THE RELATION OF THE MORE COMMON
CHILDHOOD DISEASES IN THE ADOLESCENT MALE TO
BEHAVIOR PROBLEMS AND SCHOOL PROGRESS

A Thesis Presented for the
Degree of Master of Arts

By

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Approved by:

[Signature]
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Problem

This study was made to find out the degree of relationship which may exist between certain childhood diseases, and problems of behavior and school progress. The behavior problems as specified in this study were problems which were manifested to such a degree as to be considered serious by the school authorities. In discussing this problem, the relationship between I.Q., school grades, school failures, school attendance, and ages at which the different childhood diseases occur will be considered.

Historical Resume

The present attitude toward disease is that it is caused by a multiple of factors. This is a far cry from the beliefs held by primitive man, "who conceived disease as being due to the entrance into the body of a devil or demon, or to the fact that the sick person had sinned or lacked faith in God." Among the first to break away from these ideas of disease was Hippocrates, who looked upon disease as a part of the order of nature, having a natural cause. He felt that

1. LOGAN CLENDING, The Human Body, p. 10
"the course of the disease could, within certain limitations, be predicted and even altered." This concept was the embryo from which modern medicine has grown. We have come a long way since Hippocrates first expounded his theories on the nature of disease. We now realize that "among the factors that disturb an individual's ability to function, disease plays a tremendous part." 

It is a common opinion among laymen that disease or poor health is apt to cause a deviation in an individual's behavior. Most of us are cognizant of the fact that one's behavior is often affected by past or present illnesses. In discussing disease and the relationship of disease to behavior problems, we should not overlook the fact that the "glands too play an important role in an individual's reactions." Malfunctioning of the glands often carries the manifestations of certain behavior which deviates from one's normal behavior. It is widely recognized "that the endocrine glands exert a profound effect upon human temperament." Carl Rogers, in his book "The Clinical Treatment of the Problem Child," states "that the most cautious research finds ample reason to believe that glandular maladjustment is without a doubt a most important factor in determining certain deviations from normal behavior."

In considering disease and behavior problems, we are most apt to look for only the direct effect of illness upon behavior, forgetting

2. CLENDING, op. cit., p.10
3. FLORENCE MATTER, Glands and Efficient Behavior, p.4
4. Ibid., p.5
5. PAUL THOMAS YOUNG, Emotion in the Man and Animal, p. 351
"the indirect effects of illness upon a child's behavior may be of equal importance." 7 "Many a child has become irritable or excitable due to a headache, toothache, or chronic state." 8 "The sick child shows an increased desire for attention, resistance to assuming normal responsibilities, and the enjoyment of the infantalizing tendency of bed care. All of these behavior manifestations of the sick child are known to every parent as well as to the physician." 9 Unless one exercises a reasonable amount of caution, this behavior is apt to be reinforced and may even progress to the point where problem behavior evolves from such a situation. It has been found that the "spoiled child's reactions, such as attention-getting devices and hypochondriacal trends, may be initiated or fostered by the bedside manner of oversolicitous parents and physicians." 10 One should keep in mind that "every illness, however, mild, is a potential breeder of behavior problems; hence the calm, understanding, and wise management of children during sickness and convalescence is an important part of the mental hygiene of childhood." 11

Delinquency is often apt to be the result of problem behavior, particularly if that problem behavior has gone untreated and unnoticed. In delinquency too we find that considerable work has been done bearing out the general hypothesis of the effect of disease and health problems as a predisposing factor of delinquency. Some of the following studies tend to summarize the various relationships existing between physical defects and disease, and delinquency. Morrison, in a study of juvenile

7. ROGERS, op. cit., p.7
8. WILLIAM MOODIE, The Doctor and the Difficult Child, p.36
9. ROGERS, op. cit., p.7
10. E.A. STRECKER AND F.G. EBBAUGH, Practical Clinical Psychiatry for Students and Practitioners, p. 596
11. Ibid., p. 596
offenders, feels that "physical inferiority is one of the most important causes which produce criminality." Whitman felt that, "whether physical conditions stand directly or indirectly as causative factors of delinquency, they should never be neglected." William Healy, an authority on the problems of delinquency, states in his classical book, "The Individual Delinquent," that "we should hark back to any physical conditions which may appear to be the first roots of the trouble." In an analysis of abnormal physical conditions made by Healy, from 823 out of 1,000 cases of repeated offenders whose average age was 15½ years, he came to the conclusion that "an offender, whose physical condition may be regarded as responsible for his career in crime, is most usually suffering from more than one defective condition." He further noted that some offenders made "extraordinary improvements with rectification of bodily ailments." We have discussed the effect of disease upon the problem behavior of the delinquent; now let us turn to the group of individuals whose illness has been of longer duration or has more serious after effects, and see how their behavior is influenced as the result of their illnesses. A study made in Germany reveals that "tubercular children at earlier ages show unsocial characteristics, which appear to go back to the basic feeling of insecurity as a result of their illness." A study made in the United States seems to contradict somewhat the study made in Germany. This study revealed "that it appears that there is more emotional maladjustment in the sanatorium population than in the general population. Most modern

12. W. D. MORRISON, Juvenile Offenders, p. 102
13. JOHN L. WHITMAN, "The Importance of an Up-to-Date Medical Department in a Penal Institution," Proceedings American Prison Association (1913)
14. WILLIAM HEALY, The Individual Delinquent, p. 227
15. Ibid., pp. 127-128, 135-136
16. Ibid., p. 400
opinion seems to point to the conclusion that tuberculosis merely accentuated the maladjustment present before the onset of the disease.\(^{18}\)

It should be kept in mind that one of the factors which precipitated the maladjustment of the tubercular is the nature of the illness itself. Tubercular patients usually are hospitalized for long periods of time, and this hospitalization is difficult enough for the adult, but is even more difficult for the young child or adolescent. In turning to infantile paralysis as one of the other more serious diseases, we find that "Kenny was among the first to consider the treatment of infantile paralysis from the psychobiologic standpoint."\(^{19}\) Questions were raised as to the effect of infantile paralysis on intellect and to the psychological effects which may result from such a disease. It was found that "younger children appear to tolerate the disease better than the older children, and that physically and psychologically they seemed to make a better adjustment."\(^{20}\) From a study of 98 cases made by Fordon, Roberts, and Griffiths, they found that an attack of infantile paralysis "does not appear to depress the level of general intelligence as tested by the Binet scale."\(^{21}\)

Among the more common diseases of a less serious nature, we still find that problem behavior is apt to occur as one of the results of the disease. "Five hundred children were studied to see if there were any personality changes or behavior disorders resulting after an attack of whooping cough; of these 500 cases 243 showed a history of having had


\(^{19}\) C. A. BORENDEK, "Psychobiologic Factors in the Kenny Concept of Infantile Paralysis," Psychosomatic Medicine (Vol. 6, 1944) pp. 82–87

\(^{20}\) HAUSMANN AND SACKS, Nervous and Mental Disorders from Birth Through Adolescence, pp. 139, 160

whooping cough, 58 of this number had the disease before they were two years of age, and 34 of these 58 showed neurological sequelae which was attributed to whooping cough. The result of this study indicates that whooping cough may lead to severe behavior problems, intellectual deterioration, personality distortions, and psychotic manifestations." 22

Richter made a study of "twelve children who were all suffering from mild upper respiratory symptoms; he found that they exhibited the following behavior; they were submissive, repressed, religious, perfectionalistic, and interpreted their sickness as a punishment for some ill-understood fault." 23

We have discussed the effects of diseases as a predisposing factor in delinquency, personality deviations, and behavior problems. Now we are interested in finding out the effect of diseases on the average or normal individual. Stratton conducted a study of 1,000 college students to see what effect, if any, a history of disease or serious illness had upon an individual's proneness to fear and anger. The students rated their emotions upon a specially arranged form. Stratton obtained the medical record of each student to give him a record of their health history. From this study he drew the conclusion that "ill health tends to make one more emotional." 24 He also found that a "history of serious illness is associated with proneness to responses of fear and anger." 25

In discussing diseases as one of the causative factors in behavior difficulties, one should also consider the effect of health upon intel-

24. PAUL THOMAS YOUNG, Emotion in the Man and Animal, p. 349
25. Ibid., p. 350
ligence, school grades, attendance, and school failures. All of these are an important part of the child's adjustment in school. How well he is able to compete and how successful he is in his school work; all have an inter-relationship with the state of his health.

Steadman made a study of "450 high school students in a normally healthy community to see if intelligence and school grades were influenced by health. The results showed that 91 percent of all pupils were affected by health defects. School grades were only affected by health defects when the I.Q. remained constant. Children with I.Q.'s above 115 (Terman Group Test of Mental Ability) are affected more acutely than those with a lower I.Q." Conway and Nemzek conducted a study to see if there was "any relationship between school marks and the amount of illness." They used 400 children, 200 with a history of illness and 200 without a history of illness; they were matched for I.Q., C.A., sex, grade, and curriculum. Twenty common diseases were used in this study. The results brought out the fact "that there was no evidence of any permanent detrimental effects on school success due to illness." Children who are prone to illness are apt to be absent from school more than the relatively healthy child. Finch and Nemzek have found, "the relationship between regularity in school attendance and scholarship is greater with girls than with boys." Hardy made quite an intensive study of behavior adjustment during childhood and its relation to health history. The study was a long time study covering several years of observation. Data relative to the child's

behavior were obtained from some of the following sources: teachers, parents, other pupils, and through individual interviews. The results indicated that there "was some evidence of an inverse relationship between health history and behavior adjustments during childhood. The differences which were found were not large, but were significant. The results seemed to indicate that the illnesses which the maladjusted had were of a less serious nature than those of the well adjusted, and that illness was less frequent in the maladjusted group."  

In considering behavior problems in the school, one should not overlook the relationship existing between problem behavior and intelligence. Jaggers, in his article entitled "The Relation of Intelligence to Behavior in School Children," took a group of 47 problem children and 48 well adjusted children in Franklin, Ky., from the fourth grade up, to see if there was any relation between intelligence and behavior. He did not include children in the problem group who exhibited shy, timid, or withdrawing types of behavior. The results of this study indicated that there was an average difference of 16 points in I.Q. between the problem group and the well adjusted group. The problem group had an average I.Q. of 96 and the well adjusted group had an average I.Q. of 112. (He used the Otis Self-Administering Test, The Myers Mental Measurement, and the Kuhlman-Anderson Tests in his study.)

Summarizing, it seems that from the organic point of view it is apparent that proneness to emotional disturbances depends upon fatigue, pain, hunger, state of health, functioning of the glands, and direct and

innate constitutional factors of the individual. "It is clear today that a close relationship exists between temperament and the physio-chemical state of the organism, but the details of these relationships are still in need of further investigation." 

Method

In making this investigation, it was decided to use all white boys of the same approximate ages, grades, and backgrounds; this was done in order to eliminate any sex variations. The subjects, 114 boys between 15 and 16 years of age, were chosen from a high school in Dayton, Ohio, located in an area where the socio-economic status of the group as a whole was well above the average.

The methods used in securing information for this study were as follows: from a questionnaire (see appendix) which was filled out by the boys themselves, school academic records, individual personal records kept on each student, and from verbal reports by the assistant principal as she briefed these records for the writer.

The school records provided the following information which was pertinent to this study: I.Q. (Otis Self-Administering Test High School Form), absences, school grades, course failures, and grades. The information received from the assistant principal dealt mainly with giving the case histories about the problem group and enumerating from the reports she had given what the main difficulties of each individual seemed to be. The terms used by her in describing the types of problems found were defined in her own words as follows. This was done in order

31. PAUL THOMAS YOUNG, Emotion in the Man and Animal, p. 358
to eliminate any possible misinterpretation of what is meant in the use of terms.

1. **Conflict with Father** - Personality of boy and his father clash, causing a lack of understanding on the part of each concerned.

2. **Emotional Tensions over Family** - Emotional tensions here are usually due to large families with low income. There is failure on the part of the parents to create an atmosphere of meeting life's problems realistically. This failure often produces misunderstanding and nervous tensions, resulting in quarrels and bitter disputes within the family.

3. **Emotionally Unstable** - Cases showing vacillating behavior, not in the psychopathic sense at present, but in changing reactions brought on by failure to face reality with poise.

4. **Erratic** - The individual who changes decisions frequently. It may seem that even the pattern of action is thrown in reverse.

5. **Highly Emotional** - Cases of temper tantrums, angry retorts in reactions during counseling, with the same behavior also strongly manifested in the home.

6. **Immature Attitude** - Such persons as depend upon parents or advisors for much help and direction; those who avoid responsibility and are undependable and childlike.

7. **Inferior Feelings** - Individuals who feel inadequate in comparison to others. They are somewhat restrained and shy.

8. **Insecurity** - Uncertainty of status with parents due to disrupted home conditions and economic restrictions. Divorce and placement of child have been factors in these cases.

9. **Lack of Cooperation** - Failure to follow any plan suggested for the improvement of personality, school work, and home relationships.
10. Lazy - This term is applied to physical reactions or inertia chiefly.

11. Negativism - The stubborn, resentful, cynical type of individual often seeking attention by refusing to cooperate at normal times and in normal ways. Often these individuals have a severe negative response.

12. Overanxious - The individual who is very sensitive and solicitous; the worrying type.

13. Overconfident - Those so indicated attempt to bluff information and to give the effect of sound thinking based upon inadequate data.

14. Oversize - Marked tendency for individual to be taller and more physiologically developed than the rest of the group.

15. Overweight - Marked tendency for individual to be overweight for age and group.

16. Poor Companionship - The person who gets into difficulty because his companions led him into situation; easily swayed and talked into behavior which he ordinarily would not do.

17. Poor Social Adjustment - The non-acceptance of the individual by his fellows, indicated by play habits, inability to get along with others or to be chosen as leader or team member or school officer by others in the group; failure to make a friendly approach to his peers and elders.

18. Reactions Slow - Physical and mental reactions implied. If the I.Q. is not low, then the physiological factors have direct influence in these cases. The home pattern may also be a factor to be considered.
19. Religious Conflict - Ideas and attitudes of the individual are in conflict with the strict religious viewpoint present in the home.

20. Self-Consciousness - Individuals who tend to refer incidental things to themselves, are embarrassed when with others, and have a feeling of being watched by others.

21. Stealing - Individuals who take articles which do not belong to them.

22. Too Much Responsibility - Individual assuming too much responsibility economically in the home, or doing more than his share in contributing to the family support.

The subjects were given a questionnaire which was administered through the cooperation of the Boys' Physical Education Department. The subjects were asked to check the childhood diseases which they had, and to record the age at which each disease occurred. If they were uncertain as to the age, they were to check with their parents and report back later. There were only a few cases in which this was necessary. Not all of the diseases included on the questionnaire given to the subjects were included in the final report of the study. The original group of diseases included tuberculosis, and encephalitis, but since there were no reported cases of these diseases among the group used in this study, they were deleted. The diseases used for this study were as follows: chicken pox, diphtheria, infantile paralysis, measles, mumps, pneumonia, rheumatic fever, scarlet fever, and whooping cough.

After securing the above data, for reasons of convenience and clarity, the group being studied was broken down into three sub-groups:
Low Mental Ability Group - to include only those subjects whose problem was lack of innate ability. No individuals of low mental ability showing behavior problems were included in this group. They were included in the problem group, thereby leaving this group comprised only of those of low mental ability.

Normal Group - to include only those subjects who present no problem behavior and who are well adjusted.

Problem Group - to include all subjects who showed problem behavior serious enough to come to the attention of the school authorities.

The problem group was further broken up into two more groups, to be classified as the Superficial behavior problem group and the Deeper behavior problem group. The Superficial behavior group included the following types of problems:

1. Too much responsibility  
2. Overconfident  
3. Religious conflict  
4. Lack of cooperation  
5. Slow reactions  
6. Overweight  
7. Oversize  
8. Poor companionship  
9. Self-Consciousness  
10. Lazy  
11. Feelings of inferiority  
12. Poor social adjustment  
13. Overanxious

The problems classed in this group can best be treated by dealing directly with the problem or conduct itself, and not delving into deeper types of therapy. These problems are the less serious of the problem group.

The Deeper behavior problem group included the following types of problems:

1. Truancy  
2. Emotionally unstable  
3. Negativism  
4. Emotional tensions  
5. Conflict with father  
6. Erratic  
7. Stealing  
8. Insecurity  
9. Highly emotional  
10. Immature attitude
The problems classed in the Deeper behavior problem group can best be treated by getting at the fundamental causes of the behavior and giving treatment to the causes rather than to the conduct resulting from the cause, as is done in the Superficial group. The problems included in this group are the more serious problems of the problem group.

All these data were used to ascertain the relationships which may exist between a history of illness and school grades, attendance, I.Q., different ages of occurrence of these diseases, and the relationship of these diseases to the different types of problem behavior.

Discussion and Data

A. It seems advisable to start this discussion by presenting a picture of the general average intelligence of the boys used in this study. Chart I (p. 15) presents a graphic illustration of this, showing the average I.Q. of all the adolescent males used in this study by the various classifications or groups into which they fall. Examination of this chart reveals that the average I.Q. of the normal group (110) is greater than any of the other groups, and three points higher than the average for the entire group (107). The problem group has an average I.Q. of 106, which is one point lower than the average for the entire group. As would be expected, the low mental ability group has an I.Q. of 90, which is the lowest I.Q. of all the groups, and which is 17 points lower than the average for the entire group.

Summarizing, we find that the problem group is not much lower than the normal group or the average for the entire group. A significant difference is noted between the low mental ability group and the rest of the groups, with the former having the lowest average I.Q. of the
Chart I

AVERAGE I.Q. OF THE BOYS ACCORDING TO THE GROUPS INTO WHICH THEY WERE CLASSIFIED

KEY
- Low Mental Ability Group
- Problem Group
- Normal Group
- Entire Group

Groups

I.Q.
160
140
120
100
80
60
40
20
0

Range 85-104
Range 92-139
Range 85-140

106
110
107
whole group. The normal group tends to have a slightly higher I.Q. than
the entire group, but the difference is so slight as to be insignificant.

B. Next to be considered is the relationship, if any, that there is
between the average I.Q. of those boys in the different groups failing
courses as compared with the average I.Q. of the group into which they
are classified. This comparison will be made according to the classi-
Fication or groups into which these boys fall. Examination of this chart
will show us if I.Q. is a factor in one's predisposition to course
failures. Examination of Chart II (p. 17) reveals that those failing
courses in the low mental ability group had an average I.Q. of 88, which
is but two points lower (Chart I) than the average for their group.
Those in the problem group failing courses had an average I.Q. of 102,
which is four points lower (Chart I) than the average for their group.
Those in the normal group failing courses had an average I.Q. of 106,
which is four points lower (Chart I) than the average for their group.
For all those in the entire group failing courses the average I.Q. was
101, which is six points lower (Chart I) than the average for the entire
group.

We see from the above discussion that, on the whole, those boys in
each of the various groups who failed courses tend to have a slightly
lower average I.Q. than the average for the group in which each boy is
classified. The most significant differences in I.Q. are noted for
the problem group, the normal group, and for the average for the entire
group. From these data one could assume that those failing courses tend
to have a lower average I.Q. than the average for each of the individual
groups into which they are classified.
Chart II

Average I.Q. of the boys who failed courses according to the group into which they were classified.

KEY
- Low Mental Ability Group
- Problem Group
- Normal Group
- Entire Group
C. Next we are interested in seeing just what subjects are failed by these boys and what relationship specific subject failures have with I.Q. Chart III (p. 19) graphically represents this relationship.

Interpretation of this chart reveals the following:

1. The average I.Q. of those failing Spanish was 106.
2. The average I.Q. of those failing Social Science and Hygiene was 103.
3. The average I.Q. of those failing Algebra and Latin was 101.
4. The average I.Q. of those failing General Science and Physical Geography was 99.
5. The average I.Q. of those failing Mathematics was 96.
6. The average I.Q. of those failing History and Chemistry was 95.
7. The average I.Q. of those failing English was 92.

This chart reveals that those failing General Science, Physical Geography, Mathematics, History, Chemistry, and English had I.Q.'s below the average as tested by the Otis Self-Administering Test (High School Form). Those failing Spanish, Social Science, Hygiene, Algebra, and Latin has I.Q.'s of average or above as tested by the same test. One could almost draw the conclusion from these data that a certain minimum I.Q. is necessary to attain success in certain school subjects, and that this minimum I.Q. varies according to the school subject chosen.

D. Next in the order of discussion is the average of all school grades of the boys used in this study. Again the same groupings or classifications are used. Results (Chart IV, p. 20) indicate that the low mental ability group secured the lowest grades of the entire group; however, there is nothing significant in this, since it is what would be expected. The grades for this group averaged 1.48, which interpreted into letter grades would be grades between C and D. The problem group did slightly better than the low mental ability group, receiving an average of 1.63, which interpreted into letter grades would be grades between C and D. Both of these groups are below the average for the entire group, which
Chart III

AVERAGE I.Q. OF THE BOYS ACCORDING TO THE SCHOOL SUBJECTS FAILED

Subject

<table>
<thead>
<tr>
<th>Subject</th>
<th>I.Q.</th>
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<tbody>
<tr>
<td>English</td>
<td>92</td>
</tr>
<tr>
<td>Mathematics</td>
<td>96</td>
</tr>
<tr>
<td>General Science</td>
<td>99</td>
</tr>
<tr>
<td>Algebra</td>
<td>101</td>
</tr>
<tr>
<td>Latin</td>
<td>103</td>
</tr>
<tr>
<td>Spanish</td>
<td>106</td>
</tr>
<tr>
<td>Social Science</td>
<td>103</td>
</tr>
<tr>
<td>History</td>
<td>95</td>
</tr>
<tr>
<td>Chemistry</td>
<td>95</td>
</tr>
<tr>
<td>Hygiene</td>
<td>103</td>
</tr>
<tr>
<td>Physical Geography</td>
<td>99</td>
</tr>
</tbody>
</table>

KEY

I.Q. Below Average

I.Q. At or Above Average
Chart IV

The average school grades attained by each of the groups of boys

Key (I)
- Low Mental Ability Group
- Problem Group
- Normal Group
- Entire Group

Key (II)
- 4.0 equals A
- 3.5 equals B
- 3.0 equals C
- 2.5 equals D
- 2.0 equals E
- 1.5 equals F
- 1.0 equals G
- .5 equals H
- 0 equals I

Grades
0
1.0
1.5
2.0
2.5
3.0
3.5
4.0

Groups
is 2.13, or a letter grade of C. The normal group considerably exceeds both of the preceding groups. This group has an average of 2.50, which interpreted into letter grades would be grades between B and C.

In summarizing, we find that, even though the average I.Q.'s of the low mental ability group were 16 points lower than the average I.Q. of the problem group (Chart I), we find that their academic success is about the same. This would lead one to believe that the academic success of the problem group is affected by its being in difficulty. Chart IV also reveals that the normal group gets much better grades than any of the other groups. The problem group is considerably lower than the normal group, and receives just about the same grades as the low mental ability group.

E. Next to be considered is the average number of days absent per year for each individual according to the group into which he is classified. Examination of this chart (Chart V, p. 22) reveals that the average number of days absent for the entire group is 7.21 days. The problem group greatly exceeds this average with 11.02 days absent. The normal group and the low mental ability group fall below the average for the entire group. The normal group averages 5.00 days absent, and the low mental ability group averages 4.85 days absent. There is no significant difference between these two groups. Here we do find a significant difference between the problem group and the other groups, with the problem group being absent more than twice as much.

This ends a discussion of the general background of the group used, and from here we go into a discussion of diseases and their relationships, if any, to the factors discussed above.
Chart V

AVERAGE NUMBER OF DAYS ABSENT DURING A YEAR FOR THE BOYS ACCORDING TO THE GROUP INTO WHICH THEY WERE CLASSIFIED

Days Absent

Groups

KEY

Low Mental Ability Group

Problem Group

Normal Group

Entire Group
First of the topics to be discussed under this heading is the relationship of the total number of individuals in each of the groups and the number of diseases contributed by each of these various groups, to the total number of diseases for the entire group. Examination of this chart (Chart VI, p. 24) reveals the percentage of the total number of diseases in the entire group contributed by each of the groups. The figures above the second of each pair of the colored bars indicate the number of diseases contributed by that group. Interpretation of this chart reveals that in the low mental ability group 7 individuals accounted for 20 diseases or 5.47 percent of the total number of diseases in the entire group. The problem group is comprised of 42 individuals who accounted for 137 diseases or 37.53 percent of the total number of diseases in the entire group. The normal group included 65 individuals who accounted for 208 diseases or 56.98 percent of the total number of diseases in the entire group. There were 114 cases in the entire study and they accounted for 365 diseases.

Chart VII (p. 25) reveals that in the low mental ability group there was an average of 2.85 diseases per person, the problem group averaged 3.26 diseases per person, and the normal group averaged 3.20 diseases per person.

In summarizing (Chart VI), we find that the normal group contributes 56.98 percent or the highest percentage of the total number of diseases in the whole group. The problem group comes next, contributing 37.53 percent of the total number of diseases in the whole group. The low mental ability group is the lowest, contributing but 5.47 percent of the total number of diseases in the entire group. There is no significant difference shown for the average number of diseases per person (Chart VII).
TOTAL NUMBER OF BOYS IN EACH OF THE DIFFERENT GROUPS AND THE TOTAL NUMBER OF DISEASES CONTRIBUTED BY EACH OF THESE GROUPS

(A notation below this chart also shows the percentage of diseases contributed by each of these groups to the entire total percentage)

**Chart VI**

<table>
<thead>
<tr>
<th>Numbers</th>
<th>Number in the Ability Group</th>
<th>Number in the Problem Group</th>
<th>Number in the Normal Group</th>
<th>Number of Diseases Contributed by Ability Group</th>
<th>Number of Diseases Contributed by Problem Group</th>
<th>Number of Diseases Contributed by Normal Group</th>
<th>Number of Diseases Contributed by Entire Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>7</td>
<td>20</td>
<td>137</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**KEY**

- Low Mental Ability Group contributed 8.47% of the total percentage of Diseases
- Problem Group contributed 37.53% of the total percentage of Diseases
- Normal Group contributed 56.98% of the total percentage of Diseases

*Entire Group*
Chart VII

Average number of diseases per individual according to the type of group into which they were classified

<table>
<thead>
<tr>
<th>Groups</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>2.95</td>
<td>3.26</td>
<td>3.20</td>
<td>3.20</td>
<td>4.00</td>
</tr>
</tbody>
</table>

Key
- Low Mental Ability Group
- Problem Group
- Normal Group
- Entire Group
Considering next the average age of occurrence of diseases by the various groups (Chart VIII, p. 27), we find that the low mental ability group tends to have chicken pox and scarlet fever at a younger age than any other group. They tend to have chicken pox at 5.66 years of age, which is 6 months younger than the average for the entire group. This group also has scarlet fever at 5 years of age, which is 2½ years younger than the average for the entire group. This group also tends to have measles, mumps, and whooping cough at a later age than the average for the entire group. They tend to have measles approximately 4 months later than the average, mumps approximately 3 months later than the average, and whooping cough approximately 9 months later than the average. This group had no cases of diphtheria, infantile paralysis, pneumonia, or rheumatic fever. The problem group tends to have the following diseases at an age earlier than the average for the entire group: infantile paralysis approximately 1 month earlier than the average, measles and mumps approximately 2 months earlier than the average, and pneumonia approximately 6 months earlier than average. The problem group also tends to have chicken pox approximately 1/2 month later than the average, diphtheria approximately 1 year later than the average, and scarlet fever approximately 6 months later than the average, and whooping cough approximately 1/2 month later than the average. There were no cases of rheumatic fever in the problem group. The normal group tends to have the following diseases at an age earlier than the average for the entire group: diphtheria approximately 4 months earlier than average, measles approximately 3 months earlier than average, and whooping cough approximately 11 months earlier than average. The average age for rheumatic fever and chicken pox in this group is the same as for the average of the whole group. The normal group tends to have infantile paralysis approximately 4 months later
<table>
<thead>
<tr>
<th>Disease</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
<th>7</th>
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<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken Pox</td>
<td></td>
<td></td>
<td></td>
<td>6.66</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>6.00</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diphtheria</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>4.00</td>
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</tr>
<tr>
<td>Infantile</td>
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<td>10.50</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Measles</td>
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<td>7.16</td>
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<td></td>
<td>7.33</td>
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<td></td>
</tr>
<tr>
<td>Mumps</td>
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<td></td>
<td></td>
<td>6.66</td>
<td></td>
<td></td>
<td></td>
<td>6.83</td>
<td></td>
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<td>Pneumonia</td>
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<td>7.75</td>
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<tr>
<td>Rheumatic Fever</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Scarlet Fever</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td>8.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whooping Cough</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.00</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**KEY**
- **Low Mental Ability Group**
- **Problem Group**
- **Normal Group**
- **Entire Group**

**Chart VIII**

Average age of occurrence of the various diseases according to the type of group into which these boys were classified.
than average, mumps 1 month later than average, pneumonia 6 months later than average, and scarlet fever less than 1 month later than average.

Summarizing, we find that the average age of occurrence of the following diseases is:

- Chicken Pox - 6½ years of age
- Diphtheria - 5 years of age
- Infantile Paralysis - 10½ years of age
- Measles - 7-1/3 years of age
- Mumps - 8-3/4 years of age
- Pneumonia - 7½ years of age
- Rheumatic Fever - 7 years of age
- Scarlet Fever - 7½ years of age
- Whooping Cough - 6 years of age

In reviewing, we find that the low mental ability group tends to have chicken pox and scarlet fever at a younger age than the average for the entire group. This low mental ability group also tends to have measles, mumps, and whooping cough at a later age than the average for the entire group. The problem group tends to have infantile paralysis, measles, mumps, and pneumonia at an age earlier than the average for the entire group. The problem group tends to have chicken pox, diphtheria, scarlet fever, and whooping cough at an age later than the average for the entire group. The normal group tends to have diphtheria, measles, and whooping cough at an age earlier than the average for the entire group. The normal group also has infantile paralysis, mumps, pneumonia, and scarlet fever at an age later than the average for the entire group.

We have considered the average ages at which these various diseases occur in the different groups, so next we will break the problem group down into its two sub-groups - the Superficial behavior problem group, and the Deeper behavior problem group - and see what the average ages of the individuals in this group are according to the type of behavior problems manifested by them. Chart IX (p. 29) shows this graphically. It will be
Chart II

AVERAGE AGE OF OCCURRENCE OF THE VARIOUS DISEASES ACCORDING TO THE SERIOUSNESS OF THE PROBLEM BEHAVIOR EXHIBITED

Diseases

<table>
<thead>
<tr>
<th>Disease</th>
<th>Ages in Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken pox</td>
<td>5.76</td>
</tr>
<tr>
<td>Diptheria</td>
<td>4.72</td>
</tr>
<tr>
<td>Infantile Paralysis</td>
<td>No cases in Deeper Problem Group</td>
</tr>
<tr>
<td>Measles</td>
<td>6.66</td>
</tr>
<tr>
<td>Mumps</td>
<td>9.20</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>7.88</td>
</tr>
<tr>
<td>Scarlet Fever</td>
<td>8.00</td>
</tr>
<tr>
<td>Rheumatic Fever</td>
<td>8.66</td>
</tr>
<tr>
<td>Whooping Cough</td>
<td>4.90</td>
</tr>
</tbody>
</table>

Ages in Years

KEY

Superficial Problem Behavior Group

Deeper Problem Behavior Group
remembered in the discussion of the method used in this study that the superficial behavior problems are those problems which are of a less serious nature, and that the deeper behavior problems are those behavior problems of the more serious nature. This chart reveals that those individuals whose problem behavior is classified as superficial problem behavior tend to have the following diseases at an earlier age than those individuals whose problem behavior is classified as deeper problem behavior: chicken pox 11 months earlier than the deeper or more serious problem group, and whooping cough 1.92 years earlier than the deeper problem group. The superficial problem group tends to have the following diseases later than does the deeper problem group: infantile paralysis 5 years later, measles approximately 2 months later, mumps approximately 1 year and 3 months later, pneumonia approximately 1 2/3 years later, and scarlet fever approximately 1 1/2 years later. There were no cases of rheumatic fever in the entire problem group, and no cases of diphtheria in the deeper behavior problem group. The deeper behavior problem group tends to have the following diseases at an earlier age than the superficial behavior problem group: infantile paralysis 5 years earlier, measles approximately 2 months earlier, mumps approximately 1 1/3 years earlier, and pneumonia and scarlet fever approximately 1 1/2 years earlier.

From the above data we summarize, finding that on the whole the superficial problem group tends, as an average, to have the following various diseases at a later age than the deeper problem group: infantile paralysis, measles, mumps, pneumonia, and scarlet fever. They had chicken pox and whooping cough at an earlier age than the deeper problem group. The deeper behavior problem group, on the whole, tends to have the following various diseases at earlier ages than the superficial behavior problem group: infantile paralysis, measles, mumps, pneumonia, and scarlet fever. They had chicken pox and whooping cough at a later age than the superficial
behavior problem group.

I. Next we shall compare the average I.Q. by the different diseases of the various groups. Chart I (p. 32) reveals that the low mental ability group had the lowest average I.Q. of all groups for all diseases except for scarlet fever, which exceeded the problem group by 1 point. Those in the low mental ability group having chicken pox tended to have an average I.Q. of 93, which was 9 points below the average for this whole group. Those in the low mental ability group having measles tended to have an average I.Q. of 90, which was 15 points below the average for this whole group. Those in the low mental ability group having mumps tended to have an average I.Q. of 89, which was 12 points below the average for this whole group. Those in the low mental ability group having scarlet fever tend to have an average I.Q. of 104, which is 2 points below the average for this group. There were no cases of diphtheria, infantile paralysis, pneumonia, or rheumatic fever in the low mental ability group. The normal group, on the whole, had an average I.Q. above the average for the entire group, except those having infantile paralysis who had an average I.Q. of 98, which was 4 points below average for this whole group. Those in the normal group having rheumatic fever had an I.Q. which was the same as the average for this whole group. Those in the normal group having chicken pox had an I.Q. of 108, which was 6 points higher than the average for this whole group. Those in the normal group having diphtheria had an average I.Q. of 111, which was 3 points higher than the average for this whole group. Those in the normal group having infantile paralysis had an average I.Q. of 98, which was 4 points lower than the average for this whole group. Those in the normal group having measles had an average I.Q. of 110, which was 5 points higher than the average for this whole group. Those in the normal group having mumps had an average I.Q. of 115, which was 14 points higher than the average for this whole
Those in the normal group having scarlet fever had an average I.Q. of 103, which was 3 points lower than the average for this whole group. Those in the normal group having whooping cough had an average I.Q. of 106, which was 4 points higher than the average for this whole group. Those in the problem group having chicken pox had an average I.Q. of 105, which was 5 points higher than the average for this whole group. Those in the problem group having diphtheria had an average I.Q. of 106, which was 2 points lower than the average for this whole group. Those in the problem group having infantile paralysis had an average I.Q. of 106, which was 4 points higher than the average for this whole group. Those in the problem group having measles had an average I.Q. of 107, which was 2 points higher than the average for this whole group. Those in the problem group having mumps had an average I.Q. of 99, which was 2 points below the average for this whole group. Those in the problem group having pneumonia had an average I.Q. of 98, which was 7 points lower than the average for this whole group. Those in the problem group having scarlet fever had an average I.Q. of 103, which was 3 points lower than the average for this whole group. Those in the problem group having whooping cough had an average I.Q. of 106, which was 6 points higher than the average for this whole group. There were no cases of rheumatic fever in the problem group. In combining the above date, we can summarize showing that the average I.Q. of the individuals having the following diseases is as follows:

<table>
<thead>
<tr>
<th>Disease</th>
<th>I.Q.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken Pox</td>
<td>102</td>
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<tr>
<td>Diphtheria</td>
<td>108</td>
</tr>
<tr>
<td>Infantile Paralysis</td>
<td>102</td>
</tr>
<tr>
<td>Measles</td>
<td>105</td>
</tr>
<tr>
<td>Mumps</td>
<td>101</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>105</td>
</tr>
<tr>
<td>Rheumatic Fever</td>
<td>107</td>
</tr>
<tr>
<td>Scarlet Fever</td>
<td>106</td>
</tr>
<tr>
<td>Whooping Cough</td>
<td>102</td>
</tr>
</tbody>
</table>

We find that those in the low mental ability group having chicken pox, measles, mumps, and scarlet fever tend to have a lower than average I.Q. according to the various diseases as given above. Those in the problem
group having diphtheria, infantile paralysis, mumps, pneumonia, and scarlet fever tend to have a lower than average I.Q. according to the various diseases as given above. Those in the normal group having infantile paralysis tended to have a lower than average I.Q. according to the various diseases as given above. Those in the low mental ability group seem to have a lower average I.Q. in the majority of the diseases. The same assumption seems to hold true for the problem group; however, the normal group tends to have a higher average I.Q. in the majority of the diseases.

J. Next it seems proper to cover the problem group a little more thoroughly, and to break down the problem group into its two sub-groups: the Superficial behavior problem group and the Deeper behavior problem group. Chart XI (p. 35) reveals the differences of I.Q. of the male adolescents according to the type of problem behavior and the kind of disease. Those in the superficial behavior problem group having chicken pox tend to have an average I.Q. of 103, which is 3 points lower than the average I.Q. for those in the deeper problem group having the same disease. Those in the superficial behavior problem group having infantile paralysis had an average I.Q. of 91, which was 23 points lower than the average I.Q. for those in the deeper problem group having the same disease. Those in the superficial behavior problem group having measles had an average I.Q. of 102, which was 2 points lower than the average for the deeper problem group having the same disease. Those in the superficial behavior problem group having mumps had an average I.Q. of 103, which was 1 point higher than the average for the deeper problem group having the same disease. Those in the superficial behavior problem group having pneumonia had an average I.Q. of 96, which was 7 points lower than the average for the deeper problem group having the same disease. Those in
**Chart XI**

**Average I.Q. According to the Seriousness of the Problem Behavior Exhibited and the Kind of Disease Occurring**

<table>
<thead>
<tr>
<th>Diseases</th>
<th>Superficial Problem Behavior Group</th>
<th>Deeper Problem Behavior Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken pox</td>
<td>102</td>
<td></td>
</tr>
<tr>
<td>Diphtheria</td>
<td>104</td>
<td></td>
</tr>
<tr>
<td>Infantile Paralysis</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td>Measles</td>
<td>102</td>
<td></td>
</tr>
<tr>
<td>Mumps</td>
<td>103</td>
<td></td>
</tr>
<tr>
<td>Pneumonia</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>Rheumatic Fever</td>
<td>103</td>
<td></td>
</tr>
<tr>
<td>Scarlet Fever</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td>Whooping Cough</td>
<td>104</td>
<td></td>
</tr>
</tbody>
</table>

**KEY**

- Superficial Problem Behavior Group
- Deeper Problem Behavior Group
the superficial behavior problem group having scarlet fever had an average I.Q. of 106, which was 2 points higher than the average for the deeper problem group having the same disease. Those in the superficial behavior problem group having whooping cough had an average I.Q. of 103, which was 7 points lower than the average of those in the deeper problem group having the same disease. There were no cases of rheumatic fever in either of the two groups and no cases of diphtheria in the deeper problem group.

Summarizing, we find that the superficial behavior problem group tends to have a higher average I.Q. than the deeper problem group in the following diseases: mumps and scarlet fever. This group tends to have a lower average I.Q. than the deeper problem behavior group in the following diseases: chicken pox, infantile paralysis, measles, pneumonia, and whooping cough. The deeper problem behavior group tends to have an average I.Q. higher than the superficial behavior problem group in the following diseases: chicken pox, infantile paralysis, measles, pneumonia, and whooping cough. The deeper problem group tends to have an average I.Q. lower than the superficial behavior problem group in mumps and scarlet fever.

K. Again we break the problem group into its sub-groups according to the seriousness of the problem, this time to see the average number of course failures in these groups by diseases (Chart XII, p. 37). This chart reveals that the superficial behavior problem group has a higher number of course failures per individual for the following diseases, than does the deeper behavior problem group: Those having chicken pox average 1 course failures per person as compared to .88 course failures per person for the deeper behavior problem group. Those in the superficial behavior problem group having infantile paralysis average .5 course failures per
### Chart XII

**Average Number of Courses Failed per Individual According to the Seriousness of the Problem Behavior Exhibited and the Kind of Disease Occurring**

<table>
<thead>
<tr>
<th>Disease</th>
<th>No cases failing</th>
<th>.5</th>
<th>1</th>
<th>.91</th>
<th>.80</th>
<th>.90</th>
<th>.88</th>
<th>1.33</th>
<th>3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken pox</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diptheria</td>
<td>No cases failing</td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infantile Paralysis</td>
<td>.5</td>
<td></td>
<td></td>
<td>.91</td>
<td>.80</td>
<td>.90</td>
<td>.88</td>
<td>1.33</td>
<td>3.0</td>
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<tr>
<td>Measles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mumps</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumonia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.33</td>
<td>3.0</td>
</tr>
<tr>
<td>Rheumatic Fever</td>
<td>No cases failing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scarlet Fever</td>
<td>No cases failing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.33</td>
<td></td>
</tr>
<tr>
<td>Whooping Cough</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.70</td>
<td>.68</td>
</tr>
</tbody>
</table>

**KEY**

- Superficial Problem Behavior Group
- Deeper Problem Behavior Group
person as compared to 1 course failure per person for the deeper behavior problem group. Those in the superficial behavior problem group having measles average .91 course failures per person as compared to .80 per person for those in the deeper behavior problem group. Those in the superficial problem behavior group having mumps tend to have an average of .90 course failures per person as compared to .88 per person for those in the deeper behavior problem group. Those in the superficial problem behavior group having pneumonia tend to have 1.33 course failures per person as compared to 3.0 course failures per person for those in the deeper behavior problem group. Those in the superficial problem behavior group having scarlet fever tend to have an average of 1.33 course failures per person as compared to .33 course failures per person in the deeper behavior problem group. Those in the superficial behavior problem group having whooping cough tend to average .70 course failures per person as compared to .68 course failures per person in the deeper behavior problem group. Summarizing, the superficial behavior problem group tends to have a higher average number of course failures in the following diseases per individual than does the deeper behavior problem group: chicken pox, measles, mumps, scarlet fever, and whooping cough. The deeper behavior problem group exceeds the superficial behavior problem group in average number of course failures.

L. Diseases and their relationship to school grades according to the seriousness of the problem behavior (Chart XIII, p.39) will be next for discussion. This chart reveals that the superficial behavior problem group having chicken pox averages 1.45 in school grades as compared to 1.59 by the deeper problem group. These interpreted into letter grades would be between C and D for both groups, with the deeper problem group having a slight edge over the superficial group. Those in the super-
CHART XIII

THE DIFFERENT DISEASES AND THEIR RELATION TO SCHOOL GRADES ACCORDING TO TYPE OF PROBLEM BEHAVIOR EXHIBITED

<table>
<thead>
<tr>
<th>Diseases</th>
<th>Grades</th>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken pox</td>
<td>1.45</td>
<td></td>
</tr>
<tr>
<td>Diphtheria</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Infantile</td>
<td>No cases in Deeper Problem Group</td>
<td></td>
</tr>
<tr>
<td>Paralysis</td>
<td>1.25</td>
<td></td>
</tr>
<tr>
<td>Measles</td>
<td>1.58</td>
<td></td>
</tr>
<tr>
<td>Mumps</td>
<td>1.48</td>
<td></td>
</tr>
<tr>
<td>Pneumonia</td>
<td>1.55</td>
<td></td>
</tr>
<tr>
<td>Rheumatic Fever</td>
<td>No cases in Superficial Problem Group</td>
<td></td>
</tr>
<tr>
<td>Scarlet Fever</td>
<td>1.83</td>
<td></td>
</tr>
<tr>
<td>Whooping Cough</td>
<td>1.25</td>
<td></td>
</tr>
</tbody>
</table>

**Key**
- **A** 4.0 equals
- **B** 3.5 equals
- **B** 3.0 equals
- **B** 2.5 equals
- **B** 2.0 equals (average)
- **C** 1.5 equals
- **C** 1.0 equals
- **D** 0.5 equals
- **E** 0 equals
- **F** 0 equals

Superficial Problem Behavior Group
Deeper Problem Behavior Group
ficial behavior group having diphtheria average 1.00, which interpreted into letter grades equals a D grade. There were no cases of diphtheria in the deeper problem group. Those in the superficial behavior group having infantile paralysis average 1.25 as compared to 3.5 for the deeper problem behavior group having the same disease. Interpreting these into letter grades, the former is slightly over a D, and the latter falls between B and C. Those in the superficial problem behavior group having measles average 1.58 as compared to 1.45 for the deeper problem group having the same disease. Interpreting this into grades we find the former having a little over half C's and half D's, the latter getting almost the same. Those in the superficial problem behavior group having mumps average 1.55 as compared to 1.44 for the deeper problem behavior group having the same disease. Interpreting these into grades, we find that both tend to have grades between C and D. Those in the superficial behavior problem group having scarlet fever average .83 as compared to 2.50 for the deeper problem behavior group having the same disease. Interpreting these into grades, we find that the former almost makes a D average, while the latter has grades between B and C. Those in the superficial behavior problem group having whooping cough average 1.75 as compared to 1.59 for the deeper problem behavior group having the same disease. Interpreting these, we find that the former has slightly more C's than D's, while the latter has about an equal number of C and D grades. There were no cases of rheumatic fever in either of the two groups, and there were no cases of diphtheria in the deeper problem behavior group.

In summarizing the above data, we find that the superficial behavior group tends to receive better average grades than the deeper behavior problem group in the following diseases: measles, mumps, pneumonia, and whooping cough. In the deeper behavior problem group, we find that they
receive better average grades than the superficial behavior problem group in the following diseases: chicken pox, infantile paralysis, and scarlet fever. This completes the discussion of these data included in the various charts.

There are two tables which should be discussed before entering into the final discussion of the summary and conclusions to be drawn from this study.

M. Table I (p. 42) is concerned with the percentage of the diseases contributed by each of the groups to the entire group. This table reveals that 58.52 percent of the entire group had chicken pox, with the problem group contributing 21.89 percent, which was the highest percentage contributed by any of the groups. Of the entire group 2.15 percent had diphtheria, with the normal group contributing the greater percentage of this total. This group contributed 1.43 percent of the total. Of the entire group 1.93 percent had infantile paralysis, with the problem group contributing the greater percentage of this total, which was 1.45 percent. Of the entire group 88.73 percent had measles, with the normal group contributing the greater percentage of this total, which was 30.28 percent. Of the entire group 60.62 percent had mumps, with the problem group contributing the greater percentage, 20.43 percent. Of the entire group 5.08 percent had pneumonia, with the problem group contributing the greater percentage, 3.64 percent. Of the entire group .48 percent had rheumatic fever, with the normal group contributing the whole, 48 percent. Of the entire group 13.72 percent had scarlet fever, with the low mental ability group contributing the greater percentage, 5 percent.

In summarizing, we find that the problem group contributes the highest percentage of the following diseases: chicken pox, infantile paralysis, mumps, and pneumonia. The low mental ability group contributes the highest
### Table I

**Percentage of Diseases Classified and Grouped**

<table>
<thead>
<tr>
<th>Type of Disease</th>
<th>Problem Group</th>
<th>Low Mental Ability Group</th>
<th>Normal Group</th>
<th>Whole Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totals</td>
<td>137</td>
<td>20</td>
<td>208</td>
<td>365</td>
</tr>
<tr>
<td>Chicken Pox</td>
<td>21.89</td>
<td>15.00</td>
<td>21.63</td>
<td>21.36</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>.72</td>
<td>-</td>
<td>1.43</td>
<td>1.92</td>
</tr>
<tr>
<td>Infantile Paralysis</td>
<td>1.45</td>
<td>-</td>
<td>.48</td>
<td>.82</td>
</tr>
<tr>
<td>Measles</td>
<td>28.46</td>
<td>30.00</td>
<td>30.28</td>
<td>29.58</td>
</tr>
<tr>
<td>Mumps</td>
<td>20.43</td>
<td>20.00</td>
<td>20.19</td>
<td>32.01</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>3.64</td>
<td>-</td>
<td>1.44</td>
<td>3.50</td>
</tr>
<tr>
<td>Rheumatic Fever</td>
<td>-</td>
<td>-</td>
<td>.48</td>
<td>.27</td>
</tr>
<tr>
<td>Scarlet Fever</td>
<td>4.37</td>
<td>5.00</td>
<td>4.35</td>
<td>4.33</td>
</tr>
<tr>
<td>Whooping Cough</td>
<td>18.97</td>
<td>30.00</td>
<td>19.71</td>
<td>20.00</td>
</tr>
</tbody>
</table>

Problem group accounts for 38.00 percent of the total number of diseases.

Low mental ability group accounts for 5.00 percent of the total number of diseases.

Normal group accounts for 57.00 percent of the total number of diseases.
percentage of the following diseases: scarlet fever, and whooping cough. The normal group contributes the highest percentage of the following diseases: diphtheria and measles. There were no cases of rheumatic fever in the problem or low mental ability group; therefore, the normal group contributes the full percentage for this disease. This table (Table I) sums up the following conclusions:

1. The low mental ability group accounts for 5 percent of the total number of diseases.
2. The problem group accounts for 38 percent of the total number of diseases.
3. The normal group accounts for 57 percent of the total number of diseases.

We find here an inverse relationship between problem behavior and a history of ill health and childhood diseases.

N. Table II (p. 44) breaks down the percentages discussed in the preceding table into the percentage of diseases in the problem group according to the seriousness of the problem. Interpretation and discussion of this table reveals that 71.42 percent of the total problem group had chicken pox, with the deeper behavior problem group contributing the greater percentage of this total, 42.85 percent. There were no cases of diphtheria in the deeper behavior problem group; therefore, the superficial behavior problem group contributes the full amount to the total. Of the problem group 7.14 percent had infantile paralysis, with the superficial behavior problem group contributing the greater percentage, 4.76 percent. Of the problem group 90.47 percent had measles, with the deeper behavior problem group contributing the greater percentage to the total, 61.90 percent. Of the problem group 64.27 percent had mumps, with the deeper behavior problem group contributing the greater percentage of the total, 40.48 percent. Of the problem group 11.90 percent had pneumonia, with the superficial behavior problem group contributing the greater percentage to the total, 7.14 percent. There were no cases of rheumatic fever in the problem
TABLE II

THE PERCENTAGE OF DISEASES IN THE PROBLEM GROUP
ACCORDING TO SERIOUSNESS OF PROBLEM BEHAVIOR

<table>
<thead>
<tr>
<th>Type of Disease</th>
<th>Problem Groups</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percentage of Superficial Behavior Problem</td>
<td>Percentage of Deeper Behavior Problem</td>
<td>Total Percent in Group Having Disease</td>
</tr>
<tr>
<td>Chicken Pox</td>
<td>28.57</td>
<td>42.85</td>
<td>71.42</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>2.38</td>
<td>-</td>
<td>2.38</td>
</tr>
<tr>
<td>Infantile Paralysis</td>
<td>4.76</td>
<td>2.38</td>
<td>7.14</td>
</tr>
<tr>
<td>Measles</td>
<td>28.57</td>
<td>61.90</td>
<td>90.47</td>
</tr>
<tr>
<td>Mumps</td>
<td>23.80</td>
<td>40.46</td>
<td>64.27</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>7.14</td>
<td>4.76</td>
<td>11.90</td>
</tr>
<tr>
<td>Rheumatic Fever</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Scarlet Fever</td>
<td>7.14</td>
<td>7.14</td>
<td>14.28</td>
</tr>
<tr>
<td>Whooping Cough</td>
<td>23.80</td>
<td>38.10</td>
<td>61.90</td>
</tr>
</tbody>
</table>
group. Of the problem group 14.28 percent had scarlet fever, with each group contributing 7.14 percent of the total. Of the problem group 61.90 percent had whooping cough, with the deeper behavior problem group contributing the greater percentage to the total, 38.10 percent.

Summary and Conclusions

A. Summary

The results of this study seem to justify the following conclusions:

1. That there is no significant difference in the I.Q.'s, as tested by Otis, of the problem group as compared with the normal group and the entire group. The low mental ability group averages 17 points lower than the average for the entire group.

2. Those in the respective groups failing courses tended to have slightly lower I.Q.'s than the averages for their respective groups.

3. Those failing English, Mathematics, General Science, History, Chemistry, and Physical Geography tended to have an I.Q. lower than the average. Those failing Algebra, Latin, Spanish, Social Science, and Hygiene tended to have an I.Q. of average or above.

4. It seems as if grades are affected by problem behavior, even though I.Q. is above average. The problem group tends to have grades which average but very slightly above the average grades for those in the low mental ability group, whose innate ability on the average is considerably below the innate ability of those in the problem group. The problem group tends to be way below in average grades as compared to the normal group, there being almost one letter grade difference between the two groups. The problem group is below the average of the entire group in grades.

5. The problem group shows a higher number of average days absent than do the other groups. The problem group is absent on the average over
twice as much as is the low mental ability group and the normal group.

6. There is evidence of an inverse relationship between the number of diseases contributed by the problem group in comparison to the number contributed by the normal group. The normal group tends to have more diseases than does the problem group.

7. There is but a very slight difference in all of the groups in the average number of diseases per individual. This difference is so slight as to be insignificant.

8. The only significant difference found in the average age of occurrence of the different diseases is that the problem group tends to have measles and mumps a few months earlier than the average for the entire group. They tend to have pneumonia approximately six months earlier than the average for the entire group. They tend to have scarlet fever approximately six months later than the average for the entire group. No other significant differences were noted. It was found that the average age of occurrence of the various diseases is as follows:

- Chicken Pox - 6-1/4 years of age
- Diphtheria - 5 years of age
- Infantile Paralysis - 10-1/2 years of age
- Measles - 7-1/3 years of age
- Mumps - 8 years of age
- Pneumonia - 7-1/4 years of age
- Rheumatic Fever - 7 years of age
- Scarlet Fever - 7-1/2 years of age
- Whooping Cough - 6 years of age

9. In breaking down the types of problem behavior of the problem group into two sub-groups, we find that the deeper behavior problem group tends as an average to have the various diseases approximately six months earlier than does the superficial problem group.

10. There are no significant differences in relating I.Q. to type of disease.
11. In breaking the types of problem behavior into two sub-groups, we find the superficial behavior problem group tends to have an average I.Q. according to the various diseases which is six points lower than the average I.Q. according to the various diseases of the deeper behavior problem group.

12. There is no evidence indicating that a history of certain diseases makes an individual more prone to fail courses in school.

13. There is no evidence indicating that certain diseases had by the deeper behavior problem group or the superficial behavior problem group in any way affect the school grades, although there is evidence which leads one to believe that the deeper behavior problem group tends to get slightly better grades than the superficial behavior problem group.

14. Evidence from this study seems to indicate that the low mental ability group accounts for 5 percent of the total number of diseases had by the entire group, the problem group accounts for 38 percent of the total number of diseases had by the entire group, while the normal group accounts for 57 percent of the total number of diseases had by the entire group.

15. In breaking the problem group down into the two sub-groups, we find that the superficial behavior problem group tends to contribute a lower percentage of diseases to the problem group as a whole than does the deeper behavior problem group, which tends to contribute the greater percentage of diseases to the total problem group.

B. Conclusions

The results of this study seem to point to the following conclusions:

1. There is no significant difference in average I.Q. between the problem group and the normal group, as tested by Otis Self-Administering (High School Form).

2. The boys failing courses tend to have a lower I.Q. than the average for the group into which they were classified.

3. It seems that a certain minimum I.Q. is necessary for the attainment of success in certain school subjects. This minimum I.Q. varies according to the school subject.

4. The academic success of the problem group as far as grades are concerned seems to be definitely affected by their being in difficulty.

5. The problem group is absent from school about twice as much as any of the other groups.

6. The normal group contributed the highest percentage of diseases to the entire group, having one and one-half times as many diseases as the problem group, and approximately ten times as many diseases as the low mental ability group.

7. There is no significant difference in the average number of childhood diseases had per person.

8. The average ages for the occurrence of the childhood diseases used in this study were:

<table>
<thead>
<tr>
<th>Disease</th>
<th>Average Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken Pox</td>
<td>6-1/4 years</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>5 years</td>
</tr>
<tr>
<td>Infantile Paralysis</td>
<td>10-1/2 years</td>
</tr>
<tr>
<td>Measles</td>
<td>7-1/3 years</td>
</tr>
<tr>
<td>Mumps</td>
<td>8 years</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>7-1/4 years</td>
</tr>
<tr>
<td>Rheumatic Fever</td>
<td>7 years</td>
</tr>
<tr>
<td>Scarlet Fever</td>
<td>7-1/2 years</td>
</tr>
<tr>
<td>Whooping Cough</td>
<td>6 years</td>
</tr>
</tbody>
</table>

9. The low mental ability group tends to have chicken pox and scarlet fever at a younger age than the average for the entire group, and tends to have measles, mumps, and whooping cough at an older age than the average for the entire group.

10. The problem group tends to have infantile paralysis, measles, mumps, and pneumonia at a younger age than the average for the entire group, and tends to have chicken pox, diphtheria, scarlet fever, and whooping
cough at an older age than the average for the entire group.

11. The normal group tends to have diphtheria, measles, and whooping cough at a younger age than the average for the entire group, and tends to have infantile paralysis, mumps, pneumonia, and scarlet fever at an older age than the average for the entire group.

12. The superficial problem behavior group tends to have most of the various childhood diseases at a later age than the deeper problem behavior group.

13. In those having a history of the more serious childhood diseases, it seems that I.Q. is not affected by the type of disease had.

14. The deeper problem behavior group exceeds the superficial problem behavior group in average number of course failures.

15. The superficial problem behavior group tends to receive better average grades than the deeper problem behavior group.

16. There is evidence in this study of an inverse relationship between problem behavior and a history of ill health and childhood diseases.

17. The following percentages reveal the incidence of the various diseases in the problem group:

- 71.42 percent of the problem group had chicken pox
- 7.14 percent of the problem group had infantile paralysis
- 90.47 percent of the problem group had measles
- 64.27 percent of the problem group had mumps
- 11.90 percent of the problem group had pneumonia
- 14.28 percent of the problem group had scarlet fever
- 61.90 percent of the problem group had whooping cough

There were no cases of diphtheria or rheumatic fever in this group.

18. The following diseases are listed in order of their prevalence in the problem group: (1) measles, (2) chicken pox, (3) mumps, (4) whooping cough, (5) scarlet fever, (6) pneumonia, (7) infantile paralysis.
It is obvious that this study was limited. There is a need for more extensive research with a greater variety of individuals being included in such a study. All this experiment is justified in concluding is that under the conditions used, the above results were obtained.
APPENDIX

<table>
<thead>
<tr>
<th>AGE</th>
<th>YRS.</th>
<th>MOS.</th>
<th>HEIGHT</th>
<th>WEIGHT</th>
</tr>
</thead>
</table>

What are your favorite sports (in school)?

What are your favorite sports (outside school)?

Which do you regularly participate in?

Check with an X the following diseases which you have had and state the age at which they occurred:

<table>
<thead>
<tr>
<th>Disease</th>
<th>Age Occurred</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Chicken Pox</td>
<td></td>
</tr>
<tr>
<td>2. Diphtheria</td>
<td></td>
</tr>
<tr>
<td>3. Encephalitis</td>
<td></td>
</tr>
<tr>
<td>4. Infantile Paralysis</td>
<td></td>
</tr>
<tr>
<td>5. Measles</td>
<td></td>
</tr>
<tr>
<td>6. Mumps</td>
<td></td>
</tr>
<tr>
<td>7. Pneumonia</td>
<td></td>
</tr>
<tr>
<td>8. Rheumatic Fever</td>
<td></td>
</tr>
<tr>
<td>9. Scarlet Fever</td>
<td></td>
</tr>
<tr>
<td>10. Tuberculosis</td>
<td></td>
</tr>
<tr>
<td>11. Whooping Cough</td>
<td></td>
</tr>
</tbody>
</table>
BIBLIOGRAPHY


RAITHEL, W., "Die Tuberkulose als Umgebung Faktor in der Entwicklung Jugendlichen Personlichkeit," Nervenarzt, (Vol. 16, 1943) p. 44.

SACHS AND HAUSMAN, Nervous and Mental Disorders From Birth Through Adolescence, New York: Paul B. Hoeber, Incorporated, 1926.


WHITMAN, JOHN L., "Importance of an Up-to-Date Medical Department in a Penal Institution," Proceedings American Prison Association, 1913.