

- Mills, J. H., and Horton, B. T. (1938). *Arch. intern. Med.*, **62**, 949.
- Moore, J. E. (1947). "The Modern Treatment of Syphilis", 2nd ed. 4th printing, Thomas, Springfield, Illinois.
- (1949). *Amer. J. Syph.*, **33**, 43.
- , Farmer, T. W., and Hoekenga, M. T. (1948). *Trans. Ass. Amer. Phys.*, **61**, 176.
- Nabarro, D. (1949). *British Journal of Venereal Diseases*, **25**, 133.
- Nelson, R. A., and Mayer, M. M. (1949). *J. exp. Med.*, **89**, 369.
- Nichols, C. F. (1940). *Ann. intern. Med.*, **14**, 960.
- Norris, J. C. (1937). *J. Amer. med. Ass.*, **108**, 169.
- O'Daly, J. A. (1943). *Rev. Sanid. Asist. Soc.*, **8**, 77.
- Padget, P., and Moore, J. E. (1934). *Amer. Heart J.*, **10**, 1017.
- Parsonnet, A. E., and Bernstein, A. (1943). *Urol. Cutan. Rev.*, **47**, 516.
- Penick, R. M. (1938). *Sth. med. J., Nashville*, **31**, 1096.
- Pincoffs, M. C., and Love, W. S. (1934). *Amer. J. Syph. Neurol.*, **18**, 145.
- Poppe, J. K., and de Oliveira, H. R. (1946). *J. thorac. Surg.*, **15**, 186.
- Porter, W. B. (1941). *Trans. Ass. Amer. Phys.*, **56**, 201.
- , and Vaughan, E. W. (1940). *Amer. J. med. Sci.*, **200**, 184.
- Potenza, L. (1943). *Rev. Sanid. Asist. soc.*, **8**, 103.
- Price, R. K., and Skelton, R. (1948). *Brit. Heart J.*, **10**, 29.
- Reifenstein, E. C. (1936). *Ann. intern. Med.*, **10**, 241.
- Robb, G. P., and Steinberg, I. (1938). *J. clin. Invest.*, **17**, 507.
- Rosahn, P. D. (1946). *Vener. Dis. Inform. Suppl.* **21**.
- Saphir, O. (1942). *Arch. Path.*, **33**, 88.
- Schamberg, I. L. (1946). *Amer. J. Syph.*, **30**, 58.
- Schwedel, J. B. (1946). "Clinical Roentgenology of the Heart". Hoeber, New York.
- Scott, V. (1944). *Amer. J. Syph.*, **28**, 682.
- Shimkin, M. B. (1939). *Ann. intern. Med.*, **12**, 1709.
- Sohval, A. R. (1935). *Arch. Path.*, **20**, 429.
- Spain, D. M., and Johannsen, M. W. (1942). *Amer. Heart J.*, **24**, 689.
- Sprague, H. B. (1942). *J. Mt. Sinai Hosp.*, **8**, 1034.
- Strassmann, G., and Goldstein, P. (1942). *Arch. Path.*, **34**, 745.
- Stratton, E. K. (1935). *Arch. intern. Med.*, **56**, 773.
- Thomas, E. W., Wexler, G., and Schur, M. (1945). *Amer. J. Syph.*, **29**, 604.
- Thorner, M. C., and Carter, R. A. (1948). *Amer. Practit., Phila.*, **2**, 301.
- Tucker, H. A., and Farmer, T. W. (1947). *Arch. intern. Med.*, **80**, 322.
- Vaquez, H., and Bordet, E. (1920). "The Heart and the Aorta Studies in Clinical Radiology". Yale.
- Warthin, A. S. (1918). *Amer. J. Syph.*, **2**, 425.
- Webster, B., and Reader, G. G. (1948). *Ibid.*, **32**, 19.
- Welty, J. W. (1939). *Amer. J. med. Sci.*, **197**, 782.
- White, P. D. (1944). "Heart Disease". 3rd ed. MacMillan, New York.
- , Chamberlain, F. L., and Kelson, S. R. (1941). *Ann. intern. Med.*, **15**, 589.
- Wilens, S. L. (1940). *Arch. Path.*, **29**, 200.
- Wilson, R. (1937). *Amer. J. med. Sci.*, **194**, 178.
- Woodruff, O. (1948). *Amer. J. Med.*, **4**, 248.

DISCUSSION

Dr. Geoffrey Bourne said that after Dr. Nicol's extremely full and most interesting account of the subject he felt he had very little to add. The remarks he had to make were largely impressions because although cardiologists did see a certain number of patients with cardiovascular syphilis, they did not amount to a very long series in the course of a year. A few provocative remarks might encourage discussion.

The first decision to make with a patient who had angina of effort with syphilis of the aorta or syphilitic aortic incompetence was the stage of the manifestation in this particular patient. Since treatment was so individualistic and all patients varied in the stage of the disease in which they came for examination, statistics on a large unselected series of cases of aortic incompetence or of angina of effort of spirochaetal origin were difficult to analyse or to be

sure about. In reading a series of say 500 cases it would seem to be inevitable that these cases could not all be at the same stage of the disease. This fact always increased the difficulty of assessing the value of any treatment.

With regard to such a patient coming for examination and being found to have angina of effort or a syphilitic aortic incompetence, he felt the outlook depended very largely, perhaps entirely, upon whether treatment was going to accelerate the healing process by increasing the fibrosis, or whether it would help to relieve the more acute inflammatory stage. He thought that all physicians and syphilologists were only too much influenced by the possibility that the patient might go downhill as a result of treatment. It was clear from post-mortem investigation that the cause of this was an acceleration of the fibrotic process causing further interference

with the coronary blood supply. The practical point, therefore, was to try to judge how early was the disease. If the patient came with angina of effort he believed that the length of history was extremely important. If he came simply with a history of shortness of breath the recent date of onset was a pointer to the fact that the lesion had not advanced far. In syphilitic aortic regurgitation a small leak usually indicated an early lesion.

About a year ago he had had a patient in whose case he had the advantage of being able to call upon Dr. Nicol for his help. The patient, a man of 44, had had a sudden onset of shortness of breath after exercise, and also paroxysmal nocturnal dyspnoea; he had severe oedema, could hardly walk, and was put straight to bed. The interesting point clinically was that although he had a very distant aortic diastolic murmur, his diastolic blood pressure was normal. It was clear that the leak was very slight and probably early, the apex beat was still in the fifth space. The enlargement was not great and he felt that it was safe to begin treatment in spite of the fact that his heart was failing badly as a result of his syphilis.

With Dr. Nicol's help a plan of treatment was drawn up. The patient had persistent tachycardia during the first two or three weeks, he was on oxygen continuously for 10 days, he was given mercurial diuretics and started on anti-syphilitic treatment with penicillin. The man was now back on his farm, where it was impossible to restrain his activities, he was driving his own tractor, and doing heavy work. It was essentially better to decide in every individual patient, if possible, the stage of the lesion. Anti-syphilitic treatment should not be withheld because in days past it was said to be dangerous for the heart.

The second case was a man of 60, who had some angina of effort. When first seen he was short of breath and had an aortic diastolic murmur; he was treated with five or six full courses of arsenicals and lost his symptoms. For seven or eight years he continued to come for follow-up examination. He was so grateful for the effect of the treatment that he refused to take the 5s. when he turned up as a patient for final medical examinations.

The next point was the development of cardiovascular degeneration changes on the top of previously existing rheumatic or syphilitic heart disease. This almost certainly occurred in elderly patients. It was also seen in thyrotoxicosis and in the chronic pulmonary heart. That was the second point he wished to make and it introduced considerable difficulty when assessing the prognosis.

There were certain other thoughts which occurred

to his mind with regard to physical signs. There was the accentuated aortic second sound which Dr. Nicol mentioned, and with the interpretation of which he agreed. He believed in all cases that the sound was due more to the proximity of the aorta to the chest wall than to increased blood-pressure. This was also true even in hypertensive cases. In syphilis it occurred without hypertension, and if one came across a second sound in someone who had no hypertension and whose heart was not enlarged, one should always think very carefully of syphilis.

With regard to syphilitic myocarditis he felt that it was one of those things which might occur, and probably did occur, but must be extremely rare. As Dr. Nicol mentioned, so many of these patients with gross aortic insufficiency were seen for the first time with heaving, jerking arteries, with the apex beat displaced towards the axilla, and often with no symptoms. Men working as labourers, for instance, showed a remarkable discrepancy between the gross signs and the minimal symptoms. This being true, surely if syphilitic myocarditis were really common these patients would get shortness of breath long before they did, and although he accepted the possibility he thought it must be rare.

Then there was aneurysm of the descending aorta. If one saw in a patient a definite pulsation, particularly when the thorax was jerked to the left, aneurysm of the descending aorta must be suspected, especially if the heart was not enlarged. A further physical sign which he had found useful—he once pinned his faith to it against the opinion of a man who was the best radiologist he knew—was the differential diagnosis between bronchial carcinoma and aneurysm of the aorta. He noticed that in this particular case the trachea was displaced away from the swelling, whereas a bronchial carcinoma would draw it towards the lesion. If one was in a position of difficulty and there was this definite sign, he felt that the chances were in favour of aneurysm.

Dr. Bourne asked what was Dr. Nicol's opinion with regard to the frequency of cardiovascular syphilis and central nervous system syphilis? He believed it was much more common than as students they were led to suppose. He remembered a case of a local postmaster who was sent for an opinion because he was ill, nothing definite at all, but he could not do his work, he could not be bothered to concentrate, and his wife said he would break off a conversation in the middle. Dr. Bourne said he was at a loss until he heard a distant aortic diastolic murmur. The pupils were normal, but the patient had a strongly positive Wassermann reaction, and proved to be suffering from G.P.I. An aortic diastolic murmur in someone who was known not to have had it some years before was strongly

indicative of syphilis, possibly in some other part of the body as well.

Mr. A. J. King said that the suggestion that the syphilitic process might cause stenosis of other vessels arising from the aorta, as well as the coronaries, was new to him. On the other hand, he did not see why this should not happen, and he was particularly interested in the point. It so happened that he had seen recently two or three patients with syphilitic aortitis who had shown considerable disparity in the radial pulsations in the two sides with no evidence of aortic aneurysm pressing on the large vessels arising from the aorta.

Dr. Nicol had also mentioned once or twice the possibility of rupture of one of the cusps of the aorta valve as the result of cardiovascular syphilis. He would have thought that such an accident, though presumably it could happen, must be extremely rare. In his opinion such a development would cast doubt upon the diagnosis and might suggest the presence of some other condition such as superadded sub-acute bacterial endocarditis.

In discussing the aetiological factors in syphilitic aortitis *Dr. Nicol* had mentioned race and also occupation, both of which were well known to be important. Most of the figures relating to these matters came from the United States, and *Mr. King* suggested that the factor of race was probably dependent upon the factor of occupation, for it was well known that much of the heavy labouring work in the United States was done by the coloured people, and cardiovascular syphilis and aortitis was considerably more common among them than among the whites.

He would say one word about the interesting case cited by *Dr. Bourne* and the question of having to guess as to the stage of the disease before commencing antisyphilitic treatment. If there had to be a guess he would sooner have *Dr. Bourne's* guess than anybody's, but, if he might be allowed to say so, it was possible that just as good a result might have been obtained without risk if the patient had been treated for his heart failure along general lines and antisyphilitic treatment had been withheld until compensation was restored.

Dr. McElligott said that he could not pretend to have digested the address but he would look forward to doing so when it appeared in the *Journal*. He was particularly pleased to hear *Dr. Bourne* stress the importance of treating cases of cardiovascular syphilis as strenuously as was consistent with safety. Although cardiac Herxheimer reactions must be extremely rare, he had recently seen a patient with an aortic aneurysm who developed what apparently

was a recurrent laryngeal nerve palsy a few hours after his first injection of penicillin. He would agree that this could be coincidental but such happenings put one on one's guard.

Dr. S. M. Laird said that this was a vast subject and that there were many points one would like to talk about. His own feeling in diagnosis was, that with regard to aortitis, one's clinical ability was poor and the ancillary aids were not very helpful. Because of these factors he believed that if one could detect any abnormality for which there was no obvious explanation in a patient who had late syphilis, then one should assume that abnormality to be very probably due to syphilitic involvement of the aorta. One had to bear in mind age, hypertension, and so on, and in the absence of such factors any abnormality clinically detected indicated a considerable degree of underlying pathology, which should be borne in mind in assessing the case and its treatment.

With regard to treatment, in the past he had used arsenicals after very adequate treatment with bismuth, and he felt that the drug was beneficial. The same was true today of penicillin. He thought it could be used earlier than one formerly cared to use the arsenicals, but he still preferred to begin the treatment with bismuth. He did not know of any reason why urgency should be so great that there was no time for some preliminary treatment. General medical care had been stressed, and he thought that this was probably most important. Rest in bed was of tremendous value, and he felt that probably the use of procaine penicillin rather than aqueous penicillin was desirable, even though the patient was in hospital, first because the injections disturbed the patient less, and secondly one did not get the sudden peak in the blood level which resulted from aqueous penicillin.

He would like to say a word about cardiac involvement in congenital syphilis. There was no doubt at all that it did occur. He had seen a number of cases which showed evidence of congenital infection, and there was good evidence of cardiovascular involvement. Many of the people who denied that this could occur—and he knew *Dr. Earle Moore* to be one of them—were inclined not to allow sufficient time for the involvement to become manifest. In the acquired disease it probably took 10 years to become clinically manifest, and since the first 10 or 15 years of life did not involve quite such heavy physical strain as that of the labouring adult, it was reasonable that cardiovascular congenital syphilis should not manifest itself until 20 to 25 years of age. If one saw a considerable number of cases of congenital syphilis

in adults, as he did, then the diagnosis of cardiovascular involvement was justified in a number of cases.

Dr. Oliver asked if there were any aetiological connexion between cardiac syphilis and hypertension; *Dr. Nicol* seemed to divorce rather than to wed the two conditions. In speaking of hypertension *Dr. Oliver* meant a mild hypertension with 180 systolic pressure. In support of the suggestion one could think of *Bejel*, a similar disease to syphilis, in which, if he was right, cardiovascular involvement was somewhat rare. In the races suffering from *Bejel* hypertension was also rare.

Dr. R. Lees (the President) said that *Dr. Nicol's* address had been a most interesting and comprehensive review of the subject, and that *Dr. Bourne* also had made a valuable contribution to the discussion for which the Society was grateful.

The influence of race and occupation had been mentioned as affecting the incidence of syphilitic disease of the heart and aorta. He had been informed that, on the Gold Coast, syphilis was recognized as being very common and as a frequent cause of sudden death amongst the African boatmen who unloaded ships and worked the cargo. This work imposed very severe and sudden physical strains. Though other males in the same area had also a high incidence of syphilis, they did not appear to have aortic disease unless their work involved great physical strain.

He was interested in bacterial endocarditis which developed on the basis of syphilitic disease of the aorta and aortic valves. He had had the opportunity of studying one such case, which was the only one he had recognized. The patient was admitted to hospital for cardiac symptoms and a diagnosis of aortic incompetence was made. At this time there was no evidence of bacterial endocarditis. Some 3 months after admission he developed the symptoms and signs of bacterial endocarditis and this diagnosis was supported by a growth of a streptococcus in blood cultures. Treatment with penicillin was given, the dose was increased gradually from 0.5 to 2.0 mega units per day, and continued for about 3 weeks; the total amount given was 40 mega units. The patient improved rapidly, his recovery appeared to be complete, and he had been observed for over a year, during which time he had earned his living as a hawker. No treatment had been given subsequently. *Dr. Lees* said he would be interested to know if such cases were common, and if they responded well to penicillin treatment.

His own preference in the treatment of cardiovascular syphilis was for more prolonged therapy than the short course of 10 to 12 days, which

seemed to be a common practice with many physicians. After a period of preparation with rest and bismuth injections, he gave penicillin for at least three weeks, aiming at a total dose of 20 mega units. In other cases he adopted a shorter period of treatment, but repeated the course about one month later. He had formed the impression that benefit might follow the maintenance of high levels of penicillin in the blood, so that by osmotic pressure the penicillin would penetrate into the deeper layers of syphilitic tissue.

He would also emphasize the high incidence of coincident syphilitic disease of the cardiovascular system and the nervous system. As the cardiac manifestations were often asymptomatic, neurologists tended to ignore them by failing to investigate the circulatory system fully. It was his experience that the prognosis in late syphilis depended more on the integrity of the cardiovascular system than on any other factor.

In late syphilis and latent cases of 10 years' or more duration, he always assumed that the patient had aortitis.

Dr. Nicol, in reply, said that he was most grateful to *Dr. Bourne* for his dissertation on the subject. The first patient he had mentioned was treated with bismuth and iodides and then with penicillin. He agreed that myocardial fibrosis as an autopsy finding was common. The frequency of associated central nervous system syphilis, excluding patients with G.P.I., worked out to just about 25 per cent. at the Johns Hopkins Clinic. He agreed with speakers who said that lumbar puncture should be done on all patients with late or latent syphilis.

With regard to *Dr. Laird's* views on cardiovascular syphilis and congenital syphilis, he could only say that he would believe in such a case only if there was an autopsy, when one would prefer to find spirochaetes in the tissues. As far as congenital stigmata were concerned they might occur in patients who had been adequately treated *in utero* and who later acquired syphilis. It was unlikely that a large number of cases could be explained in this way. His own personal belief was that valvular lesions did not occur in congenital syphilis.

Another speaker had mentioned the problem of reversal of positive Wassermann reactions; this reversal in late syphilis was not, in any way, important in prognosis. *Mr. King* had mentioned his doubts that murmurs due to the rupture of a valve occurred only in aortic syphilis. He agreed that if one met this clinical finding bacterial endocarditis would come first on the list of possible diagnoses. He had seen cases, including one case proved at autopsy, in which there was no evidence of sub-acute

bacterial endocarditis. He was interested in Dr. McElligott's remarks, for he believed that the Herxheimer reaction was rare, but would prefer to "play safe" and give bismuth first. It is related of a patient in the United States that he ruptured his aneurysm five minutes before getting his first injection of penicillin. Dr. Laird mentioned the interval between the development of cardiovascular syphilis and the original infection; the average duration was 10 or 15 years, and in many cases it was probably 20 years before clinical manifestations appeared. On the other hand, a definite and authenticated case had occurred in which gummatous

lesions of the myocardium were found only eight months after the diagnosis of a primary chancre.

On the question of hypertension he felt that patients who had aortic insufficiency did get a raised systolic blood pressure which he believed was due to aortic insufficiency.

He was interested in Dr. Lee's remark about the relation of manual work to cardiac failure. He could not make any comment on the question of higher dosage in treatment with penicillin being more effective. The difficulty with the whole subject at the moment was that there were so many questions which one could not answer.