

HIGH GRADE MENTAL DEFICIENCY IN RELATION TO DIFFERENTIAL FERTILITY.*

By J. A. FRASER ROBERTS, M.A., M.D., D.Sc., M.R.C.P.,

Burden Mental Research Department, Stoke Park Colony, Bristol, and the
London School of Hygiene and Tropical Medicine.

MR. CARADOC JONES this morning emphasized very clearly indeed the important distinction between high and low grade mental deficiency. He showed us some very striking figures suggesting, not that heredity is not involved in both, but that it is a different sort of heredity. It always seems to me that in considering this and related matters the analogy of stature is a helpful one. Many of us remember those posters of the last war but one, which said "Your King and Country Need YOU," coupled with the statement that "You" had to be 5 ft. 4 in. high—a standard which went down afterwards. If one rejects for any purpose a segment of the population on a measurement of this kind one is rejecting people for very different reasons. The arbitrary standard cuts off, of course, the dwarfs; the achondroplastics, the midgets, the cretins, the rachitic dwarfs, and so on; but it cuts off far more of those who are simply short. In causation we can normally expect the dwarf's condition to be due to hereditary factors, actually a single factor in achondroplasia; or it may be something environmental, as in the rachitic dwarfs or the cretins, but when we come to the people who are just short, it has been shown fairly conclusively that in a civilized community in which the standard of nutrition is adequate, at least 90 per cent. of the differences are due to heredity; but it is a different sort of heredity. We have a whole host of genetic factors, each one of which has a small effect; but the effect is cumulative; some factors make for greater stature, some for smaller, and it is on the sum total received from the parents that the stature of the individual depends.

In mental development we have something rather similar, but our analogy is not yet complete because no one supposes that mental deficiency can be defined in terms of I.Q. or in terms of what Sir Cyril Burt calls innate cognitive ability, which is measured in children with fair success by a Binet test. It is important whether the person is stable or not temperamentally, and we have to say that our standard is no longer rigid; we exclude wholly everyone below 5 ft. 2 in., between 5 ft. 2 in. and 5 ft. 3 in. we exclude most, at 5 ft. 4 in. we exclude a few, above that we exclude very few; in other words, we exclude those who are short and notably lacking in other ways. Although with a certain measure of I.Q. we can be certain that the individual will require some sort of care and control, above that level decreasing numbers of persons will,

* A paper read at the Quarterly Meeting of the Royal Medico-Psychological Association at 11, Chandos Street, W. 1, on 21 February, 1947.

in fact, require care and control, whether they do or not depending upon emotional and temperamental factors which we cannot measure, or can only measure with the very greatest difficulty. I stress that because what I want to say refers to general intelligence and not to mental deficiency. It is relevant, of course, but it is not the whole story. It is the measurable thing, as measured with fair efficiency by the Binet I.Q., that I want to talk about.

If the frequencies with which different I.Qs. occur are plotted out the curve is normal down to an I.Q. of 45; we get the familiar "cocked hat" curve, which will include the great bulk of the defectives classified as feebleminded; but below that level we find an excess—the 4 per 1,000 children found by Dr. Lewis in his survey—and so we have the low-grade defectives who owe their condition sometimes to a genetic factor, sometimes to purely extraneous things, sometimes to complicated interaction of factors which we do not understand, while on the other hand we have the dull, not separated in any sharp way from the rest of the population, but merely those who are socially inefficient and require care and control. The differences one expects to find between these two groups are not, I think, principally in their clinical characteristics. I think that Dr. Lewis has said since that he rather regrets that in that pioneer work of his he used the word "pathological" in distinguishing between the low-grade and high-grade, the pathological and subcultural, because it has to some slight extent tempted people to look for actual pathological deviations in the low grades and make that the criterion. I doubt if it is likely to be so. I do not suppose that the distinction is necessarily clear cut in that way, because though the very dull are, as it were, part of the normal curve, nevertheless one will expect, and I think find, that at that low level of mental development physical abnormality is often present, that neurological signs are present, that psychosis is present. The farther you go down the scale the more frequent these other abnormalities become, and this obscures a distinction which may be rather clear cut. The real distinction is likely to be in the family histories when we are able to study them in sufficient numbers and sufficient detail.

Some years ago my colleagues and I carried out a survey at Bath. We tried to obtain a complete sample of 3,400 school-children defined simply by age and residence in the city on a given date; and we did, in fact, by taking a good deal of trouble, succeed in making our sample practically complete. In it there were 13 children classified as idiots and imbeciles. It was true that two or three of them had similarly affected brothers and sisters, but not within the range of the brothers or sisters we could ascertain with certainty. In fact, the average I.Q. of the measured brothers and sisters of these 13 children was practically 100. The average I.Q. of the dullest 8 per cent. of our children was 72; the average I.Q. of their brothers and sisters was 88. Here we have in a very small sample this clear-cut distinction in the family history of the low-grade and high-grade.

One further thing we were able to do with our figures seems to throw some light on this distinction. In high-grade mental deficiency supposing one had influences which operated against a particular child, as there are in low-grade deficiency, then one would expect to get families in which one child only was

mentally defective and all the others more or less normal. If, on the other hand, certain sorts of environmental factors were very potent, one would expect to find them operating against whole families because the families would share those conditions. One would expect to get, on the one hand; an excess of families with one dull child and the rest normal, and at the other end an excess of families with all the children dull. This does not happen. In fact the distribution of intelligence of sibs of children in our group was just what would be expected from the simple assumptions of multifactorial inheritance, and the tendency for sibs to resemble each other.

What about the differential birth rate? In our population, as we know, different groups are reproducing at a very different rate. You heard this morning from Mr. Caradoc Jones some figures on occupational classes. The figures I want to give you refer to intelligence as measured on intelligence scales.

Amongst our group at Bath we selected for special study the brightest 4 per cent. of children in the group, and found that the number of living brothers and sisters they had was 1.70. We had to make an allowance, which can be calculated from the data, for the extra children which will be born to those mothers by the time they have passed the age of 50; this is 0.25, making altogether 1.95. In the middle 4 per cent. the average number of brothers and sisters was 2.78, others to be born 0.76, giving altogether 3.54. In the dullest 8 per cent. of children the average number of living brothers and sisters was 3.72, with an addition of 1.31, giving a total of 5.03. When ascertaining families in this way one starts, of course, with families in which there is at least one child, and one is more likely to include a family if it contains a large number of children. That seems a little complicated, but an approximate allowance is good enough; if the child who brought the family to notice is left out, the figures which remain are the effective family size; so that we can say that our brightest children come from families of average size 1.95; the dullest children come from families of average size 5.03—that is, families $2\frac{1}{2}$ times as large as those of the brightest children. That shows, in a nutshell, the differential birth rate in regard to intelligence. It is a linear relationship; as you go up the scale of mentality the size of the family falls perfectly steadily.

Where do the mental defectives come from? (I am talking of high-grade mental defectives.) Let us see how many children with an Intelligence Quotient below 70 (I choose 70 because Prof. Burt used 70) parents of different I.Q. levels will have? Without allowing for the fact that there is a strong tendency in intelligence for like to marry like, on the average a parent of I.Q. 130 will have only 0.1 per cent. of children with an I.Q. below 70 (plus the chance that 4 in 1,000 will be idiots or imbeciles); the chances of a parent with an I.Q. of 115 having a child below I.Q. 70 is 0.6; a parent of I.Q. 100 will have 2.3 per cent. of children below 70; a parent of 85 I.Q. 6.7 per cent. of children below 70; I.Q. 70, 15.9 per cent.; I.Q. 55, 30.9 per cent. That is where the very low I.Q. children are coming from, and, of course, low I.Q. has a very close relationship to high-grade mental deficiency.

Mr. Caradoc Jones told you that the lower the intelligence of the parent,

the lower the intelligence of the child on the average, but there are many more people who are dull than there are people who are actually feeble-minded. In fact, the bulk of the high-grade mental defectives do come, not from mentally defective parents, but from dull parents. There are many more people in the population of I.Q. 70 than of I.Q. 55, and we can be quite certain that there will be more children with an I.Q. below 70 born to those of I.Q. 85 than to those of I.Q. 55.

One cannot separate the problem of high-grade mental deficiency from the problem of intelligence levels in the entire population from top to bottom. I hope I am not quoting from something which Dr. Slater has not yet published, but he once said that one could never understand the stream as a whole if one concentrated one's attention on the foam at the top and the sludge at the bottom. This problem of the differential birth rate and high-grade mental deficiency is not a problem confined to the feeble-minded; it is a problem of intelligence levels in the entire population.

Given this differential birth rate, given the fact that children in the lower ranges of intelligence have more brothers and sisters, is it possible to deduce what the fall in intelligence of the population is likely to be if present trends continue? It can be done by an indirect calculation, making certain assumptions. I used to make some complicated assumptions about what was hereditary and what was not. Prof. Fisher pointed out that these complicated assumptions were unnecessary; he used a different formula and arrived at 2.0 points of Binet I.Q. per generation. Prof. Burt simplifies it yet further. Do not let us think of the parental generation and the generation of children; let us see what the difference is between the population as it is with all the differing sizes of families and with an average I.Q. about 100, and the intelligence of the population as it would be if all families were of equal size. Prof. Burt, using this method of calculation and making certain modifications and adjustments, comes to the conclusion that the fall in I.Q. is likely to be of the order of 2 points or so. Of the 2 points not less than half is likely to be hereditary causing a relative loss of valuable genes. That figure of 2 from my own data must be increased. Taking samples of school-children one is bound to get incomplete families, which increases the estimated fall to 2.6 points of Binet I.Q. per generation. If one guesses at the amount to allow for the people who do not appear in the survey at all because they have no children, then one might say 3 points of Binet I.Q. per generation.

That is far too big. If the average decline in intelligence in the population were 3 points Binet I.Q. per generation, we should have noticed a much bigger increase of mental deficiency in the last 25 years and a much greater decrease in scholarship children. Prof. Burt thinks that there has been a fall, but it is much smaller than the indirect calculation indicates. I will give you one possible reason which might account for that in a moment. Prof. Burt's figures are as follows—they all refer to people of I.Q. less than 70: In 1920 the estimated proportion in London was 1.5; in 1950, if we assume a fall of 2 points, it will be 2.3; by the year 2000 the percentage of the population with an I.Q. below 70 will be 4.1. Prof. Burt sums up by saying that it looks as though the proportion of people with I.Qs. below 70 is likely to double in the

next 50 years, and the corresponding proportion of scholarship children with I.Qs. above 130 is likely to be halved.

A number of factors may affect this indirect calculation, and I should like to mention some of them. One is the question of maternal age, and its effect upon intelligence. Maternal age and birth order are so closely related that it is difficult to distinguish between the two, but let us suppose that it does turn out to be unfavourable for the child and its level of intelligence to have a mother who is old or to be 6th, 7th or 8th in the family as compared with the first or second child. The effect would naturally be to give a higher mean I.Q. for the smaller families and a lower figure for the larger families; and it may be that a part of the effect we see when we try to relate fertility to intelligence is due to this factor. The results of experimental work are exceedingly confusing; Prof. Burt comes to the conclusion that only part of the association is likely to be attributable to this cause. But if it were big enough it could be entirely responsible, and it might be that instead of the intelligence of the population declining it would increase. I had hoped to present you with some figures from our own data, but I have not yet been able to work them out because it involves a good deal of restandardization of our norms with regard to age. I do not know what the answer is, but we have to bear in mind that it may be a measurable disadvantage on the average as regards intelligence to come late in the family or to be born to a relatively elderly mother, and this may account for part of the association between small size of families and intelligence. It may indeed be that this accounts for the discrepancy between the indirect calculation and the probable actual fall, which is considerably less.

The next factor which affects the calculation is a decline in inbreeding. During the last hundred years transport facilities have increased notably, the population has become not only much more numerous, but more mobile, and there has been a growing tendency for people to marry those who are less related to themselves. Someone had said (I do not know if the calculation is correct) that in this country some years ago the average marriage was one between fifth cousins. The degree of inbreeding has been steadily relaxed during the last hundred years. Does it affect this calculation? It certainly will affect the proportion we may expect of low-grade defectives, because some are due to Mendelian recessive genes, and so as inbreeding is relaxed we should expect a fall in the number of low-grade defectives. What about the high-grade defectives? It may or may not affect the numbers. Dahlberg in Sweden did some work years ago on stature amongst recruits in the Swedish Army, and he found that there had been a notable increase in stature over a period of years. He was convinced that this could not be attributed entirely to improvement in nutrition, and his theory was that it was due to precisely this factor—the relaxation of inbreeding. When hereditary factors are involved, such as are likely to apply to intelligence, it may be that on the whole the individual factors which make for higher intelligence are more often dominant, and if that is so less inbreeding would mean that similar recessive genes would not come together so often. This is all speculative, but it is not inconceivable that although the indirect calculation indicates a fall in intelligence in the population, although it is true that the dull have far more

children than the bright, yet that might still be combined with a rise in the general intelligence of the population. In one sense it is not a real rise ; it does not mean that the units of intelligence available in the population are increasing in number ; they are not ; they are decreasing, but they are arranged in a more useful order—the good are being used to conceal the bad.

People are not only marrying those who are less related to them, but they are marrying those who are more like themselves. It appears to be a strong universal tendency that like should seek out like, and in nothing is this more true than in intelligence. It is probably true to say that to-day the average husband and wife in our population are more like each other in intelligence through deliberate choice than are the average brother and sister because they were born of the same parents. The strong tendency of like to marry like is a very powerful factor, but one hundred years ago the choice of a marriage partner was far more restricted than it is to-day, and this tendency had less scope. It may be that the correlation coefficient of likeness in intelligence between husbands and wives is now as high as 0.6. The effect is to increase variability, and it is easy to see why. If the dull marry the dull there is a stronger tendency for their children also to be dull. Similarly with the bright, if the very bright tend to marry the very bright, then their children tend to be very bright. It does not alter in any way the average of the population or the units of intelligence available ; all that is happening is that they are being sorted out differently. The effect on these calculations may be considerable, and if the tendency increases it will increase the number of feeble-minded because it will increase the number of low I.Qs. Let us say we have a population with a mean Binet I.Q. of 100 and with a standard deviation of 15, then the proportion of people below 70 is 2.8 ; but supposing that population, without altering at all in average intelligence, has its variability increased by this assortative mating to a standard deviation of 17, then we should have 3.9 per cent of people with Binet I.Qs. below 70. The increase in the proportion of the feeble-minded would, however, be counterbalanced by a corresponding increase in the proportion of very bright children.

The last point I shall mention which affects this calculation is rather an obvious one. A low Binet I.Q., unless it is very low, does not mean that the person needs to be certified. Dr. Gordon and Dr. Thomas some years ago carried out a study at Bath and came to the conclusion that if a child at the age of 14 had a Binet I.Q. of not less than 60, and if that child were thoroughly stable and well adjusted, then he or she should be able to get on in the community without supervision. Emotional and temperamental factors, of course, come into the picture. This question of being well adjusted and stable is extremely important, and there may be developments in the next 50 years in regard to these other and varying important components in determining mental deficiency which requires certification. I entirely agree with Mr. Caradoc Jones about the positive association between good qualities of all sorts and bad qualities of all sorts. If we are losing units of intelligence which are available in the population we shall be likely to lose other things of value too. But we may be able to use what we have got to much better purpose. We know very little about the determination of emotional qualities which make for

stability and for the social success of the individual in the community. I am continually struck by the big difference in these qualities between identical twins, who have an absolutely identical hereditary constitution. I saw a pair of twin girls a month ago; they were unquestionably identical. The mother volunteered the information that they were absolutely different in character, and when she was asked why, said that one was very shy and sensitive and very fond of dolls, very fond of clothes, jewellery and dressing up; the other was self-reliant, did not care a hang about anybody, had no interest in clothes whatever, but was interested in mechanical things and ought to have been a boy. To make it more difficult, there was a size difference in these twins which had persisted since birth; it was the larger twin who was the shy, sensitive one, and the smaller one who was the more extraverted.

Another pair of identical twins, just about as identical as any twins one could ever see, are apparently similar in intelligence, extremely similar in appearance, and yet the mother describes one of them as neat and orderly, her room always kept in perfect order, while the other is careless about her possessions, her room always in confusion. These are fundamental differences, and yet they are differences in people with identical genetic constitutions. They are non-inherited differences, determined in some way we do not yet understand. We can surely look forward to advances in knowledge which will help in prescribing and obtaining the best conditions for development before birth, after birth, during school and training, which will mean that fewer and fewer of those who are potentially certifiable because of low intelligence will actually require it. We can hope that as the years go on, although there may be more very low intelligence in the population, fewer people will need to be certified and more will be able to live useful lives in the community.

DISCUSSION.

Dr. E. O. LEWIS said that he felt he was not in sufficiently close touch with investigations of recent years to be able to contribute very much to what had been said by the openers. He would like to make one point, however. Before becoming too pessimistic it would be well to ask whether such things as intelligence quotients were being interpreted correctly. Everybody regarded intelligence quotients as a measure of intelligence and intelligence only, that is, of innate mental endowment. It must be admitted that intelligence tests were influenced to a great extent by cultural levels and by temperamental development, and when there was a lowering in the intelligence quotient that lowering might not be due to the fact that intelligence, that greatly graded inherited factor, had changed very much, but that secondary factors were producing the lower intelligence. The recent work in America had shown that mental tests were influenced to the extent of 20 per cent. by factors which were not innate, and this must be taken into account before pessimism was admitted.

It was a very serious consideration if the quality of genes could be modified at the rate it was said they could be modified. He could not challenge the recent work, but he felt that they should make quite sure that they knew what they were dealing with when dealing with an intelligence quotient. He was inclined to think that what was thought to be a lowering of intelligence was a slipping back of cultural level to some extent.

His own thoughts on this subject had gone along rather different lines. What should interest them as psychiatrists was the variation and distribution of mental illness and mental abnormalities, and in his own investigations in 1925 and 1929 he found that in the distribution of mental deficiency one of the great disparities was

the difference in distribution in the rural and urban areas. From whatever angle data were collected he found that mental deficiency had an incidence at least 50 per cent. higher in the rural areas than in the urban areas. He did not mistake rusticity for mental retardation, being careful to avoid that obvious pitfall. At the same time, he did not say that the average level of intelligence was lower in the rural areas. If he did colleagues from across the border would soon correct any such tendency, because the Scottish Education Department applied educational tests throughout all the schools both in the rural and urban areas, and they found that the average level was not lower in the rural areas than it was in the urban areas, but as far as mental deficiency was concerned (and he did not think that the Scottish figures could give much evidence on this particular point because the test was a little too crude to differentiate the lower levels of intelligence) there was undoubtedly a higher incidence in rural areas. In investigating that data or that result he thought some very interesting sidelights were thrown on how mental deficiency cropped up. In the rural areas mental deficiency was to be found in very small pockets. In Cardiganshire, which was totally rural, the incidence of mental deficiency was high because there were a dozen or 15 small pockets of mental defectives, and when these were investigated it was found that there had been a great deal of migration from these districts to the urban areas. The brighter people had left the district and left a small group of retarded people to inbreed and produce defectives and throw up the incidence considerably. He wondered if there was a similar incidence of psychosis in the rural areas. The numbers in the mental hospitals were not a complete guide to the actual number of people suffering from psychosis, because a number of such patients were kept by the public assistance institutions, especially in an area such as Lancashire.

Coming to the towns the distribution of mental deficiency was very well marked. There, as Mr. Caradoc Jones and Dr. Roberts said, he found he was working in certain wards in the large towns where there were slums and poor surroundings, and there was a great disparity in the incidence of mental defect amongst the school population in the various schools; the ward which belonged to the professions had very few mental defectives. He soon found in the towns that mental deficiency was really a question of social stratum, and it struck him how much social deficiency there is which could not possibly be brought within the scope of the Mental Deficiency Act. Those who had read the Report of the 1905 Royal Commission would remember that people gave evidence thinking that the new Act would deal with all forms of social deficiency due to poor mental intelligence. With regard to crime one very responsible doctor said that 80 per cent. of recidivists were mental defectives, and many people thought that once the Mental Deficiency Act was passed the recidivists could be effectively dealt with, but it only enabled 5 to 10 per cent. of recidivists to be dealt with. There was a great deal of mental retardation which could not be brought within the scope of the Mental Deficiency Act, and the social inefficiency which could not be dealt with under the Mental Deficiency Act or any other Act produced most serious problems. Psychiatrists should address themselves to the group of people with I.Q.'s between 70 and 85, because from that group many of the most serious problems arose.

Dr. FERGUSON RODGER was very grateful to Dr. Lewis for his optimism. It was a serious thought which had been presented by three experts that by the year 2,000 there should be such a profound fall in the intelligence quotient. Dr. Lewis had raised the question whether this might not be largely cultural, and he found it difficult to understand how the experts seemed to ignore the striking work which was being done in America which showed the association between the intelligence quotient and culture. There was a correlation between the intelligence of children and their foster parents in the fact that there were such striking differences between the environments and the intelligence.

Another point which struck him as very important was the one which Prof. Penrose raised about stature—the fact that in Toronto at one time statisticians predicted, because the children of large families tended to be shorter than the children of small families, there would be a fall in stature in the next generation. He thought that these speculations that the I.Q. was falling was an affront to common sense. If these very large falls were expected it should be possible in the Scottish survey of intelligence of schoolchildren to come to some estimate as to whether the fall which had occurred since the last survey (in 1931) had occurred. The I.Q. test was subject to the culture in which it was performed and the culture

would change in 15 years and it was difficult to get a test which would act from one generation to another.

A further point was the fact that stature had been described in these genetic terms, other things, too, including infantile mortality. There was an echo of that in Mr. Caradoc Jones's paper, in which he said there was an association between feeble-mindedness and feebleness of stock. He drew attention to the fact that in the families of feeble-minded children there was a greater fatality, presumably that was due to bad care and environment; presumably there was genetic feebleness, but not so long ago the infantile mortality amongst the lower groups was described as due to feeble stock. They did not any longer believe that, but there was a suggestion of it here. There had been pessimism in the past about other things which, in the end, had turned out to be unjustified, and he had the feeling that it would turn out all right again.

Dr. NOEL BURKE said that they had seen the table of the possibility of 70 I.Q. children according to the I.Q. of the parents, but he thought it needed correction by the possibility of superior children being born to the same parents. He would like to see those figures put alongside in the same sort of table. It would help to adjust his views. The man who knew the figures might say that it followed automatically; he did not know. It had been said that it was bad to be born late in a family; he wondered if allowance had been made for the other finding of the statistical experts that the large family, on the whole, only came from people of poor quality, because if these two things were put together it seemed one would have to say that people who were sixth, seventh or eighth in the family were most likely to be people born of poor quality family and were already weighted adversely.

Then there was the question of social customs. There was no doubt that the probably more intelligent, certainly better-off families, had changed their habits and reduced their fertility. He was one of four, his father was one of seven, his father was one of a dozen, and his father was one of a dozen. Had the lower quality changed, or was there any evidence that they were changing their fertility habits? He had the impression that some were; it might be only the better ones of the so-called working classes who were beginning to reduce their families. One saw the better members of one's staff, for instance, having one, two or three children, and the not so good having six, five or four. Supposing there was some importance in the changing of social customs, was there any possibility that alteration of these customs would aid the alteration of the trend which the statisticians feared? If one studied the Births Column of *The Times* it would be found that people were having more children who at one time had one or none. All the young people out of the Services were determined to have children at the earliest possible moment, and he wondered whether there was a change in the feeling of taking the risk of having children in the classes which used not to take the risk.

Dr W. MAYER-GROSS did not wish to go into the matter of discussing optimism and pessimism in this respect, and he did not agree with Dr. Fraser Roberts that one could set these American experiences against the excellent work which had been done by a number of first-class workers in this country. He could not quite understand if Dr. Lewis thought that the intelligence test did express quite such a report, and one would expect with progressing civilization to get better results.

He wished to contribute something factual from a social survey in a rural area carried out in his department, and which would soon be terminated, and with regard to which he was very impressed by an observation which had been mentioned by Dr. Lewis. First of all, the figures of the dull and backward and the feeble-minded were even higher than Dr. Lewis had found 15 years ago. He was also impressed by the fact that these were found in groups and patches in the different country districts, and also by the fact that obviously the migration of the energetic people to the towns and other districts deprived the country of the more intelligent stock. He thought this depopulation of the qualitative stock was an enormous danger which could not be denied, and against which some measure of remedy should be found. He thought psychiatrists working in rural areas should, by their knowledge, try to counteract this depopulation of the rural districts.

One last word about the comparison between Dr. Lewis's figures and the figures of the Scottish Education authorities; he felt they could not be compared. Dr. Lewis's figures on mental defectives were mainly based on certification, while the Scottish investigation was a general investigation of the population, including all children, and that gave a very different picture. From his own rural district he

found that Dr. Lewis's findings were confirmed and that the Scottish figures of 1935 were contradicted. He did not know why this was, but thought the reason was partly that children under a special grade of intelligence were left out of the survey.

Dr. A. A. W. PETRIE said that there were one or two points he had hoped would be mentioned on the problems of social customs. There had not been any clear discussion yet on the point of social custom, namely, of contraception versus the problem of fertility, and these two things were not the same, because the problem of fertility in different types, classes, nations and so on was a very important one, apart from the social custom habit of tending to have fewer children in a higher stage of development. The mental defective had probably been less influenced by that social custom than had any other class. He remembered at one of the inquiries,—he thought it was the Brock inquiry about 12 or 15 years ago—Lord Dawson gave evidence that contraception had reached the level of the day labourer, a statement that 15 years ago was more liable to contradiction than it was to-day. To-day it would probably be accepted as a fact. The more intelligent type of parent wished to give each child a better chance in the world. The mental defective group would not be influenced by such considerations, and one still came across the 12 and 14 family which was so common 50 or 60 years ago. In that type of family there was nearly always the defective or the near defective. He did not know anybody who could collect families of 14 or 15 in the highly educated classes, whereas many could talk about their grandparents and great-grandparents having had a considerable number of children because the social habits had changed, and in a more competitive and struggling world they tried to give their children a better chance in life.

Dr. Roberts stated that owing to like marrying like the incidence was being differently distributed, and the speaker thought that information might be conveyed to the highest levels because it was said that a classless society was going to be set forth in England, and obviously the genetic factors and the trends of human nature, as one hardly needed to be told, were rather against it. The biological urge tended to segregate different types from each other intellectually as well as in every other factor.

One had hoped, perhaps, although it was such a factual informative meeting that one should not ask for it, that some recommendations would come out of it, that the Chancellor of the Exchequer might ease the burdens on certain types and so on, but this was something that this country had seriously to consider, how far they could take these trends. Were these trends natural? Dr. Rodger referred to the cultural levels. Had not the higher cultural levels tended, in history, to be diminished and be replaced by cruder types? The more cultured elements tended to be recruited from below and that might prevent, of course, the advancement of men towards the millenium, and might tend always to maintain the same sort of level. That really might be one very distinct factor, but as a nation it had to be considered how the good stocks could be improved and the bad stocks diminished, and that was something which Lord Dawson was most emphatic about. He said that the natural processes by which these less viable stocks ordinarily died out under an artificial system were obviated, and they were protected and flourished until they choked the whole nation. Something had to be done to compensate for the artificial maintenance of stock which under the natural law of the jungle would cure itself by dying out, owing to its inefficiency and poor vitality. He had always thought that it was important to have a man who could advise those in higher circles on what should be more than obvious.

Dr. Blacker gave a slight hint of the statistics which would be available in the next 20 or 30 years. He hoped these statistics would be kept as simple as possible, but he admired Dr. Blacker's optimism when he said that the medical man would complete the case-sheet the next day. At the same time, if they were to benefit by having a well-planned service, obviously the statistical section would be more than important for answering the many questions on the statistical research lines which could be answered if there were various assumptions on the lines Dr. Blacker indicated.

Dr. CRAWFORD thought it might be interesting to have a little clinical note; on the deficiency side he had been told that there was a different type of defective to deal with, especially in the higher grades. He mentioned this because of what Dr. Lewis had said with regard to the cultural and environmental side being more

important. There was not much difference in the Binet I.Q. point, but there was a large swing in that type. There was the defective who belonged to the sub-cultural group, who formed quite a large part of the patients; they were delinquents and their I.Q. showed them to be defectives, yet he would say that they were completely different. Their number was increasing. Inside the institution there were two classes, one a sub-cultural group and the other defectives as they knew them.

Dr. K. K. DRURY asked if the statisticians could give the other end of the table and bring it back to 1800, 1700 and 1600, and say what the ratio of defectiveness was then compared to what it was now. If it went from 1.5 to 1.4 in 100 years, by the time the calculations reached Elizabethan times they must have been supermen, and that was not so. It would be most interesting to know what was the proportion of mental defectives in the year 1400.

Dr. T. A. MUNRO said that Dr. Blacker gave in detail the method of obtaining some really useful facts about psychosis and numbers of patients suffering from mental disorder and all the various factors relating thereto. It was very right that he should do so. After he began to know a little about dealing with figures he was very impressed by the ease with which one could collect really valuable facts, or facts which were capable of being interpreted by quite simple means. He felt, however, that the number of facts which one had to collect on any form must be small and exceedingly simple. It was only too easy to go the other way and pile up a large number of facts about whose accuracy one had doubts, and therefore one had doubts on the value of any interpretation. Dr. Blacker also mentioned the value of the facts which might be compiled on a punched card for research. The speaker agreed, but would suggest that it would be more valuable to collect a small amount of correct data in the same form throughout for a more intensive survey and to concentrate rather on two or three hospitals or areas in England, perhaps a town and rural area, and there set up a definite research unit. Besides having the forms and the cards, one had to have the man or the team of workers who were really interested in finding out these things, and who would take care that the cases were adequately surveyed and the information obtained was correct. He would not like even to bother to read a paper which discussed family histories if he knew that these family histories had been written down by a patient in an out-patient room, while waiting to see a doctor.

Mr. Caradoc Jones, Dr. Fraser Roberts and Dr. E. O. Lewis mentioned the important surveys they had made. It was clear how valuable these surveys had been, because they continued to be quoted; they lived because the work in them was carefully compiled and, as Mr. Caradoc Jones had shown, they contained a vast number of facts. These facts, if they were carefully recorded, were always open to interpretation, and generally more facts could be dug out of the work done later on.

To come to one definite point, Dr. Fraser Roberts mentioned that a possible factor in the fall of I.Q. was the large size of the family or alternatively the late maternal age, and possibly one might take a more optimistic view of the fall if people in the future had fewer children and these large families did not occur. This was the kind of fact which could be dug out quite easily from Dr. Penrose's survey of mental defectives at Colchester. One would expect to find that there were more mental defectives among the later children of the mother than the earlier, or, alternatively, one would expect to find that there was an association of low intelligence with an older mother's age. That information could, he was sure, be obtained quite simply by merely looking at the appendix of Dr. Penrose's survey. He did not wish to misquote his former chief, but he thought he did show that that effect did not occur in families. The mental deficiency in the sibships was scattered throughout all the siblings, with the one exception of mongolism. That was the value of a survey which was carefully, correctly done and well recorded. The survey which he did in mental deficiency awaited being done in a mental hospital—he would pass it on to Dr. Blacker and Dr. Maclay.

He was glad to hear Dr. E. O. Lewis speak about his work in town and rural areas, because it reminded him of the work he did when he was to some extent under Dr. Lewis's charge on the Committee controlling his own work on consanguinity. It was striking in rural areas in Suffolk and the fen country to see social and cultural factors very dynamically at work. He met one doctor who had been 30 years in practice in a rural village and he told him how 30 years ago there

was a lot of inbreeding; the boys and girls never left the village; now they went on the 'bus to the local town 20 miles away and met the people they would marry. He remembered going to a house in the fens and meeting a grandparent who had never been to Cambridge, never seen the sea, or been to London, and he met parents who had been as far as London, and he met children who had been taken on a school tour to Holland. There was a much larger mixing of the population. Although he would agree that these social and cultural factors were strong and real, he could not go as far as Dr. Ferguson Rodger in saying that they were of more importance than purely hereditary factors. Dr. Fraser Roberts's work and Dr. E. O. Lewis's work proved scientifically that in general brainy parents had brainy children and dull parents had dull children, and if dull parents had more children than brainy parents then it was inevitable surely that there would be in the next generation a larger number of dull children. That did presuppose that the social and cultural factors remained the same, and he was sure that it was these neglected factors which were proving very much in a changing and dynamic society.

The PRESIDENT said that this was a very fundamental problem, and he thought that it had been necessary to present the facts in the way in which they had been presented. Suggestions had been made of an approach towards this problem, which was not merely a problem of psychiatry, but a problem for our nation if it was to survive at an adequate level. They could not be complacent about the situation; psychiatrists had not taken sufficient part in putting these problems of hereditary constitution and environmental structure; he did not think they had ever taught their medical students these facts, and it was surprising to find the ignorance of medical people in general in regard to questions which were not only of national but of great international significance if they were going to help a people which were going to have great difficulties in the future to contend with. That was why he felt that it was essential to build up a positive eugenic programme as fully as possible, and to inform not only their fellow medical men but the public in regard to matters which were striking at the structure of society.

Dr. BLACKER, in reply to the discussion, thanked the President for his expression of the importance of the symposium, although each contributor had touched on very different aspects of the general theme of the population. Most of the questions had been directed to the other two speakers, but he had jotted down one or two points which had a bearing on the questions which had been asked.

With regard to Dr. Munro's statement on facts and their value he could not agree more, and he was the last person to burden the doctor with more form-filling, but by organizing the records department it was possible to collect the data which were available and collate them in a way which had not been done in this country. The absence of mental health data compared to what was produced by other countries was something which there was a wonderful opportunity of remedying now. The mental health records could be made the best in the world with the changes which were promised.

He would agree with Dr. Munro that some of the facts which might be put forward might be of dubious value, and he distinguished between the demographic and the medical data. He had far less doubts in his mind as to the statistical value of the demographic data than he had of the medical data. He never suggested for a moment that a patient should be asked to fill in details of his family history while waiting to see the doctor; he suggested that the patient should be asked to recall the number of live siblings of his own and how many children, if any, he had got. Those two facts between them would enable them to work out all sorts of correlations relative to the fertility of these different elements in the population. It was extremely simple, and involved practically no extra work.

Where the difficulties would arise would be on the question of diagnosis. There was sitting at the moment a world conference to try to standardize diagnosis, and it was hoped eventually to produce agreement on a standardized list of diagnoses as between the U.S.A., Canada and this country, and when that list was perfected it was hoped, in theory, that the data from Canada, the United States and this country would be available, but when one examined the list of proposed psychiatric diagnoses one felt gravely disturbed as to the possible value of such comparisons, because he found there were, roughly speaking, 25 items divided into three main headings: psychoses, psychoneuroses and psychopathic personality. Under the heading "psychoneuroses" there was neurasthenia and hypochondriasis, and unless there was general agreement as to what conditions were covered by such

terms—neither of which was ever used at the Maudsley Hospital—what would be the value of the figures when they were compared and the statistics were worked out? This was where there would be muddles, much less than on the demographic data, unless the Committee gave an indication of the kind of case to which these labels should be attached. There would be large areas in which there would not be any neurasthenia or hypochondriac cases. The activities of the Committee would depend on its capacity to formulate fairly clear meanings of the terms they were proposing to adopt, and then persuading people who thought they were extremely bad and valueless to use them, which would be difficult.

Several speakers had mentioned cultural levels. He felt a great deal of sympathy with those who spoke about the influence of cultural levels on intelligence tests. He had read two books recently which had set his mind to work on the subject, one was called *The Oregon Trail*, which consisted largely of an account of the wanderings of a tribe of Indians. The buffalo provided their food, accommodation and clothes, and they fought against the neighbouring tribes. The chief of a village was a magnificent human specimen, who had over 30 squaws of his own; there was nothing to prevent anyone assassinating him except that the whole family would have a vendetta against the killer. The chief was the most warlike, most vindictive man and, incidentally, the most prolific. Suppose one was to take a Binet I.Q. of a tribe of Indians; the result would seem to show that they had not very much intelligence, but the intelligence was different and the scale of tests would have to be different. The other book was Mr. Frank Lorimer's study of the population of Russia. The majority of the population of the U.S.S.R. was illiterate in the time of the Tzars; the literacy had now been raised to something like 70 to 80 per cent., and that would make a difference to the capacity of doing the test. If the Binet test was given to an unselected sample of children in a Russian village under the Tzar they would do a great deal worse than they would do to-day. The education that they had received would make a great deal of difference. One felt that the tests themselves would undoubtedly undergo modifications, and it was part of the plan of the Scottish Education Committee that regular tests should be carried out at intervals and that new ones should be introduced as time went on, so that it was necessary to feel that the technique of testing was capable of improvement. It was difficult to standardize the results of the tests, and be quite sure that the conditions were similar when making two investigations separated by a long interval.

Dr Petrie raised a fundamental question when he said that the remedies had not been discussed. He had intended to say something which would touch on that subject, but it was an immense subject. The cultural pattern was being altered at the moment in a significant way in certain countries. He was thinking of France, where, as a result of the introduction of enormous family allowances, fertility had shot up. A great many of the patterns prevalent in 1939 were now changing, and there was an exceptionally enlightened school of French demography which was studying these matters. The Royal Commission on Population which began sitting in 1943 had all these questions before it.

Dr. Fraser Roberts, Dr. Aubrey Lewis and the speaker gave evidence before the Commission and he was a member of their Biological Sub-Committee, and this matter was very much before their minds. The word "demography" and the population studies should cover not only quantitative considerations, but qualitative considerations. It was of interest that Sir Cyril Burt's Memorandum, to which many references had been made, was originally submitted by him as a Memorandum to the Royal Commission on Population.

The policy side of this matter was being extremely closely studied by the Royal Commission, and when the Report appeared—it was promised for this year—it would be found that recommendations on policy emerging from its findings would not be omitted and they would have something significant to say on the subject.

Mr. CARADOC JONES said that there was one point which was raised in regard to the high mortality rate among defectives, and it seemed that he gave the impression that the whole of it was due to poor stock. He did not mean to do that. Some of that high mortality was undoubtedly due to the less care which was taken by less intelligent parents of their children and the environment in which they lived. One speaker put his finger on the right explanation of the difference in size in family as between the less intelligent and the more intelligent. He thought it was to a large extent explained by the fact that the more far-seeing parents tended rather to

restrict the size of their family, being anxious to give them a good education and so on, and the less intelligent did not look to the future at all and so they did not limit the size of their families.

Dr. FRASER ROBERTS said that many interesting points had been raised in the discussion, some of which had already been replied to. It was impossible to deal with them all, but he would mention a few. First of all he would like to deal with the point of projecting the calculations into past years and whether the population was a race of supermen in Elizabethan times. It was certain that the trend in differential fertility could only have existed in its present force for a comparatively short time. It dated from the serious decline in the European birth rate which started in 1870. There was good evidence that there was something of the kind long before that but it was weaker, and it might be that the trend in previous centuries was more than counterbalanced by differential mortality.

Dr. Burke asked about the table showing the highly intelligent children born to people at these different I.Q. levels; it was exactly the same table turned round the other way. Dr. Ferguson Rodger mentioned the American work showing the cultural and environmental differences could affect the results of intelligence tests. There was nothing very new in that, Prof. Burt had done quite a lot of work on that subject and he showed that there were these effects. What he emphasized in his recent pamphlet was not that cultural levels did not affect mental tests, but that in good mental tests one did as far as possible equalize. The Ohio work had been so destructively criticised that it was not worth quoting. It was replete with statistical inaccuracies. The work was really highly unreliable.

Dr. Munro's answer to Dr. Ferguson Rodger put the whole thing in a nutshell; the plain fact was that if the more intelligent were having fewer children the less intelligent were having more, and if inheritance had anything to do with it at all then the units making for high intelligence were being lost. Nothing would get over the seriousness of the loss of these basic units.

He would add one remark to what Dr. Blacker and Dr. Munro said about records. He agreed that records should be simply a few facts well ascertained.

The PRESIDENT moved a hearty vote of thanks to Dr. Blacker, Mr. Caradoc Jones and Dr. Fraser Roberts for a very interesting discussion, which was accorded by applause.
