alignment. At a second testing 'station' each student undergoes a colour vision test, a binocular reading test, and near-point phoria test using a Maddox convergeometer. From the subsequent histories of those examined by him, Dr. Bolton confirms the usual view that 'esophores' are more likely to have eye troubles than 'exophores' or 'orthophores'.

As part of a wider study of the socio-medical and environmental background of 2,539 students of all faculties at the University of Edinburgh, Dr. J. G. Thomson has considered the association of these factors with the academic results achieved by 592 medical students from all years except the first, and by a second group of 137 first-year medical students.

Three-quarters of all students and 83 per cent of medicals were from social classes I and II (the upper social classes). Family size does not show the normal variation between the social classes, and students from lower classes obtain academic results as good as those from other classes.

Students entering the medical faculty at ages between twenty-six and thirty showed the best academic results, followed by those who started at less than eighteen years of age. Of the year-group 18–25, those entering between the ages of twenty and twenty-two gave the poorest results of all. There was no evidence in this group that national servicemen did better or worse than non-servicemen, and, of the physical and environmental factors considered, only myopia showed a slight suggestive association with superior academic performance.

In the first-year group, students living at home did less well than those in lodgings approved by the university welfare superintendent. Room-sharing, longer hours of daily travel-time, and differences in recreational habits did not account for this, and the solution was found in a group of twenty-three students from English secondary schools who were very much more successful than any other group. What appeared to be an interesting environmental difference was, therefore, probably the result of pre-university educational factors, or of varying selection criteria.

Presenting a provocative and enjoyable paper on the relationship between physique and physical attainments, habits and behaviour, including delinquency, Dr. R. Parnell, of the University of Oxford, created a stir with a formula based on physical measurements and radiographic heart-size, which not only differentiated sprinters from long-distance runners, but also graded them according to potential performance. He confidently predicted that a particular athlete at the top of his table would win the 1,500-m. race at the Olympic Games at Helsinki next year.

A comparison of heights and weights in the University of Oxford revealed once again that students from the lower social classes are smaller than those from the other social classes. Since, however, students from government grant-aided schools are "taller and heavier than the highest level reached in the general population", Dr. Parnell argues "that the great difference between undergraduates and the general population is probably due to selection" and not to nutritional advantages. Is it not more probable that working-class parents who are ambitious for their children do, as demonstrated in Dr. Thomson's paper, limit the size of their families in order to give them both educational and nutritional advantages ?

The classification of physique by methods of standard photography based on the Sheldon technique, and standardized by the work of Tanner in Great Britain and Dupertuis in the United States, has produced evidence in support of those who propound a relationship between physique and behaviour. Dr. Parnell demonstrated the use of the 'fat clock', a graphic method of recording physical measurements and the thickness of the subcutaneous fat, which will be a useful technique for all those who are interested in this work.

In a powerful plea for a deeper appreciation of the problems of the tuberculous student, Sir Alan Rook, of the University of Cambridge, estimated that there are probably close on five hundred undergraduates in sanatoria in Great Britain and more than two thousand in need of medical care or observation for pulmonary tuberculosis. After discussing the problems of adjustment and career selection which face those students who are able to continue their studies while under observation, Sir Alan went on to paint a graphic picture of the frustration, the loss of initiative and desire to work, or the fretfulness and restless anxiety of these young people, progressing all too often to a profound psychological maladjustment, which not only retards recovery but also impedes resettlement after cure.

After referring to the success of Continental students' sanatoria, which he reluctantly classed as impracticable in Great Britain at present, Sir Alan asked that, at least, we should establish something corresponding to the Continental post-cure hostels for tuberculous students.

This must not be thought of as preferential treatment any more than rehabilitation units for industrial workers and 'Remploy' factories can be considered 'preferential'. The correct treatment should be available to all, and Continental experience has shown that the correct treatment for university students includes the mental stimulus of continued teaching and study under medical supervision. It is scarcely creditable to British universities to have lagged so far behind Continental practice in this matter. Now, however, the students of Great Britain are pressing strongly for action, and have collected a large sum of money towards this project. It is to be hoped that Sir Alan's plea will bring them the influential support for which they look so hopefully.

As the speakers freely admitted, much of their work is exploratory and open to criticism or even correction. The important thing is that a start has been made. A regular stocktaking of the health, well-being and occupational efficiency of those on whom the advancement of science will depend in the future will be of great interest to members of the British Association, especially if the approach continues to be "through physiology rather than pathology".

ARMAGH OBSERVATORY

REPORT FOR 1950

THE March issue of the *Irish Astronomical Journal* (1, No. 5; 1951) contains the report on Armagh Observatory for the year 1950, in which Dr. E. M. Lindsay, the director, gives the main items of interest and development for the year. The Armagh–Dunsink–Harvard telescope is now in operation at the Boyden Station of the Harvard Observatory at Mazelspoort, Bloemfontein, where it arrived on October 26, 1950, and was erected under the supervision of Dr. J. S. Paraskevopoulos and Dr. Bok shortly before the death of the former. The primary mirror has a diameter of 36 in., the secondary mirror 16 in., and the correcting plate 32 in. The photographic plate covers an area of about 18 square degrees, and the scale is 1 mm. = 68″. An exposure print of 61 min. is reproduced and shows the excellent performance of the instrument and its efficiency in the photography of diffuse nebulæ. A member of the staff of Armagh Observatory spends four months of the year on the observational programmes on the Southern Milky Way with the telescope. The report includes a photograph of the instrument. The completion of the objective prism for the telescope is well under way; it will be 33 in. in diameter—the largest in the world—with a 5° angle giving a dispersion of about 400 A. per mm. The cost of the prism so far has been borne by Harvard University and by a grant from the Senate of Queen's University, Belfast.

Dr. E. B. Armstrong commenced erecting the Armagh Schmidt telescope in August 1950, and the final adjustments were being made and test plates taken early this year.

The remainder of the report gives a list of publications, a summary of the meteorological work, the names of a number of visitors, a miscellaneous collection of information on lectures by Dr. Armstrong at Queen's University, the synchronous motors for the meteor cameras, various internal renovations and alterations in the buildings, etc.

A NEW MEASUREMENT OF THE VELOCITY OF RADIO WAVES

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DURING January and February of 1951, I was privileged to assist in some new tests of improved Shoran equipment. These tests were undertaken by the United States Air Force, and in general the methods employed were those developed by me[1-3]. However, several improvements were incorporated in the equipment by the United States Air Force, the most important one being a 'gain-riding technique', whereby the gains were manually controlled and maintained, both at the ground station and in the air, at a constant level. This technique effectively eliminated the 'signal intensity' correction reported in the earlier work.

The lines measured constituted a five-sided figure with a central point. Since the distances between all points were measured, there were fifteen lines in all. These distances varied from 40 to 320 miles, as shown in Table 1.

Table 1

1	2	3	4	5	6	7	8
Line	Ground stations Rate	Drift	Geod. distance	Shoran distance	Shoran minus geodetic	Col. 6 corrected for K	Adjusted V
2–6	2	3	40·6131	40·6041	−0·0090	−0·0033	+0·0008
3–4	1	3	96·7171	96·7049	−0·0122	−0·0083	+0·0024
5–6	1	2	100·3098	100·2988	−0·0110	−0·0054	−0·0007
5–1	1	3	118·9953	118·9840	−0·0113	−0·0074	+0·0002
1–6	1	2	133·0113	132·9985	−0·0128	−0·0072	−0·0009
2–3	2	3	134·9698	134·9546	−0·0152	−0·0095	+0·0013
5–2	1	3	139·1225	139·1127	−0·0098	−0·0059	−0·0025
3–6	1	2	145·8427	145·8276	−0·0151	−0·0095	+0·0006
1–2	3	2	145·8884	145·8768	−0·0116	−0·0059	−0·0029
4–6	1	2	190·5047	190·4889	−0·0158	−0·0102	−0·0013
2–4	1	2	199·1914	199·1735	−0·0179	−0·0123	+0·0002
5–3	2	3	226·9903	226·9698	−0·0205	−0·0148	+0·0010
5–4	1	2	235·5264	235·5042	−0·0222	−0·0166	+0·0023
1–3	2	3	277·0569	277·0347	−0·0222	−0·0165	−0·0003
1–4	1	2	320·1519	320·1271	−0·0248	−0·0192	−0·0002

Probable error of observation = ±0·00118

All stations were tied to the first-order triangulation network of the United States, and the inversed geodetic distances could thus be compared with the Shoran distances.

Three Shoran ground stations were used, but only a single airborne station. Each ground station is known to have a small constant error which can be determined by calibration over a known distance. This error varies from about −0·002 mile to −0·003 mile. In the present case it was possible to make an excellent analytical determination of this error from the results of the measurements.

The original Shoran measurements were made using the Anderson value of $c = 299{,}776$ km./sec. Therefore, that velocity must be multiplied by the factor 1·0000606 derived from the adjustment. This results in a velocity of 299,794·2 ± 1·9 km./sec.

The solution was made from fifteen observation equations, one for each line measured. The equations were as follows:

$$FS + K_1 + K_2 - E = 0.$$

Column 6 in Table 1 gives the value of E in each equation. Column 7 contains these values of E after correction for the computed ground station values of K, while column 8 shows the V's or the corrections to the distances. The other terms in the equation are defined as follows: