank's recommendation. All the way during the train journey from Aberdeen to Glasgow I read "Muir and Ritchie," the manual of bacteriology on the contents of which I expected I should require to be well informed. Not a bit of it. Muir greeted me amiably. "You're Cruickshank's man, aren't you, and you want to work here for a year? Why do you want to come here? Have you got your money? Do you play golf? Do you fish? When do you want to start?" I was able to answer satisfactorily all the questions except the one about fishing. "Never mind," said Muir, "we'll teach you that. What's your handicap at golf?"

I gathered that I was accepted. Many years later, when I came to know Muir on familiar terms, I asked him what he learnt from such interviews. "Enough," he replied, "to be sure that I'll have a year in which to discover whether I wish to develop the acquaintance of the person or to bring it to an end. You can't hope to learn anything for sure in less than a year. I leave potential recruits to find their own way in the department. If they really get on to something of their own choice I'll work at helping them; but if they can't find anything that interests them—well, I know what's what." I asked him if he ever turned anyone down on the basis of such interviews. "Oh yes," he said, "if they haven't got their money; and if they want to work with me for the wrong reason—like the chap who made it clear that he thought I was the Spilsbury of Scotland. I gave him an alternative address."

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Should medical and nursing staff have routine chest x ray examinations and if so how often?

The convention described in the DHSS's health circular HC(78)3 states that all NHS staff in regular contact with patients or pathological material should have an x ray film taken of the chest before they start work in the NHS and that a tuberculin test should also be carried out. BCG should be given if the tuberculin test is negative and if BCG is refused contact with patients or suspect materials should not be permitted. With regard to x ray examinations a distinction is made for NHS staff at higher risk of exposure to tuberculosis—that is, those whose work brings them into regular contact with tuberculous patients or suspect materials. This group should have an initial chest x ray examination. Any person developing respiratory symptoms that suggested tuberculosis should obviously be investigated forthwith. Most employing authorities would probably consider this advice still appropriate. It is questionable, however, whether annual films for staff known to be tuberculin test positive would be superior to prompt investigation of any symptoms suggestive of tuberculosis. If the disease developed soon after an annual film this might lead to a delay in seeking investigation.—G W POOLE, consultant respiratory physician, London.