

been mistakenly committed to the institution, the percentage of children who are satisfactory according to the standards established for average children in the normal home environment is very fair. The results show a surprising accuracy of the Bluet-Simon scale as a test of intelligence for the intermediate-age groups.

As a psychological laboratory this institution would be invaluable. Some of the environmental factors in the experiment are under the psychologist's hands; other factors are existing conditions which may be studied from the point of view of heredity or sociology. It would be valuable to know what result in terms of mental growth is obtained from the changed physical conditions effected by the transfer of children from abnormal to normal environment, to trace the development of normal children from subnormal stock, to study the adaptability of foreign and native stock, and to be more immediately useful in the difficult matter of establishing individual children in normal relations with society.

REPORT OF WORK AND PLANS FOR THE RESEARCH DEPARTMENT OF THE HOME SCHOOL FOR GIRLS AT SAUK CENTER.

Miss Nancy Tomlinson, Home School for Girls.

Among the more insistent needs at the home school has been one for a department which should investigate the records and family histories of the girls at the time of commitment. Such a department was established tentatively January 1, 1914, and was named the Research Department.

The first thing to be done was to get all the back records up to date. Until August, 1913, no attempt had been made to fill out the history cards. At that time an addition to the office force made it possible to get the data on hand at least filed and some cards filled out.

When the officer in charge of the research department took up the work January 1st, there were still seventy-nine out of one hundred seventy personal history records to be taken; and all the commitment papers of the girls sent to the school since 1910 to be filed. There are two sets of files, one for the girls now in the school, and one for those paroled or of age since 1910. In the latter set of files are the blanks for the after-community record besides the history cards. None of these blanks had been filled in, and the reports of the parole agent had not been arranged and filed.

By August 1st, of this year, all the records of the girls in school had been written up as well as those of the thirty-seven commitments since January 1st. The blanks for the parole records, one hundred eighty-eight in all, have been filled in; and the monthly reports of the parole department for the last four years have been arranged and filed.

Besides the work on back and contemporary records, some field work has been attempted. The data necessary for the application and transfer of three girls to the school for the feeble-minded was gathered by this department. A few homes have been investigated and many relatives interviewed. The burden of home investigation, however, is still on the much overworked parole department. Then there have been many conferences with various state and county officials for the purpose of securing interest

and co-operation when we take up field work in earnest. By September 1st it is hoped that we shall be able to take up such work in a systematic way. Obviously it would have been foolish to have started to get more data until the material on hand was so arranged and filed as to be of use.

Our object and need is for such information about the court record, family history and previous environment of our girls as will enable us to help and train each individual as intelligently as possible. Gathering statistics will be only our incidental aim. Of course the data compiled will be of use statistically when extended over years of investigation and many hundreds of cases. The point about statistics is emphasized to call attention to the fact that we wish to guard against losing interest in the individual human being in our enthusiasm for collecting statistics. As the "Survey" remarked recently, there are three kinds of lies: White lies, black lies and statistics.

The scope of the research department is yet to be worked out. It is not enough to have investigated a girl's previous history. Her reaction in the school must be studied. The helpers in charge of the girl often lack perspective and the special officer as often misses links in the chain of conduct, so that a just estimate of a girl's school record is a problem rather slow in working out. Upon the justness of such an estimate the parole agent must ultimately base her decision about placing the girl in the community. In general, however, it may be stated that the research department will have charge of the investigations of the previous and contemporary social reactions of each girl in order that she may be trained and sent back into community life more intelligently and with more justice to all concerned.

Dr. Rogers asked for conclusions as well as a report. There are none and could not be in six months' time spent mostly on, back work or on substitute duty of various kinds. Under the circumstances the investigator is not justified in making conclusions and will heed the advice of her father and also of her superintendent and not talk any more until she has something to say.

MENTAL EXAMINATION AT THE MINNESOTA SCHOOL FOR FEEBLE MINDED.

Dr. F. Kuhlmann, School for Feeble-Minded.

What mental examination at the Minnesota School for Feeble-Minded stands for can best be answered by a brief summary of what has been done with it so far, and what practical problems the results have brought. I shall attempt to give this summary under the following four headings.

1. Improvements in the method of examining.
2. Mental examination and reclassification of all inmates.
3. Re-examination after an interval of two or more years.
4. Courses of instruction and training in the use of methods of mental examining.

1. Improvements in the Method of Examining—Four years ago, when this work was begun, there had just appeared a system of mental tests

devised by the two French psychologists, Binet and Simon. It was then recognized by practically all authorities as a big step in advance and as the most practical method of determining the grades of intelligence of children and of feeble-minded adults in existence. But, like all complex instruments of precision, it must be perfected by degrees. Our use of these tests has led to the following improvements:

(a) Standardization of procedure in giving the tests and in interpreting the responses of children. Such a standardization is essential for scientific accuracy. The authors of the tests supplied it only in part in their publications, although they probably followed a standardized procedure in their own practice.

(b) Extension of the system of tests so as to include wider ranges of intelligence. The system began with tests for the mental age of three, and did not measure grades of intelligence below this, being intended primarily for the examination of public school children. In an institution for feeble-minded tests for lower grades are required for two purposes:

First, to determine the intelligence of older but very low-grade children. (Children with mental ages of from one to three years require quite different kinds of care, and the latter are capable of receiving some training, besides. A method of determining the differences in these low grades is, therefore, essential for proper custodial care and training.

Second, tests for these lowest mental ages are required to determine the intelligence of infants suspected of feeble-mindedness, perhaps because born of a feeble-minded parent. Every large institution for the feeble-minded has occasion every year to deal with a number of such cases. From the standpoint of remedial care and training it is of the highest importance to know the mental status of such cases at the earliest possible moment. We have extended the original system of tests downwards so as to include mental ages of two years, one year, six months, and three months. These new tests were based on very careful but small number of observations of other investigators. After devising the tests they were tried out for norms on about one hundred fifty normal babies and a larger number of low-grade feeble-minded children, and have been found to give accurate results.

The extension upwards of the scale of tests so as to include higher mental ages is more urgent than was the extension downwards. The scale stopped with tests for the mental age of thirteen, on the basis of the assumption that the intelligence is practically completely developed at that age. But because of a necessary rule for counting up the mental age from the results of an examination, mental ages beyond ten cannot be measured without making some allowances for the shortness of the scale at this end. The scale is, therefore, inadequate for all cases beyond, say the age of twelve, who are near the borderline of normal intelligence. The need of determining the grade of intelligence of those higher mental levels, while it does not arise so often because the only slightly feeble-minded are relatively rarely sent to an institution, is very urgent when it does arise. The right disposal of the case hinges on our ability to diagnose correctly at a point where diagnosis has reached its maximum degree of difficulty. To extend the scale of tests at its upper end is a difficult undertaking. After a careful study of a large number of scattered and miscel-

laeous tests for this purpose, some fifty tests, new and old, have been tried out in examining about one hundred normal adults and two hundred sixty public school children of the seventh and eighth grades. The net result up to date is a small group of tests proven to be adequate for the accurate determination of mental ages from twelve to fourteen inclusive, and probably for higher mental ages. We hope in another year to be able to extend the Binet-Simon scale upwards to include the highest grade of adult normal intelligence.

Besides standardizing the procedure in giving the tests and extending the scale with new tests, some minor imperfections of individual tests were removed. A few tests were found to be misplaced in the scale, or were for other reasons inadequate. These have been replaced by new tests, or shifted into other parts of the scale where they were found to give more accurate results. The whole scale thus revised has been tried out again by examining over a thousand public school children. In this case a group of public school teachers gave the tests, after they were given a brief preliminary training in the use of the tests. From these results it was found that in practically every instance the changes made were changes in the right direction. Our revised Binet-Simon scale has been pronounced by both German and American critics to be the best in the English language.

Finally, the interpretation of the grade of intelligence after the mental age is determined was with Binet and Simon a vague and uncertain matter, and is so still with many who use the tests. The mental age, or the difference between the age and mental age, was taken to represent the grade of intelligence. But the mental age does so only in the case of adults, and the difference between age and mental age never does. This is obvious enough when we consider the fact that a normal child of six, for example, has the mental age of an adult imbecile, while a difference of one year between age and mental age at the age of two or three means serious mental deficiency, and at the age of twelve it means a normal mind slightly below the average. The rules followed in this matter have been arbitrary and inaccurate. I have suggested that the true intelligence of a mentally growing child is represented by his rate of mental development as compared with the average normal rate. Since this rate of development is given by the ratio of the mental age to the age we need simply divide the mental age by the age to obtain the true index of intelligence in the percentage thus found. Moreover, assuming that the rate of development of a given feeble-minded child maintains the same relation to the normal rate throughout, we can at once predict what the mental age of that child is likely to be at any time in the future. I have offered this plan of procedure and have shown that the theory involved accords very closely with empirical facts. It means, of course, that such predictions as to the future mental age of a child will be true only in the majority of cases, and by no means necessarily in all.

2. Mental Examination and Reclassification of all Inmates.—The results of examining all the inmates may be put to two different uses. First, by showing us the relative frequency with which the different grades of intelligence are admitted, and how this is influenced by age and sex, the results point out the way to the most efficient and necessary eugenic measures. Second, they have their immediate application by showing the degree

and kind of training each individual case examined is capable of receiving with profit.

(a) Relative frequency of different grades. According to theory more individuals belong to an average grade of intelligence than to any other grade, higher or lower. The variations from this average become less frequent with the increase in the degree of variation. In other words, for every feeble-minded of idiot grade there are many of imbecile grade, and for every imbecile there are very many of moron grade. Statistics have shown this general theory to be entirely correct. If the feeble-minded of the different grades were equally liable to be sent to the institution, we should, therefore, have very many high-grade inmates for every one low-grade. The results of our examinations show that a relatively insignificant number of the higher grades is sent to the institution for the feeble-minded. The following figures give the number of inmates for each mental age of one thousand two hundred sixty-six feeble-minded examined in 1910-1911:

TABLE I.

Mental age.....	1-2	3	4	5	6	7	8	9	10	11	12	13
Number of cases...	338	93	125	151	183	141	94	54	41	28	12	8

This gives the largest number for the mental age of six, which is about middle imbecile grade, with the number falling off very rapidly in the moron grade. These cases, however, were not consecutive admissions, and many of them were children, whose mental ages will increase with age. I may, therefore, add the results for the examination of three hundred fifty consecutive admissions during the last two years, and also express the grades of intelligence by the percentages obtained by dividing the mental ages by the ages instead of by the mental ages directly. This gives the following:

TABLE II.

.....	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91
No. cases..	19	36	29	41	55	64	56	33	8	9

In these latter figures the largest number of cases is shifted from the middle imbecile to the high imbecile grade by removing the error involved in taking the mental age directly as representing the grade of intelligence.

(b) Age and sex differences. Next in importance from a eugenic standpoint is the question of how admissions into the institution are affected by age and sex. The next table gives the number of boys and girls examined since September 1, 1910, for each chronological age:

TABLE III.

Age.....	1-5	6-8	9-11	12-14	15-17	18-20	21-30	31
Boys.....	54	134	157	136	102	57	79	75
Girls.....	45	104	121	130	100	80	109	75

Here we see, first, that the largest number of boys is admitted for the age of 9-11, and the largest number of girls for the age of 12-14; second, that up to the age of fifteen the number of boys exceeds the number of girls, and that after fifteen the number of girls exceeds the number of boys.

We may note next the average intelligence for these different ages, and how this again is influenced by sex. This is shown in the following table, giving results for the three hundred fifty admissions examined during the last two years:

TABLE IV.

Age.....	1-5	6-8	9-11	12-14	15-17	18-20	21-30	31
Boys.....	66	39	48	46	40	40	58	40
Girls.....	59	40	49	50	52	49	50	48
Average.....	63	40	49	48	46	45	52	44

These data indicate that there is no significant difference in the intelligence of the cases admitted at different ages. The relatively high intelligence at the age of 1-5 is due to the inclusion of a number of infants born in the institution of inmates, or of feeble-minded just previous to admission, some of which infants are normal or nearly so. One might expect the presence of at least two factors which would tend to make the older admissions brighter than the younger: First, the brighter the child the longer it should take parents and guardian to see the advisability of sending him to the institution; second, parents should see the need of institutional protection, at least in the case of girls, as the child approaches sexual maturity, which would tend to keep the brighter cases at home until this age is reached. Evidently these factors are either absent or so small in influence as to be outweighed by others. There is shown further a slight but insignificant difference in the average Intelligence Of the boys and girls, the girls being on the whole of slightly higher grade.

We may now summarize the conclusions from the mental examination results that are important from a eugenic standpoint. These are as follows:

- (1) A relatively very small percentage of the higher grades are sent to the institution. Since it is these higher grades that are much more responsible than any other class for bearing feebleminded children, either in marriage or out of marriage, the institution for the feeble-minded is prevented from having much influence at the point where it could do most good.
- (2) Boys are most apt. to be admitted at the age of 9-11; girls, at the age of 12-14.
- (3) Cases admitted after sexual maturity are on the whole not brighter than the younger admission, this being about equally true of boys and girls.
- (4) After the age of fifteen girls are somewhat more apt to be admitted than boys, but without reference to grade of intelligence.

These several facts taken together indicate that eugenic considerations do not enter in an appreciable degree in determining whether a case shall be sent to the institution or kept at home.

(c) Application of mental examination results to care and training. Since it is obvious that different grade of intelligence require different kinds of care and training, we need not dwell on this subject. The newer method of examining with mental tests has three immediate advantages over older methods: First, it does in the course of an hour or less for the case examined what older methods can accomplish only after months of observation; second, the results are more accurate; third, the grading in terms of mental age, and ratio of mental age to age, is definite and fixed, uninfluenced by the personal factor of the examiner, and is more readily intelligible to the layman than the old, arbitrary grading into idiots, imbeciles, morons and sub-classes.

But I want to call attention chiefly to the new possibilities the new method of grading open up. Up to date we have had only a very rough and vague idea as to the capacities of the different grades of feeble-minded, largely because these grades were themselves not definitely fixed. With the mental age classification two problems, with the possibility of their

solution, arise which are of the utmost importance from the practical standpoint of care and training: First, the question as to the different kinds of things cases of each mental age are capable of doing without training; second, the question as to the kinds of tasks they are capable of learning to do under training. A solution of the first problem would enable us to put every case admitted at once to any one of a number of tasks for which we knew his grade of intelligence to be sufficient, without loss of time. A solution of the second problem would enable us to outline at once his course of training covering years of time, without experimenting and waste of effort. Let me add here that at present we know really very little about the training capacities of the different grades of feeble-minded. Our knowledge of what normal children of different ages can learn to do does not help us much, because the normal's grade of intelligence does not remain constant long enough. The feeble-minded adult with a mental age of eight can learn to do many more things than we ever find the normal child of eight capable of doing, simply because the former has many years to the normal child's one year in which to learn to do them while he is mentally eight. In my judgment there is nothing that seems more promising and practical for any large institution for the feeble-minded to do than to take a list of industrial tasks, supply the necessary equipment, and determine what grades of intelligence are adequate for taking the training required in learning to do these tasks. It would not only make the existing feeble-minded much more useful, but, by making the institution more of an industrial home for trained, if not skilled, labor, it might become more attractive for the higher grades, which for eugenic reasons we want most but get least.

3. Re-Examination of Inmates.—One of the oldest and most discussed questions about feeble-mindedness is that of the permanency of the condition. The new method of determining grades of intelligence with mental tests gives the possibility of solving it, but has not yet done so to the satisfaction of all. We have begun to re-examine most of our inmates. The results, together with those of other investigators in other fields, indicate that the majority of feeble-minded children keep on developing in intelligence in about the same way as do normal children, but at a slower rate. There is also good evidence that a large minority develop at quite irregular rates, relatively fast at first and much more slowly later, stopping entirely before normals do, degenerating after they have stopped, and various combinations of these conditions. It is evident at least that these re-examinations of the feeble-minded are necessary if a close record is to be kept of their mental progress.

4. Courses of Instruction and Training In Use of Mental Examining.—At various times instruction and training have been given in the methods of mental examination and in the use of the Binet-Simon tests to persons from public institutions and schools. About seventy-five have received training in the use of mental tests at the school for feeble-minded during the last three years. The use of the tests was also demonstrated in a number of other institutions and public schools on different occasions. The immediate object for this was simply to meet the demand, and to further provide for this demand regular courses of instruction and training were authorized by the laws and approved by the Board of Control in May, 1913.

Six weeks' summer courses are now a regular part of the work of the research department. These courses, however, have a further object besides that of furnishing instruction to those wanting it. This is the help it will lend in handling the problem of feeble-mindedness itself. One of the main reasons why such a small percentage of the higher grades of feeble-minded do not receive special care, and training is because the public schools are not equipped for the ready diagnosis of the condition of feeble-mindedness in public school children. Even where special classes for the so-called "backward" children are established, and this is in less than 15 per cent of the public schools of the country, the existing feeble-mindedness is usually not recognized. In this way the public schools are today unknowingly one of the factors that perpetuate feeble-mindedness, by helping to pass the higher-grade feeble-minded out into society as they grow up, instead of doing all that is possible toward their segregation. To train public school teachers in the use of the methods of mental examination, thus giving them a more ready means of recognizing feeble-mindedness in public school children, even though they remain far from being expert examiners, should in time do much for the eugenic phase of the problem.

Dr. A. C. Rogers, School for Feeble-Minded: Mr. Chairman, Gentlemen and Ladies: In a general way the research department at the institution for feeble-minded and colony for epileptics stands for anything and everything which will throw any light on either the nature, the extent, or the cause of mental deficiency or epilepsy. To be successful, certain things are especially important, in any research work. First of all there must be some definite, fairly clear idea of what is to be worked out. That is obvious. It might happen once in a long while that the dropping of a little sulphur and a little rubber on a hot stove would enable a Goodyear to vulcanize rubber, to produce a combination which he had been looking for for years. It might happen once in a thousand years that an apple falling on an Isaac Newton's head would suggest the law of gravitation and result in working out wonderful mathematical problems. But Edison has not obtained his results in that way. He has had definite problems in mind and he has worked for definite ends, and if he found in the course of his investigations that his methods were wrong, he simply worked some other way. Those wonderful results of Mendel were not the result of any haphazard work, but the faithful, conscientious work of months and months, involving eighteen thousand definite experiments. That is the way results in science are obtained and the only way that any real progress is made. So, first, there must be some clearly defined purposes. Next, there must be those who are trained technically, who know the conditions, characteristics and reactions of the materials that they work with in order to evaluate those reactions, and make their results conclusive.

Then there must be, in addition to that, the financial support of those who do the work, because the enthusiasm that is necessary, in addition to the technical knowledge of the investigators, must not be marred or chilled by the constant thought of the wherewithal with which to get their daily bread.

Then there is a fourth requisite, the clinical material, in whatever line of study it may be, and it must be abundant, because only in that way are the variations in the experiments obtained, the proper comparisons made,