FORMATIVE INFLUENCES IN THE PSYCHO-EDUCATIONAL
BACKGROUNDS OF SUPERIOR GRADUATE STUDENTS

DISSERTATION
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*****

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CHAPTER I

INTRODUCTION AND STATEMENT OF THE PROBLEM

There is at present an unusually intense interest in the problems of recognizing, developing, and using the highest intellectual potentialities of children and youth in order to serve adequately the demands of a rapidly expanding economy, fluctuating international tensions, and a somewhat uncertain future. In a critical survey of the problem in 1954, Wolfle viewed America's potential talent as a national resource to be developed to the best advantage.¹ In the same year Terman made the following statement:

To identify the internal and external factors that help or hinder the fruition of exceptional talent, and to measure the extent of their influences, are surely among the major problems of our day. These problems are not new; their existence has been recognized by countless men from Plato to Francis Galton. What is new is the general awareness of them caused by the manpower shortage of scientists, engineers, moral leaders, statesmen, scholars, and teachers that the country must have if it is to survive in a threatened world.²

Educators approaching the question have concentrated much energy on examining the relative merits of school policies of segregation,


heterogeneous grouping, enrichment, and acceleration as serving the best interests of superior students.

But, it is contended here, the problem is more fundamental, and there has been insufficient research on which to base more adequate social control over the development of talent. Among the researches most needed are individual studies of the educational and personal-social backgrounds of superior people. Very little has been done by way of surveying the influences such people report as having induced them to continue further study of a particular interest. The possibility of deriving from materials of this kind suggestions that might assist in the better guidance and education of other students almost requires that such a study be instituted.

Problems arising from such an inquiry are indeed formidable, and methodological difficulties immediately come to mind. Also, an entirely adequate description of backgrounds and motivating influences would necessarily demand an idiographic approach. In this study a compromise was attempted between the idiographic and the nomothetic modes, since, while admitting the uniqueness of each course of development, psychology as a science assumes that some useful generalizations can be made from the study of groups of people.

Much of the psychological research dealing with superior mental ability has consisted of the identification of factors
such as scores on tests of intelligence, aptitude, and achievement, and their relationships with criteria of later success such as college graduation or occupational achievement. With the expansion of educational opportunities, the values of these studies in assisting in the appraisal of and the provision for students have been immense, and much knowledge about human capacities has consequently become widely disseminated. In recent years a broader perspective has been given to the study of superior mental ability as a result of greater concern with non-intellectual factors such as inner drives and psychic mechanisms.

Both of these research approaches, however, have been of limited use by failing to suggest ways of providing conditions under which potentially high ability might find actual expression. Indeed, inasmuch as there has been a larger concentration on the finding of rather static relationships, to the neglect of the study of change and process, there has been implied a view of man as a rather unmodifiable creature. High academic potential, whether viewed in terms of aptitudes, achievements, or internal factors, has seldom been studied in process of developing or becoming, but rather it has been considered as a question of diagnosing the structure to see whether something is there or not. Structure, in terms of both some minimal, general, and presumably innate, mental ability, and a modicum of emotional stability, is obviously a necessary factor, but it is well known
not to be a sufficient one.\(^3\) To discuss this point fully is beyond the scope of this report, but at the risk of oversimplifying a rather complex position, it should be stated that a basic assumption of this study has been that man, the learner, is a highly modifiable creature, and that he needs assistance to develop his abilities to the fullest.

Research dealing with superior mental abilities has been helpful in suggesting educational procedures. However, this study was prompted by finding relatively little special attention given in the literature to the fostering of superior achievement.

The Problem

The study originated in an interest in examining non-intellectual factors in the educational histories of superior students with a view to discovering influences that had contributed to their achieving at a very high level. Laymen can readily cite people with supposedly high but actually unrealized academic ability and can also point to people who were once considered to be of modest ability but who later achieved at a high level. There was, too, an attraction toward the concept of furtherance, or systematic personal encouragement and the provision of wholesome environments, as equally deserving of psychological study as frustration, its negative counterpart.

With these ideas in mind, it was first proposed to study the high school experiences of superior senior students in each of the five undergraduate colleges of The Ohio State University. It was intended that a sample should be drawn from those who had achieved an excellent grade average, but after a consideration of the problem of satisfactorily defining the criterion and of the short period of time available to study the subjects, it was decided to abandon this plan.

On the assumption that admission to candidacy for the degree Doctor of Philosophy was a satisfactory definition of academic superiority, it was then decided to study a small group of persons from a number of different departments, who had met this criterion. Since in a group of this kind it was highly probable that important experiences outside formal education had intervened between baccalaureate graduation and doctoral study it was decided to broaden the scope of the inquiry beyond that planned for the college seniors.

**Statement of the problem.** The problem of the study evolved into three broad but related questions.

First, what generalizations can be made from a study of the backgrounds of candidates for the Ph.D. degree? Are there discernible commonalities in the nature of their early familial environments? What kinds of school and college records have they
had? How did their special interests begin to develop, and how early in life? What are their motivations for continuing with advanced study?

Secondly, what have been the sources of the candidates' encouragement and inspiration, assuming that some such influence is necessary? Have teachers played an important role, and if so, how was their influence exerted? To what extent was the family significant in transmitting values that have had a long-term effect? It was in these questions that the original impetus to study the problem of non-intellectual factors in superior attainment was largely centered.

Thirdly, what implications can be derived from this study for the better education and guidance of students in order that they might be helped to achieve at a high level and to find satisfactions in so doing?

The data for the study were the results of interviews with thirty-six students in twenty-seven different departmental programs, and two self-report questionnaires answered by each student. Although the biographies presented in Appendix B constituted the major part of the interview data, use was also made of impressions gained in the interviews. Personal contacts with the students were believed to be much more valuable than written responses alone. The students were selected from those admitted to candidacy by the Graduate School of The Ohio State University between January 1 and June 30, 1957.
Importance of the study. Here are summarized in one place some significant points which are elaborated elsewhere in the dissertation.

In comparison with other levels of school and college, so much less has been written about graduate students, and particularly doctoral students, that this study could almost have been justified solely because of this lack. Unlike elementary, secondary, and even undergraduate college education, doctoral studies have been experienced by a relatively very small proportion of people, and, mainly for this reason, critical examinations have not been made of doctoral candidates and the methods and content of their programs. In view of the lack of empirical studies of doctoral candidates as products of their educational histories, this research was therefore considered important as a broad preliminary investigation.

The assumption of intellectual superiority of the group studied was also considered important inasmuch as it eliminated a very common difficulty faced by investigators in this field, that of showing that those who were judged to be potentially superior were so in actuality. By selecting from among those who had met virtually all the academic requirements of a program which is the acme of earned recognition possible in the educational system, it was intended to overcome possible criticisms of the validity of the ultimate criterion. That is to say, selection was made from
among those who had identified themselves as intellectually superior by the fact of their admission to candidacy for the degree Doctor of Philosophy.

It could be objected that the completion of the dissertation is a major hurdle which some candidates fail to surmount, and that this requirement should have been included in the criterion. That it was not was due mainly to the factor of greater availability of those who had recently been admitted to candidacy. It may be added, in connection with the use of the term superior, that some importance was attached to the designation of these students as superior and not as gifted, chiefly because of the seeming implication in the latter term of an unearned potential with no necessary realization of it by academic achievements.

Study of the backgrounds of academically successful people has been recognized as worthy of attention since at least the time of Galton, and of recent years it has become of even greater interest, although, rather strangely, more to psychologists than to educators. While the longitudinal method used in the monumental study directed by Terman clearly has great value, in that it uses a developmental approach with a series of controlled observations over a number of years and does not rely on recall, it was obviously impractical for a single researcher. The method used in the present study of having successful people report their lives in retrospect did have the advantage over the longitudinal method of eliminating what might be called wastage, through
people in the original sample failing to meet the specified cri-
terion. Especial importance was also attached to the method used in gathering the data. Since the problem was in essence to study motivation as revealed in life patterns, it was intended to collect, not just a list of facts, but reports of situations and circumstances that were expected to be many-sided and interwoven.

Finally, there is a general warrant for this study in the current reiteration that studies should be made of normal and superior people who are healthy, intelligent, and well-adjusted, in order to avoid the constant necessity of defining human well-being solely in negative terms. Although this demand is not new, to date there has been available little empirical research specifically aimed at studying those whom Maslow called "self-actualizing people."^4

Organization of the Remainder of the Dissertation

In Chapter II the relevant literature has been reviewed and evaluated. Chapter III contains a detailed account of the procedures used in gathering the data of the study. An analysis of the data comprises Chapter IV, while Chapter V concludes the report with a review of the whole study, followed by a discussion in broad terms of the implications seen and by a summary of possible further research.

CHAPTER II

REVIEW OF LITERATURE

In this chapter attention has been given first to a review of early research into the development of superior attainments up to the early twentieth century. Then follows a summary of the research directed by Terman, a review of factors of social inheritance, an account of research into psychological factors, and finally, a brief summary of the whole chapter.

The literature is somewhat limited in that a great deal of the research has been done with scientists and not with scholars in general. It should be added that, in the studies reviewed here, superiority has usually been defined in terms of intellectual achievement rather than of social or political eminence.

Early Studies

Historically, the studies of educational backgrounds of superior people and theorizing about the influence of external circumstances on high intellectual achievement have been fairly recent, probably because of greater public faith at present in the values of formal education. As is the case with so many perennial problems, this one can be shown to have been considered and discussed by Plato. Through his parable of the metals, Plato
presented a rather inflexible view of man's abilities, despite an admission of variability in inheritance and a strong urge as to the importance of the best education for everyone, interpreted to mean, that which was most appropriate to one's "nature."\(^1\) The question was discussed by other early thinkers, but rather as an outcome or example of philosophical considerations as to the nature of man than as an educational issue in its own right.

Following the sensationalism of Locke's theories of mind in the late seventeenth century, the French educator, Helvetius, made a vigorous but quite unsubstantiated case for the view that education could make of a man almost what was willed.\(^2\) These meager references constitute the major early historical landmarks of the topic.

The real precursor of modern ideas was Sir Francis Galton, a man of such widely varied interests and high attainments as to deserve the title of "genius" himself: as evolutionist, anthropologist, mathematician, and eugenicist, he contributed much basic data and theory to contemporary psychology. In 1859 his cousin, Charles Darwin, propounded the theory of evolution and natural selection, and, as an application of these ideas, Galton wrote *Hereditary Genius* ten years later. This book reported the

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pioneer empirical study of the antecedents of intellectual superiority, and in it Galton succeeded in showing that in general distinguished men are much more likely to have distinguished sons than average individuals are.  

In 1873 the French scholar de Candolle attempted to disprove Galton's hereditary theory by analyzing the careers of one hundred and fifty eminent men selected from the membership of three great European scientific academies, French, British, and German. Although he succeeded to his own satisfaction, his work has since become almost completely forgotten. At the time, however, it prompted Galton to prepare a rebuttal.

The following year, therefore, Galton examined with a broader purpose than in his previous book the backgrounds of the one hundred and eighty most distinguished scientists in England. He asked these men to report in a seven-page questionnaire such details as parentage, circumference of head, extent of religious persecution endured, and originality or eccentricity of character. His chief interest, however, was in the twin questions, "Can you trace the origin of your interest in science in general, and in your particular branch of it? How far do your scientific traits appear to have been innate?" In light of the special interest

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5 Ibid., p. 109.
Galton had in the outcome of his study it is not difficult to understand why he asked the second question, but one can hardly avoid inferring that it gave some bias to the first, despite Galton's memoranda noted in Table 1 which appeared in his book exactly as it has been reproduced here.

**TABLE 1**

**GALTON'S ANALYSIS OF THE ORIGINS OF SCIENTIFIC INTERESTS***

<table>
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<th>No. of Instances</th>
<th>Significance of the Letters</th>
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<tr>
<td>a 59</td>
<td>Innate tastes (mem: not necessarily hereditary)</td>
</tr>
<tr>
<td>b 11</td>
<td>Fortunate accidents. It will be noted that these generally testify to the existence of an innate taste.</td>
</tr>
<tr>
<td>c 19</td>
<td>Indirect opportunities and indirect motives</td>
</tr>
<tr>
<td>d 24</td>
<td>Professional opportunities to exertion</td>
</tr>
<tr>
<td>e 34</td>
<td>Encouragement at home of scientific inclinations</td>
</tr>
<tr>
<td>f 20</td>
<td>Influence and encouragement of private friends and acquaintances</td>
</tr>
<tr>
<td>g 13</td>
<td>Influence and encouragement of teachers</td>
</tr>
<tr>
<td>h 8</td>
<td>Travel in distant lands</td>
</tr>
<tr>
<td>i 3</td>
<td>Residual influences, unclassed</td>
</tr>
</tbody>
</table>

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These findings have a significance as foreshadowing certain current ideas on potentiality and its development. Notwithstanding findings as to the variability among individuals, psychological research has tended more to support than to refute the assumption that human beings are highly modifiable, and, similarly, a primary aim of modern education has been to develop each individual to his fullest capacity. While the temper of the times in which Galton worked was not as hospitable to this view of man as is that of America at present, yet it was not a completely novel point of view even then. More specifically related to this thesis, however, were the findings of Galton which referred to opportunity and encouragement as instigating and fostering a love for science.

The total number of "instances" recorded for the more than one hundred replies was one hundred and ninety-one, of which the largest single category was innate tastes, amounting to fifty-four. Galton clearly was rather pleased with this result as reinforcing his earlier study, but it is somewhat surprising that he did not elaborate his discussion of some of the other categories more than he did. For example, the third through the seventh categories have in common some reference to either opportunity or encouragement, and taken together amount to one hundred and ten instances. The one category he did discuss rather fully was that of "encouragement at home of scientific inclinations,"
in which he remarked on the importance of freedom and opportunity to pursue scientific hobbies and of encouragement to do so.\textsuperscript{6} 

Galton urged a very utilitarian kind of education, being much influenced in this by his friend Herbert Spencer, but although he wanted certain scientific and mathematical subjects to be \textit{rigorously} taught (his italics), he also contended that all teaching should be greatly vitalized. Having questioned his group of scientists about their education, he reached this conclusion:

\ldots my returns show that men of science are not made by much teaching, but rather by awakening their interests, encouraging their pursuits when at home, and leaving them to teach themselves continuously throughout life. Much teaching fills a youth with knowledge, but tends prematurely to satiate his appetite for more.\textsuperscript{7} 

Earlier in the book, Galton summarized the implications he drew from the findings about the origins of interest in science by noting that, in addition to creating more research positions, giving more help with research, and creating more traveling fellowships, "a love of science might be largely extended by fostering and not thwarting innate tendencies."\textsuperscript{8} 

In 1894 Yoder presented much descriptive material about the early lives of fifty eminent persons, all well-known in the nineteenth century, and of a wide variety of occupations. His

\begin{itemize}
\item \textsuperscript{6}Ibid. 
\item \textsuperscript{7}Ibid., p. 193. 
\item \textsuperscript{8}Ibid., p. 169. 
\end{itemize}
aim was merely to establish the importance of the pedagogic study of the childhood of such people.\textsuperscript{9}

The next outstanding researcher was Ellis, another Englishman, who in 1904 reported his study of 975 men and 55 women selected from the Dictionary of National Biography.\textsuperscript{10} Although he was interested in many factors including pathology, stature, county of birth, longevity, and evidence of early precocity, his conclusions were much less assured than Galton's. Interestingly, he noted the need for an anomaly as a stimulus to thought, almost as Dewey also stated it, "...the shock of contact with a strange and novel environment...acts as a most powerful stimulant to the nascent intellectual aptitudes." However, his main finding was that "...the determining factors of genius, or even all the conditions required for its development...are really very numerous and that genius is the happy result of many concomitant circumstances." Important among these circumstances were "...the early environment and all the manifold influences to which the child is subjected from infancy to youth."\textsuperscript{11}

The findings of Galton and of Ellis, although not primarily aimed at discovering how high potential in children and youth

\textsuperscript{9}A.H. Yoder, "A Study of the Boyhood of Great Men," Pedagogical Seminary, III (1894), 134-156.

\textsuperscript{10}Havelock Ellis, A Study of British Genius (London: Hurst and Blackett, Ltd., 1904).

\textsuperscript{11}Ibid., pp. 233-234.
could be developed to the maximum, did in fact point to the im-
portance of very favorable environments and of early encoura-
gement and opportunity. For the most part, however, both men were
more concerned with what might be termed reality factors, such
as place of birth, physical data, parental occupation, and data
about relatives. The significance of some of these factors is
discussed later in this chapter.

Two other researches belong historically in this period,
those of J. McK. Cattell and his student Cora Castle, the former
stimulating a good deal of further interest. In 1906 Cattell
produced the first directory of American Men of Science using
data from the membership lists of certain scientific associa-
tions. From the four thousand men selected and listed with bio-
graphical sketches in the directory, Cattell further selected by
the votes of one hundred and twenty leaders in the sciences, the
one thousand most outstanding people and "starred" them.\(^\text{12}\) Five
later editions have been produced each increasing the number of
biographical sketches up to the 1944 figure of 34,000. This pro-
cedure has been copied and modified by other researchers, and,
in addition, the lists have been used as a basis for further
study of the backgrounds, education and training of eminent men,
which, indeed, was the real purpose of the original study.

\(^{12}\)J. McK. Cattell, American Men of Science: A Biographical
In 1913 Castle studied by the same method the backgrounds of 868 eminent women. She presented much descriptive material but raised few further questions apart from a suggestion that greater female emancipation and franchise might produce relatively more eminent women. By most standards of judgment her long-term prediction must be considered to have been wrong.\textsuperscript{13}

Terman's Study

Since Terman's research has been unique in many respects, it is given a separate section.

Working at Clark University under G. Stanley Hall in 1903, Terman began his life-time interest in superior human ability, writing his dissertation on a comparative study of seven superior and seven inferior boys. Although he retained this interest during his early work at Stanford, he was able to do little research until he gained a large financial grant for that purpose in 1921. The following year, outlining the procedures for the study of one thousand gifted children, he criticized Galton and Ellis for limiting their research to the socially successful and regretted that Cattell had not attended to juvenile traits and early mental development.\textsuperscript{14}

\textsuperscript{13}Cora S. Castle, "A Statistical Study of Eminent Women," Archives of Psychology, Number 27 (1913).

Terman first proposed to identify the traits and characteristics of gifted children as an antidote to the tendency he had remarked "...to encourage an attitude unfavorable to a just appreciation of native individual differences in human endowment." He wrote scathingly of the environment hypothesis, the attempt to explain deviations from norms of intellectual functioning in terms of differences in educational opportunities, and concluded, as a result of the first stage of his investigation, that, while there were advantages in the cultural environments of the majority of the gifted children identified, the formal educational opportunities they experienced were entirely commonplace.

In his summary of the first volume, Terman noted the limitations of the tests used and added that the superiority of the group in most cases was made manifest at a very early age, usually by indications of intellectual curiosity, of a wealth of miscellaneous information, and of a desire to learn to read. He also discussed the educational problems involved and pessimistically concluded that so little was known about the characteristics of gifted children that teachers were very frequently unable to recognize intellectual superiority and that the best that could


16 Ibid.
be hoped was that the usual methods of dealing with it "might not be as bad as they seem." At this stage, too, Terman was already much concerned about the ultimate validity of the designation of the group as gifted. He believed that eminence as a criterion was both a poor measure of success and a product of somewhat fortuitous circumstances, and he noted further that his group was not nearly as highly selected from the general population as were those of Galton, Ellis, and others.  

In his editorial preface to the second volume, Terman remarked that there was no inevitability that genius would be brought to fruition, but that faith in education assumed that the school, the home, and other institutions were able to control the circumstances that would be most likely to bring this about. This volume was mainly the work of Catherine Cox, a former student of Terman's. She studied extant biographical data about the childhood experiences and achievements of men of acknowledged genius, such as Leibnitz, Bacon, Mozart, and Goethe. By categorizing facts such as age of first reading, examples of reading accomplished at various ages, personal productions in the form of writing done, devices made, questions asked, and concepts developed, she judged how far intellectually in advance of their

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17 Ibid., pp. 632-640.
age-mates these men were. She then calculated approximate mental ages and intelligence quotients for each genius, and found, for instance, that John Stuart Mill deserved an I.Q. rating near 200. From her study she drew three main conclusions which are reported here verbatim (italics in original):

1. Youths who achieve eminence have, in general (a) a heredity above the average and (b) superior advantages in early environment.
2. Youths who achieve eminence are distinguished in childhood by behavior which indicates an unusually high I.Q.
3. That all equally intelligent children do not as adults achieve equal eminence is in part accounted for by our last conclusion: Youths who achieve eminence are characterized not only by high intellectual traits, but also by persistence of motive and effort, confidence in their abilities, and great strength or force of character.¹⁹

Four years later, in 1930, Barbara Burks and others presented the third volume in the series, reporting follow-up studies of the original group of children selected by Terman.²⁰ Many of these children had entered high school, some had completed high school, and, of those who had done so, the majority were in college. Of particular relevance to this study was the finding at this stage that about one-third of the boys and nearly half of the girls (the exact proportion varied from age to age) reported that "their lives had been greatly influenced by a single

¹⁹Ibid., pp. 215-218.
person, book, philosophy, or religion. The type of influence mentioned most frequently was that of one or both parents.\textsuperscript{21} Burks also found that reading was preferred above all other leisure interests by gifted boys and girls.\textsuperscript{22}

Finally, a most important contribution was the construction of standards for rating achievement, social adjustment, and environmental conditions, and the description in dichotomized fashion of superior and inferior children on each of these counts. For the purposes of convenience and strict relevance, only the characteristics of children in the top category on each variable have been quoted in this summary:

Achievement. The child shows outstanding achievement in some field, for example, science, music, literature, scholarship, dramatics. The achievement is of an order that would justify any impartial judge in predicting a career of distinction.

Social Adjustment. The child has many desirable friends and is a leader among them. He is successful in getting cooperation, is normal in his attitude toward those of the same and opposite sex, is fair in his dealings with people, and abides by the laws or requirements of his community--home, school, civic.

Environmental Conditions. The environment provides every incentive for leading a wholesome and productive life, and for attaining and profiting from a higher education. A spirit of companionship exists between the parents and children. The financial conditions are adequate to finance the child through college. The cultural atmosphere and ideals of the home are such as to encourage high standards of attainment and character.\textsuperscript{23}

\textsuperscript{21}\textit{Ibid.}, p. 133. \textsuperscript{22}\textit{Ibid.}, p. 132. \textsuperscript{23}\textit{Ibid.}, p. 193.
The general conclusion was that the promise of youth had been realized.

In 1947, when the average age of the Stanford group was thirty-five years, and their adult careers were for the most part well established, Terman and Oden presented an overall report of the work done since the study began. Again, the general conclusion reached was that, despite many individual variations to the contrary, early promise had been achieved, and that there were significantly more successful people to be found in this group than in the general population.\(^{24}\)

As the authors pointed out, the criterion of success or high achievement is not absolute or universal, but "relative both to the prevailing patterns of culture and to the individual's personal philosophy of life."\(^{25}\) Whether famous politicians, scientists, or writers should be considered to have been more successful and to have achieved at a higher level than relatively unknown missionaries, teachers, or nurses is quite debatable, but Terman and Oden took the position, as did the writer of this study, that the standard to be used was biased toward achievement demanding the use of intelligence, and was concerned "...with


\(^{25}\) Ibid., p. 312.
vocational accomplishment rather than with the attainment of personal happiness." They added that, even in occupations that have little social prestige, significant achievements may be made in rather mundane aspects of daily life. While the intellectual criterion is probably not inconsistent with current social philosophy, whether the general public accepts it wholeheartedly is again a moot point. Nevertheless possible criticisms were anticipated by Terman and Oden's inquiring into many aspects of daily life in addition to educational and vocational achievement: they found the group to be significantly above what would be expected, and in some cases was empirically found, for the general population in almost all desirable measures, such as marital happiness, physical health, and mental health and general adjustment. They concluded that, in their group, success was associated with these factors:

...stability rather than instability, with absence rather than presence of disturbing conflicts -- in short a well-balanced temperament and with freedom from excessive frustration.  

Terman and Oden also reported on the results of efforts to discriminate between very superior achievers and those who made rather modest attainments, and also between those above IQ 169 and the total group. The latter comparison was somewhat less fruitful than the former, due probably to the greater "remoteness"

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26 Ibid. 27 Ibid., p. 352.
of the I.Q. criterion in terms of both time, twenty-five years, and validity, but it still tended to indicate the general superiority in the group with the higher I.Q. Of the first comparison, the conclusion was drawn that the essential difference between the two groups was in drive to achieve and all-round social adjustment.\(^28\)

In conclusion, they made an eloquent plea for further study of the whole problem:

At any rate we have seen that intellect and achievement are far from perfectly correlated. Why this is so, what circumstances affect the fruition of human talent, are questions of such transcendent importance that they should be investigated by every method that promises the slightest reduction of our present ignorance. So little do we know about our available supply of potential genius, the environmental factors that favor or hinder its expression, the emotional compulsions that give it dynamic quality, or the personality distortions that make it dangerous.\(^29\)

**Social Inheritance**

Under this heading have been reported what were considered to be some of the most important relationships existing between certain rather immutable facts of life and later superior achievement. These facts could for the most part be loosely categorized under the rubric of social inheritance. That this is an artificial and arbitrary restriction, placed on data that have important

\(^{28}\)Ibid. \(^{29}\)Ibid.
psychological effects on human behavior, is readily admitted, but it seemed to be a necessary and a useful one.

In an important sense, these facts are not immutable at all because, granting the influence of genetic inheritance and the ability to subsist economically above the level of mere sustenance, it could be held that the ultimate determinants of personality development are psychological in nature. However, the factors discussed here become of central importance if it can be shown that they allow other factors, such as psychological ones, to operate. In this thesis, the restriction would be artificial and misleading only if the psychological significance of major reality factors were to be overlooked. Maslow expressed this general point well in his arrangement of human needs in a hierarchy of prepotency, showing that, until lower, more urgent, and more insistent needs were satisfied, higher needs, culminating in self-actualization, could not emerge.\(^{30}\)

Community influences. The existence or otherwise within the local community of values favorable to the development of intellectual interests is obviously an important factor in the development of superior students, and some research has been done on this. As would be expected, the indications have been that there is a relationship between the extent to which academic and

\(^{30}\) Maslow, Chap. V
cultural values are held to be important by a community and the proportion of people eminent in academic and cultural pursuits produced by the community. Historical examples of this can be seen in the artists of northern Italy during the Renaissance and the musicians of eighteenth century central Europe.

Faris observed the significance of children's early experiences in proximity to "central points of opportunity and stimulating contact," and noted also the values of travel, "wide acquaintanceship with educated persons, wide knowledge of reading matter, and adequate habits of using reference methods."

Visher described in great detail the geographical and other relationships he found in his appraisal of the backgrounds, first of U.S. notables in general, and then of all the scientists who had been "starred" under Cattell's system of recognition. He noted that in terms of birth-places of superior people, the midwestern states were becoming more productive, but he also found that those regions of the country that had been long settled and well-established were the most productive both as birth-places and also as providers of university training:

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In proportion to population, New England produced about twice as many as did the Middle Atlantic or North Central States, nearly three times as many as at the Pacific States, about six times as many as the South Central States.34

These findings as to regional origins have been largely substantiated by Clark for psychologists, but only in regard to baccalaureate and doctoral education, although many chose colleges that were nearby.35 In these days of extreme mobility, the fact of regional birthplace per se is probably becoming less significant. As did Paris, Visher also took a broad view of the meaning of the environment and its impact on the individual, urging no simple casual relationships.

In many respects the most significant of the studies of the immediate environment, as considered here, were those recorded by Goodrich and his colleagues in 1951,36 and by Knapp and Greenbaum in 1953.37 These men studied colleges in the United States in order to make comparisons of the extent to which talented scientific people were produced by different institutions. According to their indices, which were expressed as the number of Ph.D. degree holders and winners of fellowships and prizes

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awarded on regional or national bases per one thousand students, certain colleges stood out remarkably from the rest.

Knapp and Greenbaum pointed out that it used to be held that the small liberal arts colleges which concentrated on de­
veloping scientists were the most productive, but more detailed analyses revealed that the best explanation of high productivity of superior scientists was probably a more general one;

Here, it seemed to us, the superiority of the institution in the production of scientists was...attributable... rather to their singular hospitality to intellectual values in general. We termed them institutions of "general intellectuality," not a happy phrase, but one intending to convey the fact that their scholarly achievements were spread across the entire spectrum of learning instead of being confined to science, and that the climate of values sustained by the institutions ele­vated the scholar and the intellectual to the position of 'culture hero.'

On the face of it, this conclusion is a far cry from the topographical, economic relationships suggested by some of the data discussed by Visher, who incidentally was a geographer. However, both Visher and Faris, as noted earlier, took a very broad view of the environment and its meaning and impact on human beings. In fact, as can be seen from a sample of their comments, their conclusions have a high degree of congruence with those just cited. Visher wrote thus:

The number of leaders in America can be increased by giving better opportunities to able young people and, of especial importance, by inspiring them with high but

<ref>ibid., p. 97.</ref>
approachable ideals. This can best be done it appears, by enthusiastic, competent, idealistic parents and teachers.39

Some of Faris' conclusions were as follows:

Also of importance is the organization of the intellectual surroundings of the person. The child who lives in an organized and rationalized world may learn more easily because of his confidence that the world is mechanical and that answers to his questions can be found...40

...the most significant factors are relatively obscure and subtle, operating in the more private mental processes of the person, and not always closely correlated with the more obvious external environmental features usually considered as the principal factors in many statistical studies of intelligence.41

It might be added that Faris was actually a very fervent believer in environmental influences in this sense, going so far as to state that it was unnecessary to assume any innate advantages, and remarking of talented mental calculators that theirs is no mysterious talent, but the natural result of a definite series of experiences.42

Pressey discussed the total impact of the environment in an article stressing the importance of cultural values as powerful modifiers of the extent to which superiority in certain fields was sought and achieved. He compared the flourishing of musical genius in Mozart's day with the competence shown by modern

39Visher, Indiana University Studies, 137.
41Ibid., p. 538.  42Ibid., p. 543.
champion athletes, and identified five procedures which he believed to be highly significant as determinants of the kinds of superiority developed. These procedures were: the provision of early opportunities for the development of an ability and encouragement from family and friends; early and continuing superior guidance and instruction; the opportunity to practice and extend ability according to progress made; close association with others of similar interests; and the stimulation of many and increasingly strong success experiences. Given basic ability, such influences, acting in favorable concomitance, would foster superiority in whatever activity the culture honored.  

From the evidence presented it can be concluded that the facts of the immediate environment have considerable significance for the development of superior ability, but not in a simple cause and effect fashion. The true link between the environmental facts and the behavioral outcome is in the psychological construction the individual puts on his environment. To labor the point a little, it is contended here that the problem of the maximum development of superior ability is essentially a psychological problem, and that to approach it, for example, solely through the granting of financial aid for further study, or through some particular educational policy, is to look at it

myopically. This is not to deny the importance of trying to improve methods of assisting students, but to emphasize, with Wolfle, that the most pressing problem is that of developing expectations in desired directions.\textsuperscript{44} In short, the problem is one of judiciously changing values, and providing suitable opportunities, and it concerns both home and school.

\textbf{Family background.} Details about family background factors which have been brought out by research lead to practically the same conclusion as that reached in regard to environmental factors in the local community. For instance, there has been extensive agreement on the fact that significantly more superior people are the first born in their families than would be expected by chance.\textsuperscript{45} Such information is interesting and no doubt useful, but its significance for the development of superior attainments in others seems quite limited if this were all that were known.

\textsuperscript{44} Address by Dael L. Wolfle, "Education and the Need for Talent," given as part of the celebration of the fiftieth anniversary of the College of Education, The Ohio State University, Columbus, Ohio, April 11, 1957.

Fortunately, there is research available dealing with this question and showing that the significant fact seems to be differential treatment by the parents of first born children and those born later. Although nothing has been done specifically with superior children, the available evidence from studies of mothers' attitudes towards normal and problem children indicate that parents are usually less warm emotionally and more restrictive and coercive toward second and later children. It is believed that the ultimate effect of this attitude toward the first born may lead to somewhat more solitary and perhaps self-reliant habits which stand the child in good stead in preparing for a scientific career. It is also of course entirely possible that greater independence of thought and action may have been the result of a highly intelligent child becoming dissatisfied first with his parents' attempts to answer his many questions and later with what he may consider to be the childish games of his own age-mates. However, the differential treatment finding at the moment seems to be the more likely explanation.

Some other well-corroborated findings about the family backgrounds of superior people in the sciences have been:

1. Parents tend to have been of upper socio-economic status.
2. Parents tend to have had more formal education than the average.
3. Learning has usually been valued for its own sake.
4. In proportion to what would be expected from the general population, Catholics are greatly under-represented in the sciences, and certain Protestant groups, notably Unitarians, are over-represented.
5. Very few eminent people are negroes.
6. Women have seldom attained eminence.\(^47\)

In a recent study MacCurdy presented a composite portrait of the family backgrounds of superior science students on the basis of statistically significant differences (at the one percent level of confidence) which he found between this group and a random sample of non-superior science students.\(^48\) He found, for instance, that there were many teachers and some scientists among their relatives, and that their parents tended to have had a college education.

Many of the students were the first born in the family. The principal residence was in a large city of a million or more population. During high school years the family

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\(^47\) Clark, America's Psychologists; Visher, Scientists Starred 1903-1943; Cattell and Brimhall, American Men of Science (1921); Roe, Psychological Monographs, LXVII, Number 2.

\(^48\) Robert D. MacCurdy, "Characteristics of Superior Science Students and Some Factors that were Found in their Backgrounds" (unpublished Ph.D. dissertation, Boston University, 1954).
did not move or change residence. The families were apparently financially comfortable because the students did not have an after school job and they did have leisure time to study science. They had adequate laboratory or workshop facilities available and often these were at home.49

These data can best be summarized by noting the significance of a total environment in which intellectual values are highly prized in both overt and subtle ways and opportunities are given to realize these values. Although the whole environment, including material, psychological, and moral-religious aspects, does not determine what the individual may become, it certainly has a very pervasive influence on him.

**Education.** Much has been written about the education of superior children, but many studies merely describe the establishment of an educational environment that would be desirable for all children, without showing how the superior might benefit more than they do at present; advocates of acceleration, however, usually go beyond this position. Evaluations of the various educational policies have been made by Havighurst and his colleagues50 and by a group led by Passow.51

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49 Ibid., p. 116.


Considerable emphasis is usually given to the early and
careful appraisal of abilities and interests followed by encour-
agement of and freedom and opportunity for full development of
talents. Roe illustrated this with respect to physical scien-
tists when she said that

the vital point is to give the student the opportunity to
find things out for himself. It makes no difference if
the fact is well known or not at this level, what is im-
portant is that the student not learn it by rote but by
discovery. 52

She was speaking particularly of the sciences, but it does seem
possible to translate this emphasis to learning in general.

Brandwein, with a background of experience in a high
school which concentrated on the development of good science
students, emphasized the importance of three factors, the gene-
tic factor, the predisposing or psychological factor, and the
activating factor. 53 The last referred to the extent and kinds
of opportunities offered in school and to the special skills of
the teacher. Brandwein believed that tests were relatively less
important in the identification of superior science students than
the provision of opportunities for students with minimal amounts
of the genetic and the predisposing factors to identify themselves

52 Anne Roe, "A Psychological Study of Eminent Physical
Scientists," Genetic Psychology Monographs, XLIII (1951), 226.

53 Paul Brandwein, The Gifted Student as Future Scientist
by taking advantage of the opportunities offered to show skill and interest in developing their own research projects.\footnote{Ibid., passim.}

Other features strongly commended by Brandwein in such a program were: the importance of personal guidance and occupational information, the abundance of latent scientific talent in boys and girls, and the value of early commitment to science as is common in music, art, and baseball. Probably the key factor in the whole scheme was the quality of the teaching, especially the fostering of true research attitudes in high school pupils by freeing them from the cook-book approach to scientific knowledge.\footnote{Ibid.}

As noted earlier, Goodrich et al. also remarked on the importance of the teaching given, both in the general sense of the tone of the institution as a whole, and also in the special qualities of the individual teachers. They said of the college they found to be the best according to their index:

The curriculum is organized to foster maximum individualization of instruction, and teachers and pupils alike carry on a tradition of disputatiousness which in many another institution might be a sign of disorganization and dissatisfaction.\footnote{Goodrich et al., Scientific American, CLXXXV, 16.}

They cautioned against concluding that the general tone was all-important by noting the outstanding record of another college
with almost nothing to recommend it by way of atmosphere, general reputation, or facilities, except the achievements of its alumni in physics and chemistry. In each of these departments there was a superb teacher who was able to inspire students to tremendous heights and to induce them to specialize in those subjects. 57

MacCurdy, in a survey of the literature on the superior science student, found that the typical science teacher of such a person "...taught with a loose rein and allowed great freedom for the student to find out for himself," and gave personal inspiration, guidance, and assistance to his students. 58 From his own comparative study, MacCurdy derived the following picture of the science teacher:

...he was fun to be with most of the time and he quickly gained their admiration and respect...Many teachers believed in hard work for themselves, that is, long hours; so they sponsored science clubs, gave students opportunities to lead group science activities and almost all assisted students in after school science activities. 59

By questioning the former students of some two hundred professors, Goodrich and others set out to determine what factors, personal and pedagogical, influenced students to take up careers in science. They found that the successful science teacher was

57 Ibid.
59 Ibid., 117-118.
usually not greatly distinguished for his mastery of the skills of teaching:

Rather, the successful teachers are marked by three cardinal traits: masterfulness, warmth, and professional dignity. It would appear that the success of such teachers rests mainly upon their capacity to assume a father role to their students, in the best sense, and to inspire them to an emulation of the teacher's achievements. 60

Roe, although admitting that the teacher may have a great personal influence on vocational development, was inclined to believe that in the total picture this was secondary to the provision of freedom for the student to do research. 61

However, evidence has usually tended to support the idea of the importance of a close relationship between teacher and pupil. It does not seem necessary for this to have been the sole kind of contact, nor does it appear that the mere existence of a one-to-one relationship is enough: there appears to be a need for something not unlike psychic identification or even the psycho-analytic transference in order that the enthusiasm may be caught. That is to say, the teacher must somehow add to his role some of the characteristics of a parent or some other friendly authority. Boring has shown Titchener to have been authoritarian:

Many of his more able graduate students came to resent his interference and control and eventually rebelled, to find themselves on the outside, excommunicated, bitter,

60 Goodrich et al., Scientific American, CLXXXV, 17.
61 Roe, Genetic Psychology Monographs XLIII, 227.
with return impossible. Quite early in our married life my wife and I decided that we would accept the "insults" and arbitrary control from Titchener in order to retain the stimulus and charm of his sometimes paternal and sometimes patronizing friendship.62

To pursue this thought a little further, it may be noted that one of the students sampled in this research advanced the thesis that the best possible teachers of adolescent boys would be men with homosexual tendencies. These tendencies would not be strong enough to lead to seduction, but would provide an apparently altruistic attention to fostering intellectual inquiry because of an urge to associate with the boys and the absence of strong emotional ties with a family.

It may well be asked whether the parent who assumes part or all of the teacher's role, has the same kind of effect that the fatherly teacher does. Most case studies of superior people show that the influence of parents in a positive helpful way has been important for later achievement. In cases where this is not so, it often appears that the original impetus has come from a strong reaction against some parental trait. James Mill, the father of John Stuart Mill, is the outstanding example of a parent becoming an inspiring teacher, although many of his procedures fly in the face of modern theories of socialized teaching.63

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Although a number of writers have advocated and experimented with accelerated programs for superior students, educators have looked with disfavor on the principle, usually on the grounds that accelerated students lose important social values. Among the most vigorous proponents of acceleration is Pressey, who, as a result of studying speeded undergraduate programs, suggested various ways in which acceleration might be successfully promoted. He emphasized the importance of a flexible and effective guidance program by means of which education would be so adapted that students could progress according to their academic competence and maturity. Reporting the results of a program of this kind, he concluded that on most desirable measures the college records and early careers of accelerated students were superior to those who had proceeded at the average rate.  

Personality Factors

Very few studies have been conducted of the personality factors involved in academic success at the level of graduate work or above, and, even in the case of undergraduates there has been an excessive concern with the isolation of traits and with the questions of overachievement and underachievement. There has, however, been some desire to know more about the

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64 Sidney L. Pressey, Educational Acceleration: Appraisals and Basic Problems (Columbus, Ohio: Bureau of Educational Research, The Ohio State University, 1949).
personality functioning of persons working at a high intellectual level. In this regard, Friedenberg and Roth's summary sketch of the successful student, derived from an analysis of several other reports, is appropriate. It described a person with a happy home background, including positive attitudes toward his parents, and it showed how this basic happiness led the student to expect that he would be accepted by others and that he would be rewarded for his accomplishments. By the time advanced work was reached, such a student was already characterized by independence, dependability, confidence, productivity, and need to achieve.

He appears more interested in others than in himself because he is relatively free of fears about his own station and because he is more sensitive to the demands of the environment. These same qualities make him more concrete and positive in his approach to problems. He is intellectually flexible, but controlled. His intellectual dominance is accompanied by considerable suppression of his impulse life with the exception of aggressive impulses. He is quite freely aggressive and the aggression is generally well directed to promote his interests. He is strongly and positively oriented toward a higher age-grade and status level.65

This sketch will be shown to need some careful qualifications if certain other studies are to be considered valid.

In their own research Friedenberg and Roth studied forty-nine male graduate students of social sciences, made up of

successful and unsuccessful students as judged by departmental supervisors. They first administered a Q-sort of 120 semi-projective cards covering "the widest possible range of perceptions of and attitudes toward the university and the career and life of the social scientist, with an emphasis on the experiences of graduate study," and grouped these according to thirty-eight needs. Next they interviewed each student about his reasons for placing cards in the four extreme categories of the nine provided. From these data they distinguished by factor analysis several groups of individuals, the most conspicuous and relevant of which were: the successful students who exhibited conformity to attitudes and purposes considered desirable by the university; the unsuccessful students, distinguished by "conspicuous succorance and masochism;" and the unhappiest ones, "...characterized by iron conformity and continuous control, fear of impulsivity and choice, and incapable of setting a term to their own program of activities."

In 1949 Cronbach reported a three-year study of Ph.D. candidates preparing for work in the general area of education. The purpose was to try to predict from performance on the Rorschach, administered on entry to the program and analyzed as a sample of problem-solving behavior, to later performances as a

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66 Ibid.  
67 Ibid.
doctoral researcher. From twenty-three completed cases, Cronbach concluded that, although the validity coefficient derived was very low, some of the individual predictions were surprisingly accurate. Examining the group as a whole he noted that their advisers commented repeatedly on their drive, persistence and strong motivation, and praised them for their accuracy in going after evidence and sticking to it, but that most of the students were too timid in generalizing and that the advisers felt that they lacked imagination and the ability to theorize. It was concluded that there were many connections between research performance at an advanced level and two cores of basic personality structure--attitude toward oneself as being either competent or inadequate, and perception of authority as being represented mainly by threatening, or protecting, or competing persons.

Cronbach later noted that the most important observation, not brought out by the study, was that, since graduating, only a few of these men had done any research, and then only of an institutional nature. He had to conclude, then, that his study was not of researchers at all, but of men with Ph.D. degrees who

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later became school psychologists, testers, teacher trainers, and college presidents. 69

In a vigorous critical essay, Mooney charged that graduate education at present was failing to give graduate students "an adequate challenge and opportunity to discover, honor, and develop themselves as instruments of inquiry." Instead, he believed, because of both curricular structure and certain psychological shortcomings in the institution, the graduate student was being pitched into his dissertation task unprepared and unable to give himself to a personally satisfying inquiry. During the research for the dissertation, the student often had revealed to him painfully, and for the first time, the real effects of having for so long put himself outside his education, or vice versa. Four negative assumptions were stated by Mooney as largely responsible for the lack of self-involvement characteristic of much graduate education:

1. The seat of knowledge is not in the learner.
2. Values are not to intrude on scientific research.
3. Subjective feelings are not to intrude on scientific research.
4. Proof is not esthetic. 70

In 1953 Anne Roe summarized the results of a series of studies of sixty-four eminent scientists, divided almost equally

into biologists, physicists and social scientists. The data comprised life histories, discussions with the men about their work, and the results of three tests, a specially prepared Verbal-Spatial-Mathematical Test, the Thematic Apperception Test and the Rorschach. Among the personality factors found to be common to the whole group, Roe first discussed curiosity, which, she said, much of formal education tends to discourage, but which she found to be of crucial importance in providing these men with the motive power for the development of their own problems and procedures. The feeling of intense curiosity in a setting of almost perfect freedom, limited only by time, equipment, and their own understanding, gave them an independence that satisfied very deep roots, and was almost identical with the personal autonomy or self-realization so frequently listed as an ideal of human existence.71

These men had worked extremely hard in reaching positions of eminence, and Roe, as a psychologist, naturally wondered why they did this. She found that their efforts had "usually been directed quite specifically toward the solution of some immediate problem rather than to a long-term goal of eminence."72 This finding, although probably contrary to popular notions and even

71 Roe, Psychological Monographs, LXVII Number 2.
72 Ibid.
to some comparisons of achievers and non-achievers, is consonant with McClelland's conclusion as to the antecedents of the achievement motives. Elsewhere, but in reference to the same group of people, Roe called attention to "the rarity of any indication of the drive for achievement that all of these subjects have actually shown in their lives."

Another contribution of Roe's study was the analysis of differences among the scientific disciplines in respect to such factors as the nature of the visual imagery most often used, the extent of verbalization and of social adjustment, indications of unconscious psychic mechanisms. She showed in her discussion that many of these were to be logically expected as a result of working in a particular field, but she also raised the question as to whether such differences did not in many cases explain the choice of the field rather than appear to be the result of it. She concluded that the choices often were explained, as for example, when differences between the physical and the social scientists in kinds of imagery and extent of verbalization would be related to the occupations of fathers of these men. Other conclusions she reached were that there seemed to have been more

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family conflicts in the social scientists' backgrounds which probably helped to direct them toward the study of interpersonal relationships; more serious illnesses and physical handicaps among the theoretical physicists, probably leading to more solitary interests; and more early death and divorce among the parents of biologists, probably accounting for their considerable independence. 75

Roe noted, too, that in general these sixty-four scientists could be divided into two distinct groups on the social adjustment dimension, the social scientists being well-adjusted, and the others having histories, and indeed current interests, that suggested that they were shy, lonely, and over-intellectualized. 76 Yet it was precisely these latter tendencies that seemed to have assisted scientists in becoming highly productive and creative. The activities of these people cannot always be shown to have been compensatory, nor are compensatory mechanisms necessarily undesirable. It is possible, suggested Roe, that the kinds of people that enter the social sciences have had a seriously biasing effect on the establishment of norms of social adjustment and general maturity, and that these factors have been considered to be more important for happiness and effectiveness than they actually are. 77

75 Roe, Psychological Monographs, LXVII Number 2.
76 Cf. Terman's findings, supra, p. 24.
77 Roe, Psychological Monographs, LXVII Number 2.
Useful as providing a limited comparison with Roe's data, was the study reported by Sternberg, in which he administered three psychological inventories to 270 male undergraduates. From his intercorrelations and factor analyses he derived seven factors, of which five were found to be discriminatory of different subject specialties, although in only a very crude way. The factors were:

I Aesthetic Communication vs. Practical Science.
II Go-getter vs. Passive Aesthete.
III Self-expression through Art vs. Faith through Good Works.
IV Driven Extravert vs. Pure Scientist.
VI Quantitative Detail vs. Social Welfare.

In general he found expected differences and logical relationships among subject specialties. He found that English and music majors were closest on all five factors and also that tendencies toward maladjustment were greater in this group than in any other area. Further, although both of these groups seemed to be alike in having a common interest in people, in both cases their motivations seemed to be more ideational than interpersonal. Chemistry and mathematics majors were very similar in preferring scientific, mechanical, and quantitative activities or attitudes, while biochemists and psychologists, although diverging on factors I and IV, were very close on II, III, and VI.79

79 Ibid.
In the literature reviewed it has been evident that, although the study of the development of talent began about eighty years ago, not until comparatively recently has much attention been given to the problem. Research aims and procedures have been varied, with a resulting accumulation of knowledge of many separate aspects. However, the researches here reviewed have had in common the assumption that much potential talent does not bloom into superior achievement, chiefly because environmental conditions have hindered rather than fostered its expression, and that the removal of the hindrances and the widespread introduction of favorable circumstances will increase the number and quality of superior achievers. Various kinds of evidence have been adduced to support this assumption. Environmental conditions have been considered in many different ways, ranging from the geographical to the interpersonal, but the tendency has been to construe their effects from a psychological point of view.

Although the literature showed that there were a number of retrospective studies of superior achievers, relatively few of these had been broad appraisals of environmental influences, and even fewer had surveyed the situation of the advanced graduate student. This study was planned to meet these needs. It
was hoped that the research would yield suggestions as to how favorable circumstances might be socially controlled in order that potential talent could be better developed.

The following chapter contains an account and discussion of the procedures used in gathering the data for the study.
CHAPTER III

METHODOLOGY

The methods used in the research have been described and discussed in this chapter. First the sample has been broadly considered, following which some support has been adduced from the literature for the procedure adopted, and finally the interviewing and the testing has been discussed in some detail.

The Sample

The people studied were thirty-six graduate students, specializing in twenty-seven different fields, who had been admitted to candidacy for the degree Doctor of Philosophy by the Graduate School of The Ohio State University between January 1 and June 30, 1957. It was assumed that these students were academically superior.

This assumption is debatable, especially in light of Wrenn's finding considerable variability on a college test of academic aptitude among Ph.D. candidates in science from two midwestern states. However, the highly verbal content of the test used as compared with the ordinary work of scientists raises

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further questions, the most important of which concerns the meaning of a rating for intelligence or scholastic aptitude at the terminal doctoral level. Roe had a special test devised to measure the verbal, spatial, and mathematical abilities of her group of sixty-four scientists, and found that although the mathematical section was not nearly difficult enough for the physical scientists, two of the anthropologists "declined" to attempt it. It is maintained that admission to candidacy in itself is an intrinsically valid measure of high ability in a sense that no predictive test can be, since it is the highest earned recognition of formal education. For this reason, and despite the likelihood of substantial variability in scholastic aptitude among this group, admission to candidacy was used as the criterion of intellectual superiority.

The distribution of the students among the different departments was governed by the simple principle of drawing from as many as possible of the fields of specialization offering doctoral programs at the university. No attempt was made to have the sample proportionally representative of doctoral specialties in this university or in universities in general. The availability of students, and the time required to schedule and

complete interviews and meet for follow-up sessions, were major factors also.

The twenty-seven fields of specialization sampled were as follows, there being only one student from each unless otherwise indicated: aeronautical engineering, agricultural biochemistry, agronomy, bacteriology, business organization, chemical engineering, chemistry (2), economics, education (5), English, entomology, fine arts, geology, history, horticulture, mathematics (2), mechanical engineering, physical education, pharmacy, philosophy, physics (2), physiology, psychology, romance languages, sociology (2), speech (2), zoology. It should be added that two of the five people in education were in the field of music but under the general jurisdiction of the Department of Education.

It is interesting and relevant to note at this point that at this university there were in 1957 seventy-two recognized departmental programs leading to the degree Doctor of Philosophy, not to mention alternatives and further specializations which occur within some of these programs. As is well known the degree has become so highly and so widely regarded that it is recognized as the basic requirement merely for entry into certain types and levels of work, and therefore has become very like the more frankly professional degrees of law, medicine, education, business administration, and science. Thus, originating as certifying the holder to be a "doctor" of "philosophia," that is, a
teacher of the love of wisdom, the degree has changed its character remarkably in the past half-century. While its most desirable emphasis is still debated, the indications are that the present trend toward more specialization will continue.\(^3\)

Prospective subjects for study were selected from a list of names of recent candidates supplied by the Supervisor of Doctoral Records in the Graduate School of The Ohio State University. Except in the case of three subjects, those selected were not known to the investigator by name, and in no case was there any prior knowledge of data provided in the interviews. The people selected were telephoned and appointments were made for interviews, usually in their own offices. Only two prospective subjects decided that they could not find the time to assist in the project, and, while scheduling was often difficult to arrange, all the students were extremely courteous and cooperative. However, as noted later in this chapter, some difficulties attended the administration of the questionnaires.

**Rationale for Procedure**

By invoking both general theory and specific research in the study of people's lives, a rationale for the procedure used has been outlined.

\(^3\)Leo L. Rockwell, "Whence and Whither the Ph.D?," *School and Society* LXXXIV (1956) 107-109.
General considerations. There is an increasing acceptance among psychologists of the importance of a broader outlook on human growth and development than that which is limited by studying behavior solely in atomistic fashion. Three current issues, which have been selected to illustrate this trend, seemed to be particularly relevant to this research, and the resolutions indicated greatly influenced its orientation.

Allport criticized the positivism of the Lockean view of the human mind, which regarded the individual as the resultant or locus of external acts and assumed the primacy of such concepts as species equivalence, molecular observation, and the early genetic impress. Approvingly, Allport then analyzed the Leibnitzian view of the individual as the source of acts, as purposive, cretive, conative, self-realizing, and "becoming," and he pointed out that, although not entirely congenial to Anglo-Saxon empiricism, this view is now gaining ground.\(^4\)

The second issue was stated by Maslow as means-centering versus problem-centering. He deplored the tendency among social scientists to be over-zealous about the choice of the "correct" method of investigation, too often identified as that approximating most closely to the rigorously controlled procedures of the physical sciences, and maintained that the most crucial problems

were thereby neglected. Clearly, he did not mean that methodology was unimportant, but that criticisms of research were too often criticisms only of methodological questions, and rarely was there any suggestion that the problems studied were trivial.

White's effort to understand the lives of three people exemplified a third dilemma. Accounting for natural, healthy psychological growth in normal people was found to be a major difficulty because it was so easy to take positive desirable aspects for granted, and to concentrate instead on careful explanations of "the more rigid, crippled, and irrational features" of his subjects' personalities. In giving substance to the concept of natural human growth, White said, certain broad facts had to be accommodated: first, that continuous change occurs both within and outside the individual; secondly, that the multiplicity of influences exerted demands a selective response; thirdly, that the individual is not merely the locus of acts but takes action on the environment; and fourthly, that reality factors in adult development must also be considered. The major contribution of White's study was a clear demonstration of the value of examining the psychological meanings in people's lives as they are lived, using theoretical frameworks and psychological

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techniques to be sure, but concentrating on the mundane and the normal as well as the spectacular and the deviate.6

The purposes, procedures, and data of the research here described, the reports of superior people as to the motivations and influences which seemed to have contributed significantly to their continuing to a high level of attainment, are consistent with the stands taken on these three issues. That is to say, the problem did have prior consideration over the method, the accounting for constructive human growth was given precedence over explanations of that which was destructive, and the assumption was made that individuals live in a state of becoming rather than as creatures of circumstance.

Research methods. In this section appears a brief survey of some of the literature relating to the use of the interview as a method of obtaining a picture of past development, including attitudes as well as factual details. While there is an apparent weakness in that the studies cited are mostly of vocational choice, this aspect of development is seen in the broad contemporary sense of involving the total personality.

In 1938 and 1941 Vernon reported two studies in which she questioned female university students in England about their

careers in order to generalize about the influence of motiva-
tional and personality factors on the choice of university cur-
riculum and later occupational preferences. She asked "no
directly embarrassing questions" but concentrated chiefly on the
use of general leads such as, "What was it about...?" or, "How
did...?"\textsuperscript{7,6}

Ginzberg et al. used a structured interview with similarly
open-ended questions to investigate occupational choice in stu-
dents aged eleven to twenty-three years, accepting the hypothesis
that, "only the historical context of an individual's development
can give meaning to decisions or choices which, if viewed in
isolation, may appear accidental, arbitrary, or sometimes even
bizarre."\textsuperscript{9}

In a fact-finding check of some 300 unemployed persons,
Keating and two colleagues found very high validity coefficients
(+.90 to +.98) for reports of work histories given in interviews,
and these validities were found to remain high for up to six
years prior to the interviews. Although the investigators had

\textsuperscript{7}Magdalen D. Vernon, "The Drives which Determine the Choice
of a Career," \textit{British Journal of Educational Psychology}, VII
(1937) 302-316; VIII (1938) 1-15.

\textsuperscript{6}Magdalen D. Vernon, "The Relationship of Occupation to Per-

\textsuperscript{9}Eli Ginzberg et al. "The Problem of Occupational Choice,
\textit{American Journal of Orthopsychiatry}, XX (1950), 166-198.
taken care not to let the subjects know that their histories were to be verified, it may have been that, as unemployed people, they were especially loath to falsify their reports.  

In his 1950 study of the vocational development of teachers and factory workers, Norton discussed three major approaches to the investigation of developmental histories and three major techniques for collecting data. He chose the interview as a technique for using the case history approach because he believed that the disadvantages of length of time and difficulties of recording and standardizing were outweighed by its highly flexible character.  

Roe found in her report upon the psychological study of research scientists that life histories obtained through interviews that were very little structured provided excellent cross checks for projective material.  

Yonge, in a review of research, concluded that the most valuable interview was one using a standardized form "designed to assess complex, dynamic constellations of traits rather than relatively isolated, static traits." He also reported an

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investigation checking a standardized pre-employment interview with supervisors' ratings in which he found validity coefficients ranging from +.48 to +.99.\(^{13}\)

The major question that arises from these reports is that of the validity of the interview technique. Of the studies cited, only those of Yonge, and of Keating et al. attempted to check on this, and their findings were essentially that in an employment setting the interview was a fairly valid method of inquiry. The other studies were concerned more with development and the phenomenon of choice in a more holistic, dynamic sense, and thus were not easily checked empirically. This, however, need not be considered a weakness if the good intentions of the subjects seem very likely, for their reports as to attitudes and personal reactions are also important data that can not be observed from any more valid vantage point. Bartlett, in a classic elaboration of this idea, said that remembering was not "the re-excitation of innumerable fixed, lifeless and fragmentary traces," but was:

...an imaginative reconstruction or construction, built out of the relation of our attitudes towards a whole active mass of organized past reactions or experience, and to a little outstanding detail which commonly appears in image or in language form. It is thus hardly ever

really exact, even in the most rudimentary cases of rote recapitulation, and it is not at all important that it should be so.\footnote{Frederick C. Bartlett, Remembering (Cambridge: Cambridge University Press, 1932), p. 213.}

In summary, although there have been some high coefficients found for the empirical validity of the interview in special settings, most researchers have tended to assume that matters of fact have been reported without gross distortion, and have, indeed, also been very interested in personal attitudes and perceptions shown in interviews.

Description of Procedure

The data were gathered in two steps, the first being an interview with each student for approximately one and one-half hours. From notes made at that time a biography was written, and this was read critically by the student during a second meeting which usually took place between four and ten weeks after the first. Changes suggested by the student about points in the biography were discussed and agreement was reached. During the second meeting two self-report questionnaires were administered to each student, and personal data were recorded. Because of a delay in obtaining the questionnaires, it was necessary to make the second contact with four of the students by mail. An explanatory letter, a biography and the two questionnaires were sent to each, and all were returned. As noted earlier, in
addition to the biographies and questionnaires, the impression
gained from the interviews and the notes made were also used as
data on the assumption that personal contacts would give a better
total picture of each person than written responses alone.

The interview. During the first few days of interviewing,
the form and purpose of the interview changed somewhat. Originally it had been planned to use it as a follow-up measure to a
structured autobiography, but it soon became evident that the
time taken to explain what was wanted in the autobiography could
more profitably have been spent in interviewing and taking notes.
In addition, these students were so busy that the task of spend­
ing several hours writing an autobiography was usually postponed.
Thus the importance of the interview changed from a supplementary
to a central role.

The form of the interview also changed to some extent,
largely in the direction of greater freedom and less structure,
since it was found that students tended to talk more easily under
such conditions while covering essentially the same points. The
evolution of the interview schedule is shown by the three follow­
ing forms, the first of these being originally used as the auto­
biographical outline:
Form A (Questionnaire)

1. For what reasons are you pursuing graduate study?

2. In what area or areas of study are you most interested and competent? Note the approximate age at which each started.

3. Can you trace the origin of your interest in academic work in general and in your particular specialty?

4. What accomplishments, other than scholastic grades, have resulted from your interests?

5. Have any experiences in your community contributed to the fostering of your interests?

6. Describe any special recognitions, such as interviews, awards, publicity, that you have received for your accomplishments from your school or college, your work, your community, your family. What effect did these recognitions have?

7. Have any home circumstances contributed to the fostering of your interests? If so, how?

8. Have any particular people encouraged you in your interests? If so, how?

9. What contacts have you had with experts in your field of interest, such as specialist teachers in school and college or persons working in the field, and what effect have these contacts had?

10. What school and college experiences gave you most encouragement in developing your professional interests?

11. What school and college experiences seemed to frustrate you most in this respect?

12. Describe briefly the incidents that now seem to have been most influential in encouraging you to develop your professional interests.
Form B (Interview Outline)

1. Can you trace the origins of your interest in academic work in general, and in your particular specialty?

2. Have any home circumstances contributed to the fostering of your interests? If so, how?

3. What effects have school, college, and work experiences had on the development of your interests? Note encouragements and/or frustrations.

4. What people have been important in the development of your interests? Describe some of these contacts.

5. What accomplishments, other than scholastic grades, have resulted from your interests? Describe any special recognitions that have resulted from these accomplishments.

6. Describe the events that now seem to have been influential in encouraging you to develop your professional interests.

7. For what reasons are you pursuing graduate study?

Form C (Interview Outline)

1. "Can you trace the origins of your interest in your specialty?" (This was discussed in general terms following which it was intimated that this might be discussed again later. A lead-in was then made to a discussion of childhood experiences).

2. "Can you recall anything of your early experiences that seems to have strongly influenced your later learning, or your particular specialty?

3. Then the subject's school history was discussed, with an emphasis on asking about factors or influences that seemed to make school very pleasant, very easy, very unpleasant, or very difficult. Supplementary probing questions about further reasons for personal reactions, or elaborations of reported incidents were then used to carry along the student's account of his educational and work history, together with significant concomitants of it, up to the present time.
4. At various points, including discussion of family backgrounds, elementary school, junior high school, senior high school, and college, work experiences, and friendships, students were asked about people who had influenced them strongly, either by encouraging them or by creating negative reactions in them.

5. After proceeding through a chronological account of their lives, the students were then asked to make a brief summary of their lives, noting the significant influences that seemed to have influenced them in becoming what they were.

6. Finally the students were asked about their reasons for continuing their education to the doctoral level.

The good intentions of the group in reporting about themselves have had to be assumed, but willingness to cooperate and the absence of any possible personal gain could be cited as support for this assumption, and this, it is held, indicated a valid procedure. Although some of the students appeared to be less able or willing than others to explore within themselves and report personal reactions, or to try to differentiate between present and past perceptions of their experience, most did try to do this. In the following chapter this point is discussed further.

From the notes made in the interviews, biographies were written for each student; these thirty-six records appear in Appendix B. In order to conceal identities as far as possible, the names of places and people were avoided and the initials of the students were coded. In the biographies the idiographic nature of the study was apparent as students emphasized different phases of growth and development and a variety of environmental
factors as exerting formative influences on their lives. During the second meetings students on the whole suggested very few changes in the biographies, and this was regarded as evidence for the reliability of the procedure.

The questionnaires. Since motivation was a central part of the study and some understanding of the psychological makeup of the students was clearly implied, a further check on the inferences made by the investigator seemed highly desirable.

It was difficult to assess the exact importance that should be given to these internal factors. On the one hand the study was designed to generalize from a broad survey of the lives of superior students to principles useful in the guidance and education of others, and it was expected that, in order to do this adequately, the psychological significance of background factors would need to be explored to some extent. On the other hand, however, deep analysis of motives was not anticipated, and no particular theory of personality structure and function was espoused as explanatory of the students' continuing study and specialization. The task was to select an instrument that would provide a check on psychological factors deemed to be at once relevant to the character of the group and descriptive of internal mechanisms, and yet sufficiently close to surface behavior as to be amenable to some relatively simple observational checks.
The instruments considered to meet this need best were the Gordon Personal Profile and the Gordon Personal Inventory, both using forced choice methods. The subject is required to choose from among tetrads of items one statement which is "most like me" and one which is "least like me." There is less opportunity for faking on this test than on the usual questionnaire, because in each tetrad the items are arranged in pairs which have been matched for social preference value. It is therefore presumed that the subject will report himself more accurately than he will on questionnaires in which he has to check every item. Shaffer’s evaluation of the Inventory compared it with the Profile and concluded that both:

...commend themselves favorably for use when economy of time is essential. Few other instruments obtain as broad a picture of self-reported personality in less than 30 minutes.15

The reliability coefficients of the traits of both scales were found to be fairly high, ranging from +.74 to +.94, but validations have so far been made mainly in terms of construct validities inferred from the factor analysis.

A weakness of the questionnaires for this study was the fact that, although the Profile was developed on 5,000 cases and the Inventory on 1,786, the final norm groups in both cases were

small and rather selective. Caution must therefore be used in interpreting any but outstandingly high or low scores on the several traits. The Profile measures Ascendancy, Responsibility, Emotional Stability, Sociability, and also yields a Total score which is interpreted as overall self-evaluation. The full meaning of the Total score on the Inventory has yet to be properly evaluated, but the other traits are Cautiousness, Original Thinking, Personal Relations, and Vigor.

Four students were absent when the follow-up interviews were being given, and had to be contacted by mail. Each was sent an explanatory letter, a typed biography of himself, and the two questionnaires. One student, however, had such difficulty in responding to the questionnaires that he did not produce a scor­able result, and even a later brief meeting with him failed to yield an appropriate attitude toward the task. Another subject, contacted personally on both occasions, also failed to produce a scor­able effort. Two others were similarly rather resistant but responded in such a way that approximate ratings could be given. The net result, therefore, was that questionnaire ratings were gained for thirty-four out of the thirty-six students.

Summary

This chapter has considered methodological factors in the research. A description of sampling procedures was followed by
a section devoted to establishing briefly a rationale for the
general and the specific methods of gathering the data. Finally
a detailed description of the data gathering was presented.

The following chapter contains a detailed analysis of the
data, and concludes with a summary of the major findings.
CHAPTER IV

ANALYSIS AND DISCUSSION

In this chapter the data have been analyzed and discussed, first by surveying them according to certain broad patterns of development, and then by more detailed approaches. A description of the present and past status of the group according to certain given variables has been classified under the heading of Vital Statistics. This section has been separated from a discussion of data of social inheritance on the grounds that the latter are concerned with factors that are more amenable to social control. Following this, personality factors and the results of the questionnaires have been discussed and summarized, after which a resume of the past encouragements and present motivations of the students has been attempted. The chapter has been concluded with a summary of the major findings of the research.

Patterns in the Biographies

This section describes an attempt to survey the biographies according to certain broad patterns. In a real sense the only patterns are the thirty-six individual records because many qualifications have had to be made in the classifying, and overlap has inevitably occurred. Commonalities do exist, to the extent, for instance, that all but a very few students testified
to the significance of good teachers in their development. However, some categorization seemed essential in order to provide a conspectus that could not easily be gained from reading each biography separately.

Reinforcement of early specific interests. In eleven cases, as shown in Table 2, there were rather obvious connections between the interests and abilities fostered by the family in the students' childhood days and the present academic specializations.

TABLE 2

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Cases</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reinforcement of early specific interests</td>
<td>EG, FH, GH, HI, JK, JL, NO, PR, RT, SV, IJ.</td>
<td>11</td>
</tr>
<tr>
<td>Specialization from early general attitudes</td>
<td>AC, DF, FG, HJ, KM, OP, OR, PS, ST.</td>
<td>9</td>
</tr>
<tr>
<td>Direct influence by teachers</td>
<td>AB, BC, BD, GJ, IK, LM, MN, NP.</td>
<td>8</td>
</tr>
<tr>
<td>Direct influence by associates</td>
<td>CD, DE, LN, MO, RS.</td>
<td>5</td>
</tr>
<tr>
<td>Strong internal drive</td>
<td>CE, EF, KL.</td>
<td>3</td>
</tr>
</tbody>
</table>

These connections appeared to indicate a deep-seated fascination for a particular activity which could, and sometimes did, persist
despite the impingement of experiences that might have been expected to have discouraged progress and interest. Obstacles, deviate or multiple interests, and procrastinations were all evident in this group, but in general there was never any question as to what were primary interests. Some, for instance, long considered their specialties only as recreations and did not find out for many years that there were real career opportunities in their favorite fields. Had their interests not been so firmly based, it is doubtful whether some would have made the careers that they finally did make.

Some specialties seem to enjoy a peculiar advantage over others in possessing correlative childhood interests, and this was the case with these, two being music, and the others fine arts, history, English, education (the teaching of English), speech, horticulture, romance languages, and zoology. These are recognized as legitimate childhood recreations and studies even if the exact nature of the corresponding adult activity is not widely known. It is commonly believed that some disciplines, notably the social sciences, do not have an equivalent childhood activity, and it is often urged that a high degree of social maturity based on experience is required for advanced study in this field, thus accounting for the older average age of doctoral graduation of social scientists as compared with other scientists. However, although the age differential was also true of this
small sample, the requirement that social maturity be based on experience seems to have been more of an assumption than an empirical finding. There seems to be no reason why people could not be sensitized to deep personal interest and high achievement earlier than is usually the case.

Students classified under this heading were, as a result of family encouragement, deeply engrossed in their specialties before the onset of adolescence. Later they had especially easy and pleasant experiences in elementary school, and they had teachers in high school and college, who, wittingly or unwittingly, gave them a great deal of further inspiration. An outstanding example of a person with this kind of background was JL, a horticulturist. His father and grandfather were both most enthusiastic amateur gardeners, and, even before he was eight years old, JL was working with them and growing plants like an adult. Then, soon after he learned to read well enough, he read the bulletins his father obtained from experimental stations. JL did particularly well in elementary school, and in high school a chemistry teacher stimulated his scientific interest a great deal, supplementing a chemistry set that JL had bought as a result of his enthusiasm for this man's classes. He had good science instructors in college, worked at plant-breeding stations in summers, and early determined to advance to the Ph.D. degree.
Four of this group were among the oldest of the students sampled, being three or more years above the mean age, two being victims of the depression years to the extent that their further education was curtailed. Thus the generalizations made about students in this category concealed the fact that, in these four cases and to a lesser extent in the others, the life patterns were not necessarily smooth and continuous successions of positive reinforcements of early interests. However, interests were implanted deeply and early enough to develop strength and persistence, and this early beginning, combined with constructive assistance in the formative years, to a large extent accounted for the present specializations. That these students have progressed to the doctoral level is undoubtedly partly due to their early beginnings, although, as discussed later, there were motivational differences among students in the various specialties. In this connection, it was somewhat surprising to find only three physical and biological scientists falling into this category, since it has been a not uncommon finding, and a frequent assumption, that scientists have usually been given to much tinkering in childhood with materials appropriate to their later specialties. Of scientists classified elsewhere in this section, only three (OP, HJ, and MN) could be considered as possible candidates for this group on the basis of childhood interests.
Specialization from early general attitudes. Nine biographies illustrated what one student called "an undirected zeal toward learning," in which there were early fostered generally intellectual attitudes with no obvious specialization, but which later seemed to fuse into a specialty as a result of one or more momentous learning experiences. Sometimes, as in the case of HJ, who, with OP, does not fit well into this group, the early attitudes were not especially fostered, but were rather allowed to flourish in an atmosphere of freedom. In HJ's case it seemed to have been by sheer chance that his own fancy happened to settle upon chemistry. These nine people, like the first group, had rather pleasant and successful elementary school experiences, and, with some exceptions, they had in high school and college a preponderance of happy and stimulating experiences with good teachers who generated intense interest in what later became special interests.

The three exceptions, each of whom had pleasant and successful educational experiences, were OP, PS, and KM. The first two developed their special interests in work settings, while KM had a rather amazing single experience in which, unaided, he came to appreciate the logical structure of mathematics. Although the others also separately and uniquely reached the stage of deeply appreciating the special focus of his or her specialty, the whole nine may be crudely grouped as having had much general preparatory groundwork laid by the family environment.
There were close similarities among the backgrounds of people in this and in the previous grouping in that in both there were several instances of early reading, rather direct efforts by parents to encourage much reading for recreation or for finding answers to questions, the provision of a favorable cultural environment for learning in the home, and a very strong emphasis on the value of education.

Direct influence by teachers. These students tended to report somewhat less favorable family backgrounds than was true of the previous two groups, although, apart from GJ, none reported unfavorable backgrounds, and on the whole the students were in a general state of readiness for helpful action by a teacher.

Eight cases were judged to fall into this category on the grounds that the students seemed to have been so stimulated by one or more teachers at the high school and college levels that, as a direct consequence, their later specialties began to emerge, and their lives seemed to have become profoundly influenced. It was estimated that this would not have occurred had the students not had these experiences. Not unexpectedly, each of these students reported that the associations with their teachers were usually warm, personal, and mutually satisfying, extending beyond the conventional teacher-student relationship.

In three cases, however, (GJ, MN, and AB), it seemed highly probable that the personal friendships were necessary
forerunners of the direct intellectual stimulations, these appearing to have been outcomes of the associations rather than instigating factors. That is to say, there seemed in these cases to have been some insecurities or uncertainties which required amelioration by direct reassurance before intellectual growth could take place. GJ, for example, reported that, as a result of taking one course with a certain instructor, he decided to change to a major in that area:

The important feature of this experience, GJ said, was the very personal interest that this man took in his students, having a remarkable ability to make one feel special, "like a son," and to gain and hold one's confidence. GJ agreed that this instructor may have served as a kind of father substitute for him, but in retrospect he seemed more like a professional model to follow. While the most lasting impression on GJ was through this instructor's personality and kindliness rather than through any inherent subject matter interest, the latter began to develop as GJ worked with his mentor for the next three years. From being an indifferent student previously, GJ became an honors student in college.

This was a good example of the kind of teacher-student identification discussed in the review of the literature, and was very similar to that reported by MO, whose biography has been classified in the group of cases following. Compared with the whole sample, GJ's and MO's cases were the most like instances of early psychological deprivation, and yet, as examples of strong and not uncommon subcultural values, they could hardly be so considered. Whether, as teacher-student relationships, GJ's and MO's awakenings were different kinds from the others, whether they were
merely intensified and therefore differed only in degree, or whether they were just the outcomes of deeper self-analyses are all possible answers to an interesting problem. The judgment is ventured that they were different only in degree, but this could well be the subject of further research.

It was difficult to generalize about the critical behaviors of the teachers in these few cases, or, for that matter, to isolate the behaviors. It might appear that each relationship was an idiopathic manifestation, had not these and other students reported of their best teachers that they were, in the words of one student, "just personally nice guys" who had a stimulating effect on many of their students. A high degree of skill and knowledge in the subject field combined with ordinary personal warmth seemed to have been essential. However, these "ordinary" qualities may be deceiving, and may conceal the possession of extraordinary traits and a super-normal level of personal adjustment. The essential characteristics of superior teachers has not yet been satisfactorily isolated, and an additional good starting-point might be further analyses of those teachers who have stimulated superior achievers.

In the matter of teaching techniques, the science students were better able than others to identify constructive aids to learning, and these usually related to freedom and encouragement to do individual research. Of the eight students in this category,
seven were in biological or physical sciences, although two of these were grouped with GJ as having probably reacted to subtle interpersonal factors. In such a small number, this high proportion of science students is probably due to chance, but it is not inconceivable that such areas are relatively more susceptible than others to the arousal of interest through research, or rather, that more is known about how to do this effectively in science subjects.

Direct influence by associates. This group had family backgrounds very like those of the previous group, in that they were not especially stimulating, even if they were not unfavorable; an exception, as noted above, was that MO's early circumstances were rather inhibitory. The five biographies were distinguished from the previous eight on the basis of a difference between formal and informal educational settings, but insofar as all thirteen were examples of approximately the same kinds of close identification, the separation can hardly be justified.

In the experience of three men there was evidence of a kind of total and necessary re-birth as an antecedent to real intellectual progress. In the case of DE, a chemist, a priest with whom he had many associations over six years of adolescence played an almost therapeutic role, deliberately shaping DE's life ambitions and correcting his personal-social defects.
During his high school days in a small southern town MO, a philosopher, had highly stimulating contacts with the best educated man in the community, who was also the most despised because of his strongly atheistic views. RS, a sociologist, was a college freshman with only a mediocre high school and college record until his close associations and long discussions with an upper classman inspired him to think deeply about the social origins of human behavior and value standards, and eventually to study at an advanced level in that area.

Two less striking examples were those of LN, a physical education teacher, and CD, a student of business organization, who were influenced by admired associates. LN, as a recent MA graduate, very strongly admired a man who had recently gained the Ph.D. degree, and CD formed a close and continuing attachment for an older student while in college and later while teaching.

Strong internal drive. This small category (EF, KL, and CE) might well have been labeled "miscellaneous" or "others" since these cases did not fit well into any of the other patterns. The classification was further unsatisfactory in that there were three other students who exhibited drives very like those of CE and who were classified elsewhere. One of these was DE who asserted that he began specialization in chemistry mainly because it was recognized at his college as the most difficult subject and one at which only the best could succeed. The second was ST
who held very firmly to a moral-religious view of his relations with society, and the third was MN who specified the great need for will-power in order to accomplish even disliked activities.

The chief characteristic of both EF and KL was a strength of character not easily related to external factors, but in all probability merely more inaccessible to immediate introspection. Inasmuch as no interview contacts extended over two and one-half hours, it is very likely that this category would disappear if a more therapeutic kind of relationship were to be initiated. With the data that were available the differentiation seemed legitimate, and these examples tend to support this judgment.

EF reported that as a child he was very shy and reserved despite his "needling" of the teachers, and that, because he did not want to make excessive demands on his rather poor parents he refused to tell what he wanted for Christmas. Further, he felt that in high school he "never quite made it with the best crowd" even though he showed that besides being an excellent scholar he could also succeed at many athletic activities. Later, in his college years, he changed his major to economics chiefly because he "began to get wary of the extremely odd people in advanced mathematics courses."

In the case of KL the most obvious cause of his strength of drive was the fact that he was orphaned by the time he was ten years old, and yet there seemed to be no specific aspects of
this undoubtedly important circumstance to relate to his personality. This judgment is made notwithstanding KL's testimony as to the encouragement given by his wife and by his adviser.

CE did not fit well into this group because, as he reported, his "never-say-die" and "things-don't-come-easy" attitudes were clearly outcomes of a close identification with his father. However, he resembled EF and KL in his inner-directedness:

The discipline at the military school was hard to take, but it was similar to that which his father had always taught him. Although CE would never admit the fact at home, he was often beaten by the upper classmen and he felt that he would be the better for it. "There is sometimes a great deal of satisfaction in being subordinate to others," CE remarked, recalling how the lower classmen developed a strong esprit de corps.

The persistence shown by this small group may be remarked as very like that shown in the superior people studied by Cox, and may have been underestimated or not even considered by the group as a whole. Cox said that

...high, but not the highest intelligence, combined with the greatest degree of persistence, will achieve greater eminence than the highest degree of intelligence with somewhat less persistence.\(^1\)

Vital Statistics

This section is devoted to a summary and brief discussion of what might be called census data, certain relationships among

which have been corroborated in other studies. Because of the very small number of students sampled, the earlier caution as to the limited extent of generalizations and comparisons that are possible is reiterated here.

It was believed that the omission of information about specific religious affiliations from these data was a minor weakness that could be justified on the grounds that moral-religious influences on the subject's development were not barred from the interview. Indeed the form of the interview was such as to encourage appropriate mention of general influences of this kind, and, as the biographies show, these were often forthcoming. The relationship between specific denominational allegiance and superior achievement has been largely confined to studies of eminent scientists, and, in proportion to what would be expected in the general population, the major conclusions have been, first, that there are very few Catholics, and secondly, that certain Protestant groups, notably Unitarians, tend to produce a great number. These relationships are extremely interesting and deserving of further study.

Age and sex. There were four women in the group, three of these being cases in which they were the sole available representatives of subject specialties. Of these four, three were over thirty-four years of age and one was twenty-eight. In the
life of the oldest woman, aged forty-four the economic depression of the 1930's had been an important factor, causing the postponement of college study for many years. The generally poor social conditions in which several others in the group spent their early years seemed to have had somewhat similar effects.

The indications from Table 3 are that the average age of this group on completion of the doctorate will be about thirty-two; this figure is approximately the same as that found in data presented by Pressey, \(^2\) and by Hudson. \(^3\) In this regard, World War II had a marked effect on several of these candidates, many tending to postpone decisions as to their later education and vocation because of the imminence of military service. Even after 1945, the Korean War and the continuation of selective service produced similar effects in certain other cases, and this seems likely to continue to be true of doctoral candidates in the immediate future. Practically all of the men in the sample have given about two years of military service, and the subtraction of this figure would make a substantial difference in the statistics of the group. As is shown later, however, military service did not always have a detrimental effect on intellectual development.


TABLE 3

DISTRIBUTION OF AGES AT CANDIDACY

<table>
<thead>
<tr>
<th>Years</th>
<th>Age Groups</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>6 to 46</td>
<td>2</td>
</tr>
<tr>
<td>37</td>
<td>6 to 40</td>
<td>1</td>
</tr>
<tr>
<td>34</td>
<td>6 to 37</td>
<td>1</td>
</tr>
<tr>
<td>31</td>
<td>6 to 34</td>
<td>8</td>
</tr>
<tr>
<td>28</td>
<td>6 to 31</td>
<td>15</td>
</tr>
<tr>
<td>25</td>
<td>6 to 28</td>
<td>9</td>
</tr>
</tbody>
</table>

*Up to, but not including

Range: 25 yrs 8 mths to 46 yrs 8 mths
Mean: 30 yrs 10 mths
Median: 29 yrs 6 mths

It might be suggested that the continuing improvement in the national economy would lead to a decrease in the mean age of doctoral candidates. However, the actual requirements of the formal educational system preclude any great decrease, since it is scarcely possible to gain the Ph.D. degree before the age of twenty-five without educational acceleration. In fact, the evidence is that the average time taken to complete graduate work is increasing.

Seven students (EF, JK, HJ, JL, KM, OR, and PR) had had double promotions and thus entered college either before or very soon after their seventeenth birthdays. PR, over twenty-seven
at admission to candidacy, had his B.A. degree at nineteen, but believed that he would have become more socially mature had he taken at least another year as an undergraduate. However, at twenty-seven he strongly criticized the system which required one to wait "on the dole" until about thirty before obtaining the first job. Another candidate, JK, now aged thirty-six, was also graduated at nineteen, and with a teaching certificate and Phi Beta Kappa election as well, but in her case the motivation to do advanced work had been rather desultory. KM had skipped grades in a country school so fast that he was retained in the eighth grade of a large city school because it was believed that he should not be admitted to the ninth grade before he was eleven. Although he was able to keep up with his classmates, KM at thirty felt that, "You can't skip four grades without losing something."

These were the outstanding examples of double promotions and, together with the data on the ages of the group, they seemed to point to the fact that whatever the merits of acceleration in the lower levels of schooling, it might profitably be attempted at the higher levels. Indeed, there would seem to be some urgency to the demand that potential doctoral candidates could and should be graduated for productive work much earlier than seems to be the case. This is especially called for in view of
Lehman's findings on the relationship between age and superior achievement.³

Marital status. The data of Table 4 show that, although a smaller proportion were married than in Roe's or Visher's studies, marriages took place at earlier ages than in those studies.

**TABLE 4**

**MARITAL STATUS**

<table>
<thead>
<tr>
<th>Married</th>
<th>Single</th>
<th>Divorced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>27</td>
<td>8</td>
</tr>
</tbody>
</table>

**Age at marriage**

Range: 18 years to 35 years
Mean: 23 years 6 months
Median: 23 years

**Number of children per marriage**

<table>
<thead>
<tr>
<th>Children</th>
<th>Marriages</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>7</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

Roe's group married at an average age of about twenty-six,⁴ and, of Visher's sample, only eighteen per cent were married by the


age of twenty-four\(^5\) as compared with over sixty per cent of marriages by this age in this group. The mean age for first marriage of Terman's gifted group was just over twenty-five for men and just over twenty-three for women.\(^6\)

Since these candidates were all still studying, Roe's attributing later marriages in her group to longer educational histories gives rise to the query as to whether the undoubted superiority of her sixty-four scientists could be shown to have led to greater devotion to work and thus militated against early marriage. Possibly, other factors were operative in the two groups. There seem to be more and better financial aids available to graduate students now, both through grants and also through the increasing social acceptance of the fact that wives can support their husbands by working. The group studied here may also reflect the general national tendency toward earlier marriage, or perhaps of the desire to marry either before or very soon after military service.\(^7\) A number of the married

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students, notably KL, LM, and MN, made special mention of the important role of their wives in giving moral support.

These marriages have already yielded an average of exactly one child per marriage which, although lower than most other researchers have found, still promises to increase because of the much younger age of this group. However, because of the widespread voluntary limitation of the number of children it is unlikely that the 2.3 average found by Cattell, for example, will be exceeded.

**Siblings and order of birth.** These results, shown in Table 5, were among the most striking of the personal data recorded for the group. Galton, 9 Cattell and Brimhall, 10 Terman, 11 Visher, 12 and Roe 13 all found essentially the same trend, namely, a remarkably high incidence of first-born children among people of superior abilities and attainments. For example, Cattell and Brimhall and also Terman found, among two-child families, that almost three-fifths were first born, while this study, with an

---


admittedly very small sample, revealed that four-fifths were first born of two-children families.

TABLE 5
NUMBER OF CHILDREN IN PARENTAL FAMILY AND BIRTH ORDER OF SUBJECTS

<table>
<thead>
<tr>
<th>Number of Children Including Subjects</th>
<th>Number of Subjects</th>
<th>Position in Family</th>
<th>Number of Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>1</td>
<td>26*</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>7</td>
<td>*9 were only children or effectively so by force of circumstances.</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>9</td>
<td>1</td>
</tr>
</tbody>
</table>

Using the same procedure as Roe's comparing the observed total number of first-born with the calculated expected number, the incidence of first-born in this group was found to be reliably greater than chance ($P < .01$). The data presented included as first-born seven who were in fact only children, and two who were virtually only children from infancy, because of early death of an older sibling in the one case, and remarriage of a parent in the other. There are difficulties with inquiries of this kind, and discrepant results have ensued. For example, Visher's data
as to siblings referred to those who had reached adolescence, which is very different from Terman's data giving the number of pregnancies, including miscarriages, but not necessarily the order of live births and miscarriages. Although Cattell and Brimhall considered the importance of recording exact details, they did not make a clear distinction among all births, live births, and those now living. Roe and Galton were similarly inexact. The data presented in Table 5 were for all live births, but, as Roe pointed out, it is not unlikely that people do not have exact information on this point, even in regard to their own families.

The psychological meaning of these findings is open to much debate. In Galton's day order of birth was related to the system of primogeniture, of which traces remain to this day. However, modern parents probably support the idea of giving each of their children equal opportunities. The data from the biographies of this study do not suggest whether this was or was not the case.

Lasko's study on the differential treatment of first as compared with later children hypothesized that greater independence and self-reliance would occur in the first-born, but little evidence on this point is available from this study. However, these desirable traits seemed to be lacking in certain of the

candidates, regardless of their birth order, so that it may be surmised that one may grow into graduate study and eventually become a Ph.D. candidate without feeling that one was making any momentous decision or asserting one's independence and self-reliance to a greater extent than that indicated by these excerpts from the biographies:

She always felt that while her brother was quite independent in making his decisions, she was rather "spineless" in acceding to other people's wishes...trying as usual to do what other people told her.

He saw himself as "not too much of a scholar...would rather be a family man," and noted that he never liked study very much but had somehow conditioned himself to it.

...recognized in herself a strong trait of receptivity, even passivity, in all her learning. She felt that she has always tried to "absorb, to find out what they want, and to regurgitate it. It is better to do what it takes to get through."

Despite these statements, however, the indications among the group tended to substantiate the importance of independence and self-reliance in studying at an advanced level and the association of these traits with a large proportion of first-born children in the sample.

**Parental education and occupation.** Tables 6 and 7 show that on the whole the students greatly surpassed the educational and occupational levels reached by their parents. In a few cases these data were gained by approximations, as for example when the parent had been educated in a foreign country or had died when
the subject was very young, or when the subject was not quite sure of the exact nature of his father's occupation.

### TABLE 6

**EXTENT OF FORMAL EDUCATION OF PARENTS**

<table>
<thead>
<tr>
<th>Level</th>
<th>Mother</th>
<th>Father</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than high school</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Some high school</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>High school graduate</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Some college</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>College graduate</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

The education of the mothers tended to exceed that of the fathers, in several cases because the mother was a teacher, having received two years of preparation at a teachers' college. In fifty-three per cent of the cases either one or both parents had had some college education or held a college degree, but in thirty-one per cent of the cases neither parent had completed a high school education. These data conceal a commonality among the group that is discussed at greater length below. Over two-thirds of the group reported that they were strongly urged by their parents to do well in school, or were told that being educated was highly important, or had special efforts made to provide a particularly easy transition from home to school, and, with minor exceptions, these people felt that school was usually
easy and pleasant. This attitude was inculcated by parents at all levels of the classification shown in Table 6, although it was truer of those who had had the most education.

**TABLE 7**

**OCCUPATIONS OF FATHERS BY GROUPS**

<table>
<thead>
<tr>
<th>Professional and managerial: 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers: 4 Pharmacists: 2 Stockbrokers: 2</td>
</tr>
<tr>
<td>Commercial artist: 1 Clergyman: 1 Sales manager: 1</td>
</tr>
<tr>
<td>District plant supervisor: 1 Mechanical engineer: 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clerical and sales: 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salesmen: 5 Retail merchants, own business: 2</td>
</tr>
<tr>
<td>Railway agent: 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service: 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barber: 1 Sheriff: 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Agriculture: 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers, own farm: 4 Laborer: 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Skilled: 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machinist: 1 Baker: 1 Railroad trainman: 1</td>
</tr>
<tr>
<td>Watchmaker: 1 Plumber: 1 Tailor: 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semi-skilled: 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dress presser: 1 Oil gauger: 1</td>
</tr>
</tbody>
</table>

As can be seen in Table 7, the occupations of the fathers tended toward the professional and managerial and the clerical and sales levels of the classification system of the Dictionary.
Adequate comparisons with other researches are difficult because of the variety of classificatory systems used. However, the indications here are quite strongly that the professional groups were the most productive, and various other evidence supports this finding.

Social Inheritance

In this section consideration has been given to the contributions of social institutions to the development of high levels of ability and interest in the people sampled.

Family backgrounds. The most patent conclusion that can be drawn from data about the family backgrounds of the group is that these were, in general, highly favorable to the development of intellectual values. Even in cases in which students failed to indicate that their early environments were directive and formative of such attitudes, it was usually evident that there was at least an absence of stimuli inducing negative attitudes.

Only two candidates, GJ and MO, had family backgrounds that seemed directly to militate against academic advancement beyond the legal minimum. GJ's help was needed at home and considerable pressure was exerted by his very uneducated parents to induce him to leave school at the end of the eighth grade in order to work on farms, while MO was raised in a small community with rigid moral-religious standards which became oppressive to
him. Both these men, however, were sufficiently spirited and strong-willed as youths to resist these influences, perhaps because the pressures were so strong as to evoke a reaction. BC, BD, and EF tended to deprecate the influence of their home environments, reporting rather poor and unstimulating conditions, the first two, as sons of farmers, being needed as manpower. However, these three environments were characterized by an apparent absence of stimulation rather than by active discouragement of learning, and all three went on to college with parental blessings.

In approximately two-thirds of the biographies there was evidence of strong encouragement in intellectual pursuits. Sometimes the encouragement was merely hortatory and general, expressed in such forms as, "education is the greatest thing you can have," or, "college was just a normal expectation," or, "They insisted that I go to college; after that I could please myself." This kind of encouragement alone may not be very significant since it probably reflects an attitude which is now typical of a large proportion of American families and which was undoubtedly typical only to a slightly lesser degree in the childhood and youth of these students. Examples of early family environments especially favorable to the cultivation of intellectual values usually included a considerable amount of direct teaching. IJ's parents had him take private tutoring in ceramics at the age of
seven, KM's mother had him learn and recite a long verse at the age of three and pushed him into spelling bees and vocabulary competitions, and FH's and GH's parents began them in music before they were eight years old. JL's and SV's fathers, horticulturist and nature-lover respectively, used less directive methods but these were even more successful and interesting.

More specific characteristics of the family environments that the candidates reported as being very stimulating naturally varied widely, but two procedures were prominent—the encouragement of reading, and the stimulation of curiosity, each accompanied by a great deal of pleasure on the part of the student. In childhood and youth a great many of these students seemed to be naturally alert and intelligent, and therefore very curious and eager to learn to read, and special opportunities were given to indulge these tendencies.

Even if the parents did not own many books or were not highly educated, their children usually had access to books through nearby libraries or were given books as presents. Sometimes there appeared to be merely a provision of opportunities—"we had piles of books and magazines"—without any special urging and assistance given. At other times there were evidences of specific efforts by parents to help their children to use books to the best advantage. Thus, when OP was very young his father showed him how to use an encyclopedia to find answers to his
many questions. AC's father bought many valuable reference books especially written for young children and showed his two daughters how to use them, so that they often seemed to get more out of the books than they did from their school work. HI used the extensive home library to compare editions of various pieces of literature that she encountered at school. Five others (JK, PR, EG, FH, and SV) could read before they entered school. In addition nine students (PS, RT, IK, HJ, MO, FG, KL, OR, and JL) reported that as soon as they could read they enjoyed it so much that they devoted a great deal of time to it, sometimes, as in the cases of OR and RT, as a compensation for lack of ability and interest in athletics.

Stimulating students to ask questions, giving scientific answers to questions, teaching the use of reference books, and inculcating the idea that the world was subject to scientific laws and scientific investigation--these were all mentioned as early orientations from parents, especially by physical and biological scientists. Five candidates in these areas (NO, OP, JL, AC, and HJ) reported that their parents gave them considerable opportunity and encouragement to find out things for themselves, and generally to develop the questing attitudes of scientists while still in elementary school. Four others (LM, SV, MN, and NP) had somewhat similar parental support, although in their cases the influences occurred later and were much less direct.
The development of scientific traits was in no case mentioned by students who were not specializing in the physical and biological sciences, and this may have various implications. It may mean that the scientists had these particular attitudes firmly instilled into them by their families and so strongly reinforced, or perhaps initiated, by their educational experiences that as a result they became scientists. This was Roe's hypothesis and it seems perfectly tenable. But it may also have been that the non-scientists (those not in the biological or physical sciences) did not mention these matters because they had adopted a professional outlook and stereotype which did not require them to have such attitudes, or, stated more positively, which actively suggested an aesthetic, subjective approach to their discipline, rather than the objective mode of inquiry associated with the study of scientific fields. Interestingly, three students of subjects not considered scientific in the popular sense, history, music, and fine arts, did develop quite strong scientific interests in high school and college. While granting the importance of probable genetic inheritance and of early encouragement in scientific modes of thinking, this investigator inclines to the view that the later adoption of professional stereotypes is important enough to account for the fact that non-scientists tended not to emphasize scientific approaches to problems.
Freedom also seemed to have been an important ingredient in the early backgrounds, but this is difficult to isolate as a variable. Most of the group seemed to have had happy childhoods, and presumably they had a good deal of freedom, as, for example, many read a great deal, not because they were forced to read, but because they were given opportunity and encouragement to do so. Similarly, RT seemed to have felt free to accept or not to accept his mother's invitations to act in plays, FG to work or not to work at various arts and crafts as home recreations, and FH to learn or not to learn the trumpet. In this sense, freedom takes on the meaning of providing constructive activities for children, often with direct teaching, but usually without any suggestion that they would be coerced into them. Specifically, it seems not to have been an absence of assistance. There were many evidences of this, and, further, it is possible that those who said that their home circumstances were not especially stimulating, LM and AB for example, may have described just such a situation had they elaborated sufficiently.

Although most had favorable and pleasant early backgrounds none seemed to have had the freedom enjoyed by HJ. This case was a good example of the operation of chance factors, in that he happened to select and develop a hobby, chemistry, which led to an intellectual interest. Yet, considering the careful guidance
between IJ's childish play in the mud of irrigation ditches and his present skill as a ceramist, one might wonder whether it could be said with any real assurance that a given childhood interest could not lead to intellectual pursuits.

**Education.** The fact that each of these students had been exposed to at least nineteen years of formal education and that most of them planned to continue to work in an educational setting, qualified them in a particularly apt way, within the limits of the interview, to assess the influence of educational experiences on their lives.

Reference has already been made to the role of formal education in favorably influencing the development of some of the students. In particular, the importance of interpersonal relationships with teachers was discussed, and the conclusion offered that in several cases warmth and friendliness on the part of the teacher seemed to be a pre-requisite to stimulation. Most of the students reported at least one rather sustained contact with a teacher as having been very significant in their general motivation and in the development of their specific interests. Teachers were usually influential at either or both the high school and the college levels.

Four students (PS, EF, FG, and SV) either failed to mention any teacher as having been significant in their lives, or specifically stated that they believed that none had been
important enough to deserve mention. Four others (GP, RT, CE, and KM) noted that they had not had any personally inspiring teachers until they had begun graduate work. However, even among those students who were rather mundane and matter-of-fact in outlook and not inclined to speculation and introspection, there was usually a sincere tribute paid to the powerful reinforcement of warm and friendly teachers who seemed to have great confidence in them.

Students reporting such circumstances tended to be imprecise when asked to give details of the specific teacher behaviors which transmitted confidence and motivation. Often the teachers seemed to have been just imbued with friendliness and to have been disinclined to "pull their rank," as one student expressed it; at other times they were merely reported as having "seen something" in the student, although what the something was, the student usually could not say--one man said that apparently his teacher thought that he was not "a social square." One characteristic which the teachers might have been expected to show, that of firing a student with ambition toward rather distant goals was not much in evidence, except that they often gave very useful information as to possible vocations within a specialized area. Usually the inspiration and assistance was oriented toward immediate problems and circumstances rather than ultimate ones. This finding supported Visher's conclusion as to the
importance of giving able young people better opportunities and of inspiring them with high but approachable ideals.

The candidates specified a number of defects in their education, from which four broad categories have been made. Three of these seem to be rather closely interrelated, and are probably dependent for amelioration on a long program of improving teacher preparation procedures: personal characteristics of teachers, methods of teaching, and student reactions to school. Some teachers were criticized for having been finickety, unimaginative, very mediocre, or even stupid, while others were said to have been excessively harsh, domineering, or authoritarian. Complaints of poor teaching methods referred to a great deal of "busywork," to an excessive reliance on text books and on rote memory, and to the impression, gained by one student, of science as consisting of "isolated bits of information." A rather common occurrence was an active liking of elementary school as easy, pleasant, and interesting, followed by the feeling that secondary school was dull, or irksome, or difficult. The group tended to have a record of successful school achievement, but (even apart from temporary difficulties with special subjects), it was surprising to note that there were eight students who at some point or other were doing such generally poor work as either to be placed on probation or to feel that they were below average in their attainments. These students were DE, RS, LN, HJ, MO,
CE, GJ, and OR. This is viewed as a serious state of affairs and one which suggests a need for more and better individual studies of pupils by teachers.

The fourth, and possibly the most important, defect noted of the educational system was the lack of assistance given with vocational choice. Eighteen of the group made major curriculum substitutions after entering college, and this did not include those who merely were undecided as between two or more attractive possibilities. The changes in many cases could not be called serious, and insofar as some were often in the same general area, for example from medicine to physiology or from social work to psychology, they were undoubtedly useful and legitimate explorations. Few viewed these changes as defects. Other cases, such as the eight who first began college study in medicine, could be explained on the basis of social prestige or parental pressure taking precedence over real interest.

But there were, in addition, some remarkable changes in direction which suggested a great need for vocational guidance, including, and in addition to occupational information. Outstanding examples were the following curriculum changes: from medicine to real estate, to speech; from music to psychology, to English, to sociology; from chemistry to clinical psychology, to philosophy; from social work to psychology, to mathematics; from engineering to music; from physical education to industrial arts.
It is important to note, however, that in each of these cases, the changes, although apparently drastic, were perfectly explicable and logical when viewed in terms of the life histories, and the constellation of influences on the individual. They were good examples of the key to the understanding of behavior residing in knowledge of the individual and his total experience.

Some of these students could undoubtedly have profited from some good counseling procedures, but others were hampered merely by a lack of information. A physicist exemplified this by stating that for a long time he had thought that the only thing a physicist did was to teach physics, and two of the biologists prepared for medicine thinking that that was the only possible vocational outlet for their interests. Several students reported that they were sure that they could easily have become interested and capable in other subjects, usually in closely related fields, but only one expressed a desire to have been able to start again and to have taken a substantially different direction.

The two major favorable influences resulting from education appeared to be a close and stimulating association with one or more teachers, and the encouragement of a research attitude. Both of these have been briefly discussed above. The first factor, although more difficult to specify than the second, seemed
somewhat more clear-cut, probably because the encouragement of research attitudes seems a less essential part of studies which lie outside the biological and physical sciences. This may not be necessarily so, but students of these two branches of science tended to emphasize the development of a personal commitment to research attitudes as their chief motivation for continuing in their studies. The difference between these and other students in this matter may thus be that it is conventional as well as necessary to have these scientists do research and cultivate research attitudes, whereas in other disciplines it is less conventional to stress these factors, even though they may not be deemed to be unimportant.

Among the physical and biological scientists in the group, the majority had their first taste of the joys of research in educational settings, and testified as to the intense motivation that resulted. Sometimes this experience was gained much later than it should have been. In several cases, for example, it was not until they were doing graduate study, or had been assigned to a field experimental station, that students came to appreciate the meaning of scientific research. More often than necessary, it seemed, chance factors operated, so that one might wonder how many students have never become scientifically curious simply because they have never had appropriate experiences.
It could well be held that curiosity and the motivation to do research not only are desirable basic attitudes in the physical and biological sciences, but should also be characteristic of the equipment of scholars generally. However, as has been discussed below, a number of the students not in these specialties, although deeply interested in their particular subjects, were primarily motivated in graduate study by the desire to advance socially, administratively, and financially. While these motives were not absent from the physical and biological scientists, those who were in other fields cultivated research attitudes as vehicles for other ends to a greater extent than did the scientists. These attitudes need not be considered necessarily bad in themselves, but inasmuch as they have here appeared to take precedence over important intellectual attributes, the school may rightly be urged to restore at least a balance between the intellectual and the social ambitions. It is recognized that this is a value judgment which asserts the primacy of the intellectual function of the school; this is consonant with the focus of this research on intellectual superiority rather than superiority in some other sphere.

Work and service experiences. Most of the group have had some employment other than research assistantships or similar emoluments, and even those few who have not worked outside a
university setting have experienced conditions of responsibility equivalent to paid employment in the popular sense of the term.

For about half of the students, doctoral study has meant a return to, rather than a continuation of academic life. Some of these gained a great deal of impetus and motivation for further study from enriching work experiences, several found the practical life too practical and incapable of stimulating them in abstract and theoretical modes of thought, while for five of them (LM, SV, AC, PS, and OP), work was tremendously significant in ways that their education had never been.

AC, for example, working in a large corporation, was assigned to do research with men holding the Ph.D. degree while still having only a master's degree herself. She found that she was far more excited and stimulated by her work than they were, and she felt a freedom and a sense of achievement that she had never experienced as a student. LM gained greatly in self-confidence as a result of meeting the challenges of work successfully, and of being able to compare himself with others and find that he measured up well. In a field laboratory during the summer before his senior year in college, SV for the first time was able to recapture his boyhood enthusiasm for studies of wildlife, and as a direct result began graduate work with a sense of purpose that until then had been seriously lacking. One can hardly avoid the implication that in these cases education had
completely failed to contribute to personal growth according to the responsibility which is assigned to it, and that, at least in the cases of AC and SV it was only by chance that the stimulation was gained at all.

The complaints of DE and AB, turned into positive suggestions, were that in the huge laboratories in which they worked, many more technicians of even a lower grade than a B.S. degree could have profitably been employed and could thus have released more highly trained men, such as DE and AB, for work on more challenging problems.

As was true of work experience, military service had somewhat similar effects. Some assessed it as a complete hiatus in their lives, while for others, because of the wrenching of family ties, it contributed significantly to personal-social maturity. Since its occurrence was predictable with a high degree of probability, it was frequently used as an additional support to the uncertainties and vacillations that many had about vocational decisions, by enabling them to shelve such problems.

For six men, military service contributed in important ways to the growth of interest and ability in their fields of specialization. RS used his foreign service to reflect upon the relativity of social values, EF's vocational leaning toward the business world was greatly modified by his reaction to the hierarchy of the military structure, and KM, who during service
worked in mathematics and met many expert mathematicians, became convinced that this was his primary interest. FH and MN were likewise assigned to duties which gave them considerable scope for the further development of their respective specialties, while BD actually began the study of his present specialty during service.

Personality Factors

In the preceding sections of this chapter psychological interpretations have been attempted of certain aspects of the students' backgrounds, and since this was an important part of the study, total personality appraisals were not made for each person. Indeed it would be difficult to do this without espousing a particular theory of personality structure and function. Therefore, the first sub-section here is an appraisal of the group as to the more accessible aspects of personality gained from the interviews and not contained elsewhere in the report, while the second records and interprets the results of the psychological inventories.

Self-concepts. Relatively few discussed their inner selves directly and at length during the interview, even though questions were asked which were intended to lead to such discussion. This was not unexpected in these relatively brief contacts
which were largely devoted to fact gathering. Thus the conclusions reached were usually the investigator's interpretations of background factors stressed by the subjects, of attitudes mentioned, and of modes of expression. Not infrequently the students voluntarily did some self criticism, assessing the extent to which their perceptions of their experiences were compensatory or rationalizing.

Inasmuch as the biographies contain most of the data for this sub-section, apart from interpretations of nuances of intonation and expression, bias may well be present from the beginning by the mere fact of the investigator's choosing to include certain materials and to exclude others. This could have been an even more limiting factor had not each subject seen his or her biography and approved it, usually with very minor changes.

Seven students (HJ, MO, CE, LM, AB, GJ, and DF) seemed not to have appraised their real scholastic ability until they were in college, and to these may be added DE, whose awakening came late in his high school studies. There were also other students who had self-revelations that were less marked than these. It seemed that in their elementary, secondary, and early college years, these eight students thought of themselves as about average in intellectual ability, or sometimes even below average, and not until some person showed sufficient confidence in them, and they themselves found the most significant focus
for their ability and interest, did they begin to evaluate their abilities more highly. In these cases it could be justly concluded that the school system had failed to give these students adequate opportunities for realistic self-appraisal and for the exploration of their interests.

The thirty-six students as a group, evaluating themselves in the interview, had attitudes towards themselves as being neither superior nor inferior, but viewed themselves as being very like other Ph.D. candidates. When, on occasions, it was suggested to them that a Ph.D. candidate was a superior person, they often replied that they did not feel very superior. The lowest self-evaluation was that offered by DF, the youngest of the group, who thought that he would never be more than a mediocre Ph.D. and hoped that he would get interested in his work. Even of the twenty who did appreciate their ability early in their education, it can not be assumed that the school always played the important role of assisting in self-appraisal.

The mental health of the group seemed to be good. There was direct evidence of mental illness in one person, but this clearly was of an acute and temporary nature. As noted above, a number of the students were voluntarily self-critical, and often attempted to analyze their motivations in terms of rationalizations, compensations, or some such psychic defense mechanism. MO and RS were the most verbose, analytical, and self-critical
in the group, and seemed to represent the best examples of people solving personal concerns through an intellectual activity. Their specialties, philosophy and sociology respectively, happened to lend themselves readily to such processes, but if a series of interviews of greater depth were given in other areas, similar examples might appear of personal concerns being resolved both through subject matter and through psychic defense processes. The best judgment of the investigator was that these thirty-six people were personally well adjusted and had realistic self-concepts.

However, the biographies of six people indicated a degree of dependence on others for approval and help, and of satisfaction in subservience that, it is suggested, was less than desirable in people who would soon be holding a doctoral degree. Some, like FG, showed that they were aware of this, but it is not known whether any viewed it as a defect in their personal equipment. The most significant examples of dependence on others were considered to be CD, JK, MN, CE, FG, and KM, the referents for these judgments being summarized in the following two paragraphs.

CD accepted the statements of others as to the difficulty of certain subjects in high school, and was very strongly influenced by a friend in his undergraduate work, in his first
employment, and in his graduate studies. JK, comparing herself with her brother, specifically mentioned her "spineless attitude" in acceding to the wishes of others, and spoke of herself as usually trying to do what people told her. To an extent not at all apparent from the record, MN was shy and reticent in the interview, and during the second meeting was quite anxious that his wife should also critically read his biography. He made especial mention of feeling comfortable with only one teacher, remarked on his wife's role as a consultant and morale booster, and spoke of the importance of having will-power in order to accomplish even things which he despised.

CE, who internalized a rather grim outlook on life from his father, remarked on his day-dreaming in elementary school, his almost masochistic attitude to the discipline of a parochial military high school, and his considerable indecision in his early college years, culminating in a desire to do graduate study largely "to show them." FG's early attitudes to school were of extreme conscientiousness and personal responsibility, she chose teaching because there seemed to be "not much else to do," and, as noted above, she reported an extremely passive attitude to her learning. Yet, rather surprisingly, she thought that she had not been greatly influenced by people in her life. KM told how, during summer vacations, his mother had coached and stimulated
him to an even greater extent than she had his siblings, who had rebelled at her pushing. He told, too, how he had sought personal recognition through mathematics and checkers, and how he had felt greatly under the influence of his mother right up until his entry into military service.

Questionnaire results. As reported in Chapter II, the Gordon Personal Profile and the Gordon Personal Inventory were administered to the group during the second interview, and thirty-four usable records were obtained. The detailed percentile ratings for each person on each trait and on total scores have been presented in Appendix A. There were interesting individual rating patterns in relation to the norms, to the group here studied, and to the biographies and the judgments made from them, but in this section attention has been concentrated on grouped data.

Since the norms had limited applicability for this sample, all but extreme scores had to be viewed very cautiously, and it was therefore decided to confine discussion chiefly to cases falling within the upper and the lower seven per cent of the percentile norms. These two limits, used and approved by the author of the inventories, mark off the uppermost and the lowermost of five levels of equal standard score magnitude. Those reporting themselves as being high or low to this extent on the defined
traits were considered worthy of mention; Table 8 shows the extreme scores.

**TABLE 8**

**HIGHEST AND LOWEST QUESTIONNAIRE RATINGS**

<table>
<thead>
<tr>
<th>Profile</th>
<th>Percentile Group</th>
<th>Ascendancy</th>
<th>Responsibility</th>
<th>Emotional Stability</th>
<th>Sociability</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level I:</td>
<td>FH</td>
<td>DE, JK, RT, MN, ST, JL, AC, CE, FG.</td>
<td>RS, MN, SV.</td>
<td>None</td>
<td>ST, AC, EG, FG, FH, GH.</td>
</tr>
<tr>
<td></td>
<td>Upper 7 percent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Level V:</td>
<td>DE, CD, IK, DF, CD, EF.</td>
<td>CD, EF.</td>
<td>CD, EF.</td>
<td>DE, CD, EF, LM, IK.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lowest 7 percent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Inventory | Percentile Group | Cautiousness | Original Thinking | Personal Relations | Vigor | Total |
|-----------|------------------|--------------|------------------|--------------------|-------|
|           | Upper 7 percent  |            |                |                     |       |
|           | Level V:         | None        | CD.             | CD, DE.             | JK.   | CD. |
|           | Lowest 7 percent |            |                |                     |       |

The meanings of each of the four traits of the Profile, for which the extreme ratings have been shown in Table 8 are as follows:

**A.—Ascendancy**

Those individuals who adopt an active role in group situations, who are self-assured and assertive in relationships with others, and who tend to make independent
decisions, make high scores on this scale. Those who play a passive role in the group, who would rather observe than participate, who generally lack self-confidence, who prefer to have others take the lead, and who tend to be overly dependent on others for advice, normally make low scores on this scale.

R.--Responsibility

Those individuals who take responsibilities seriously, who are able to stick to any job and get it done, who are persevering and determined, score high on this scale. Individuals who are unable to stick to tasks that do not interest them, and in the extreme, who tend to be flighty or irresponsible, usually make low scores on this scale.

E.--Emotional Stability

High scores on this scale characterize individuals who are well balanced, emotionally stable, and relatively free from anxiety and nervous tension. Low scores are associated with excessive anxiety, tension, hypersensitivity, and nervousness. Large negative scores may indicate the traditional "neurotic."

S.--Sociability

High S scores are made by individuals who like to be with and work with people, who are gregarious and sociable. Low scores reflect a lack of gregariousness, restriction in social contacts, and in the extreme, an avoidance of social relationships.

According to the author, the meaning of the Total score is less clear than those of the trait scores. Very high Total scores, those above the eighty-eighth percentile, probably represent "both the normal tendency of individuals to overrate themselves on self-description tests of personality and their actual self-evaluation." However, the principal value of the Total scale is in the interpretation of very low scores:
Such scores result from the individual's marking a highly disproportionate number of items in a manner unfavorable to himself. This type of self-description is associated with strong functional feelings of inferiority, and has been found to be indicative of poor personality adjustment...An extremely high incidence was found among such individuals of persons clearly problem cases in need of counseling therapy.

Two persons, CD and EF, scored below the first percentile on Total scores, and, except for EF's percentile ranking of twenty-eight on Ascendancy, their trait scores were also extremely low, none being above the ninth percentile. Although this research was not a validation of diagnostic procedures, these indications are here briefly evaluated.

There were some behavioral indications of maladjustment in both cases. Under the heading of "Self concepts" above, CD was described as showing rather dependent tendencies, looking to others for direction and reassurance, as suggested by his maintaining a long contact with a much admired colleague. EF, classified as having a life pattern of a "Strong internal drive," possibly had more definite indications of personal concerns through his resistance to telling his parents what presents he would like, through his extreme shyness despite his "needling" the teachers, and through his wariness of the "odd" people in advanced mathematics.

Taking the scores on the Profile at face value then, CD and EF seemed to need some personal help, and, since CD also
rated very low on the Inventory, this prognosis may be judged to have some additional confirmation in his case. However, during the interview neither of these students was considered to have indicated any greater need for counseling or therapy than did, say, DE and LM, who scored at the sixty-third and the ninety-ninth percentiles, respectively. These discrepancies can best be reconciled by pointing out first, that, within the scope and the time available, the interview could not have been expected to bring to light any but the grossest indications of psychopathology, and, secondly, that the Profile was not designed to serve any other diagnostic purpose than a quick screening.

The most precise evaluation of the Total scores on the Profile is thus that, compared with the norm group, CD and EF were willing to rate themselves in a very self-depreciatory manner, that DE and LM were prepared to do this only to a lesser degree, and that most of the group fell within the average or superior ranges, having adequate self-concepts.

Continuing the study of the Profile from the negative aspects, it is noteworthy that, apart from CD and EF, three others (DE, LM, and IX) fell into the lowest of the five percentile groupings on Ascendancy, which also included DF, and on Sociability. These findings were taken to indicate, at least among the latter four students, a tendency to withdraw from social contacts, and in the context of norms of social behavior,
it may be concluded that these are indications of maladjustment. However, a scanning of all the ratings indicates that, on this dimension and for this group of people, it may be that the norms are awry, and not these four people.

A total of twelve students, including CD and EF, out of the thirty-four for whom ratings were made fell into the low or the very low levels on both Ascendancy and Sociability and seven others were given low or very low ratings on one or the other of these traits. Only one person was in the highest level on Ascendancy and none were in the top group on Sociability. Admittedly the sample was small and the norms not quite appropriate, but the results are nevertheless striking. They suggest that further studies yielding a portrait of the "typical" doctoral candidate might well include a de-emphasis of undergraduate kinds of socialized behavior as a criterion of adjustment, a finding somewhat consistent with Roe's research supporting the popular picture of the scientist as a recluse intensely devoted to his work.

The results of the ratings on Responsibility showed, as might be expected, that the group stood fairly high on this trait, nine people gaining the highest of the five levels shown by the norms. In fact, only CD and EF fell below the average limits of the norms.

Similar findings were shown for Emotional Stability, only five students other than CD and EF falling below the average
range. Three persons were in the highest group, and another
five were just one percentile rank below it.

According to Gordon, the traits of the Inventory, the
extreme ratings for which have also been shown in Table 8, have
the following meanings:

C. -- Cautiousness

Individuals who are highly cautious, who consider
matters very carefully before making decisions, and do
not like to take chances or run risks, score high on
this scale. Those who are impulsive, who act on the
spur of the moment, make hurried or snap decisions, enjoy
taking chances and seek excitement, score low on this
scale.

O. -- Original Thinking

Those who tend to be original in their thinking, like
to work with ideas, enjoy difficult problems, and are re-
flexive, score high on this scale. Individuals who do
not care for intellectual or creative activity, and who
lack both an inquiring mind and a general inclination for
original thinking, score very low.

P. -- Personal Relations

High scores are made by those individuals who have
great faith and trust in people, and are tolerant,
patient, and understanding. Low scores reflect a lack of
trust or confidence in people, a tendency to be critical
of others and to become annoyed or irritated by what they
do.

V. -- Vigor

High scores on this scale characterize individuals
who are vigorous and energetic, who like to work and move
rapidly, and who are able to accomplish more than the
average person. Low scores are associated with low vita-
licity or energy level, a preference for setting a slow
pace, and a tendency to tire easily, to fall below
average in terms of sheer output.
High Total scores on the Inventory as on the Profile, are said to mean that people often evaluate themselves highly on self-description tests, but the meaning of low Total scores on the Inventory have not yet been empirically investigated.

Again, CD's case is notable for the generally very low ratings on traits and Total score.

It is submitted that the traits of Personal Relations and Vigor showed few definite trends for the group. In view of the findings on the Profile as to withdrawal from social contacts, there might have been expected a group tendency toward low scores on Personal Relations; this was but slightly indicated. Low scores on Vigor were similarly neither frequent enough nor extreme enough to be considered significant.

The group was found to be rated rather highly on Cautiousness: six people were rated at the highest level and none were in the lowest group. In a group of scholars of this caliber, this is not unexpected.

The most clearcut and probably the most predictable result from the group's performance on both questionnaires was that these people were highly original thinkers. Twelve fell into the highest grouping, three more were very close to that rating, and only two were classified as being less than average in this respect.
In summary, granting the limitations of the questionnaires, certain conclusions appear to be justified:

1. The most outstanding characteristic of the group was a marked preference for working with ideas, doing original thinking, and enjoying reflection and difficult problems.

2. To only a slightly lesser degree, these students showed that they took their responsibilities seriously, were persistent in completing assigned tasks, and were persevering and determined.

3. Within the meaning of the trait description the group tended to be somewhat cautious in outlook.

4. As a result of indications that about one-third of the group lacked "ascendancy" and "sociability," it was concluded that there was a distinct tendency toward social withdrawal in these students.

5. Apart from two cases indicative of deep personal problems, the group appeared to be well-balanced emotionally.

It is possible that the administration of the questionnaires in a different total setting, say two years after this study, might suggest that these findings were to a large extent a function rather of the fact of participating in a doctoral program than of the "real" characteristics of these people. Although the findings were rather limited, insofar as they depicted candidates' responses to and perceptions of the educational
situation (although it cannot be certain that they responded in
those terms), they revealed something of the students' personali-
ties. A more projective technique, although it would take a
great deal more time, skill, and rapport-building, could be ex-
pected to yield valuable additional data.

Encouragements and Motivations

In the belief that, granted a minimum level of general
intellectual ability, motivation to achieve at a superior level
is an essential element in high achievement, it was endeavored
to find out how and from what sources the students gained these
desires. Although in some biographies there were early indica-
tions of superior ability, these were considered to be secondary
in importance to finding out how the students were helped to
achieve at high levels and how they became interested in con-
tinuing to do so. Some evidence and discussion of this point
has already been presented; this section collates and elaborates
these findings.

The most striking general finding in this respect was
that all but a very few of these students reported that one or
more people had been of outstanding significance in their lives
in promoting learning and self-appraisal. As would be expected,
the home and the school were the main settings in which these
contacts occurred, with the former the most frequent. The school
less often than the home initiated such assistance, but its contributions in providing a focus for nascent interests and in sustaining those that were well developed were not less important.

At least twenty people gave clear evidence of the initiation and sustenance of intellectual values within the family circle, either by the direct inculcation of specific interests or by the fostering of general attitudes. The methods by which this was done varied a great deal, from the frankly and deliberately didactic to the subtly and perhaps unintentionally osmotic. However, commonalities were found in the fostering of a spirit of inquiry and curiosity, the instilling of an early love of books and reading, and the provision of facilities and opportunities for engaging in such activities and also in experimentation. The psychological climate in the homes usually seemed to have been wholesome, and none of these students felt that they were coerced into learning. On the contrary, for them learning was just a good thing to do, pleasant and easy, and in most cases these attitudes were gained early in life, usually during their elementary school years. Of the remaining sixteen students, two (MO and GJ) reported definite limitations in the home environments, while the others, although their homes had no especially stimulating effects, usually noted merely that there were no discouraging circumstances. Among this latter group were classified some, such as WN, IK, and LN, whose parents urged the importance
of becoming well educated, even if they themselves did not actually facilitate the process in their children.

Almost all students reported significantly helpful relationships with teachers at some point in their schooling, and these contacts were usually highly individualized and personal. The teacher in some cases generated a subject interest chiefly as a result of his personal qualities, while in other cases he apparently detected the student's ready response to his teaching and followed this up by encouraging close personal contacts. In both instances the results were essentially the same—students gained greatly in self-confidence and in interest and ability in a special field. It seemed especially regrettable that for some students a major experience such as this did not come until they were either well along in their college programs or at work. This applied particularly to students in the sciences, and it seemed that the essential ingredient that had been lacking in their education was the opportunity to do original research work under conditions of great freedom. Students of specialties other than the sciences more often spoke of their teachers' personal qualities and of their ability to inspire students through being exceptionally well versed in their subjects.

The findings serve to emphasize the importance of the home environment as a transmitter of intellectual values, but they also show how a good teacher can compensate for limitations
from home backgrounds, so that both home and school are significant in making an impress on the individual. The number and extent of the reinforcements of early interests of some of the students would lead one to conclude that a favorable environment alone accounts for intense interest and superior ability, were there not also many evidences of opportunities for growth and of feelings of personal freedom. Perhaps in the present cultural milieu, which favors what Terman called the environment hypothesis, too much faith is placed in the power of teaching per se, and not enough on the provision of more flexible guidelines which would assist the individual as an agent in his learning and development and play down his role as a reagent to stimuli. This would not mean that less guidance would be needed than is now given; on the contrary, there would be more guidance, and of a different kind.

The findings of this research seem to suggest that teachers and parents should both provide opportunities for the development of interests, capitalize upon and foster incipient interests, and help the young person to understand his abilities and relate his interests to adult occupations. Although the great majority of this group seemed to be happy, successful, and well balanced emotionally, there were indications in the lives of some of a need for personal help, which, to be sure, was eventually provided, but which often appeared to have occurred by chance.
As shown in Table 9, two major reasons accounted for the present motivations of all but five of the group. Candidates usually mentioned more than one reason, and often gave rather subtle shadings to their statements, and thus the classification was made according to what seemed to be the main emphasis, some individual judgments being necessarily arbitrary.

TABLE 9

BIOGRAPHIES CLASSIFIED ACCORDING TO PRIMARY MOTIVATIONS FOR DOING DOCTORAL STUDIES

<table>
<thead>
<tr>
<th>Category</th>
<th>Cases</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational Requirement</td>
<td>GJ, HI, PR, RT, ST, LN, EG, OD, JK, FH, GH, OR, DF.</td>
<td>13</td>
</tr>
<tr>
<td>Self-satisfactions</td>
<td>CE, FG, KL.</td>
<td>3</td>
</tr>
<tr>
<td>Service to Others</td>
<td>NP, PS.</td>
<td>2</td>
</tr>
</tbody>
</table>

However, despite possible weaknesses in these judgments, the two groups seemed to be fairly well differentiated on the basis of the extent of personal commitments to subject specialties. Those desiring research freedoms as a result of obtaining the doctoral degree were more devoted to their subjects and more
personally, voluntarily, and in some cases eagerly, committed to full and free inquiry. This does not mean that those who were not so categorized were not really interested in their work, but merely points up the emphasis given to expressed motivations at the time of the study.

It is interesting and probably quite significant to note that the majority of those motivated by reasons relating to personal research (thirteen out of eighteen) were physical or biological scientists. Although one can hardly generalize from this study to real and significant differences between scientists and non-scientists, there is certainly a suggestion here that the scientists have a greater intrinsic interest in their work, and that this is the result of their having had highly satisfying research experiences. Research is not the prerogative of the physical and biological sciences, but, on the basis of these results, students in those fields seemed to have had more satisfying learning experiences in research than did students in other areas. Indeed, in several cases the first experience of personal research appeared to provide enough motivation almost to account for subsequent educational careers.

The five "non-sciences" represented in this category, fine arts, sociology, economics, philosophy, and mathematics, varied among themselves and were sufficiently different from sciences to suggest that the development of personal research
attitudes need not be limited to the sciences, but that students in other areas may also be helped to become more personally committed to their studies. There was substantial evidence among eighteen cases that the key to this may be in providing conditions which encourage and assist students in finding out things for themselves. In emphasizing the importance of research attitudes and skills, it is not suggested that social ambition is an unworthy motivation for advanced study, but rather that it is less harmonious with the criterion of superiority that was used in this inquiry. The superior achiever need not be devoted solely to scientific advancement, nor to giving service to others, but if he tends to view his higher learning mainly in terms of status and occupational requirements, it might justifiably be held that his ultimate contribution to society will tend to be meager. Probably the best that could be hoped for in such a case would be that through functional autonomy, as Allport uses the term, intrinsic interest might eventually develop.

Summary

This section consists of an account of the major findings reported in this chapter.

1. The ages of the people studied ranged from twenty-five to forty-six years, the mean age being over thirty and the median

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between twenty-nine and thirty. These central tendencies were approximately the same as those found in other studies.

2. Over three-quarters of the group was married, the median age of marriage, twenty-three years, being approximately the same as the present national median. This is about one year younger than that found for some other superior people, and two or more years younger than that found for some more highly selected groups of superior people.

3. Among the most striking of the findings, and one that has been strongly corroborated in other researches, was that, to a statistically significant extent, these superior students tended to be either only children or the first born in their families.

4. For about one-half of the group either one or both parents had attended college, but in almost one-third of the cases neither parent had completed a high school education.

5. Teaching, farming, and selling were the most common occupations of the fathers of these students, while the professional-managerial level was the largest occupational group represented.

6. About half of the students reported that their family environments had been highly favorable to the development of interests in intellectual pursuits or to the cultivation of childhood activities which, when later developed, led to intellectual specialties. There was usually specific evidence of the existence of parental values and material arrangements which
developed either a strong love for learning or a very favorable disposition towards it.

7. About one-quarter of the group, not including those with the very favorable home environments, were strongly influenced by one or more teachers with whom they formed close personal relationships and without whose encouragement and assistance they very probably would not have undertaken further study. Teachers played a formative role with many others in the group, usually facilitating their progress toward immediate rather than distant goals.

8. Those students who seemed to be motivated chiefly by deep intrinsic interest in their specialties had usually had significant experience doing independent research. Such experiences often occurred late in their formal education, but there were also instances of its first occurrence in non-educational settings. About half of the students were so motivated, and most of these were scientists.

9. A feeling of freedom in the early cultivation of intellectual interests was often found to have been important, and this was usually characterized, not by an absence of assistance, but by the use of constructive aids to learning, and by an absence of coercion.

10. There was evidence that the educational experiences of the group had often failed to provide opportunities for and
assistance in three major tasks: self appraisal, personal involvement in learning, and career planning.

11. The students seemed to be well adjusted, but in comparison with some undergraduate groups, they appeared to be somewhat more socially withdrawn.

The following chapter contains a review of the research and presents the conclusions and implications.
CHAPTER V

CONCLUSIONS AND IMPLICATIONS

This final chapter has been divided into three main sections. In preparation for the concluding discussion, the first section consists of a brief recapitulation of the research. Since the major findings were summarized at the end of the preceding chapter they have not been repeated here. The second section of this chapter is the heart of the report, containing a discussion of the conclusions reached and the implications seen, in terms of both broad educational policy and useful further research. In the third and concluding section there is a summary of the chapter.

A Review of the Study

This research developed from an interest in examining the influence of favorable circumstances on the development of superior achievement, and was designed to obtain from a group of superior people accounts of those factors which had contributed to their particular academic interests and to their motivation to do advanced study. A review of the literature showed that much research had been done on specific aspects of this problem, but that few broad surveys had been attempted which appraised the
lives of intellectually superior people in developmental fashion. It was therefore planned to study a wide variety of factors in the backgrounds of a group of persons who had demonstrated their superiority by achieving at a high intellectual level.

On the assumption that admission to candidacy for the degree Doctor of Philosophy was a satisfactory criterion of such achievement, individual interviews were conducted with thirty-six students who had met this standard and who represented a variety of specializations. At the first meeting, which lasted for about one and one half hours, an interview outline was used which would give a survey of personal histories with special emphasis on those factors which had influenced intellectual interests and abilities. Informality was encouraged and each student was able to tell about his background almost as he wished. Specifically, such points were included as pre-school life, school, college, work, and service experiences, and special abilities and interests, particular attention being given to the circumstances of critical choices and to other people involved in these choices. At a second meeting each student took two psychological questionnaires, the Gordon Personal Profile and the Gordon Personal Inventory. Certain vital statistics were requested at this time also, and finally each student read critically his biography which had been written by the investigator after the first interview.
Using the biographies, impressions gained during the interviews, and data from the questionnaires, an analysis was made of the backgrounds of the group, with an emphasis on those circumstances which had favorably influenced the students' intellectual interests and motivations.

The Problem Re-considered

Answers have here been attempted to the three broad questions of the study:

1. What kinds of psycho-educational backgrounds do these doctoral candidates have?

2. How have they been motivated to achieve at a high level, and what are their present motivations?

3. What implications may be derived from a study of these people for the better education and guidance of other potentially superior achievers?

The first two of these questions have been answered below by presenting factual summaries, while the third has been dealt with by a broad discussion of proposals for change in education.

Backgrounds. In general, the backgrounds of these people showed many evidences of home environments in which intellectual values were highly prized and school achievement encouraged, and in which parents often deliberately facilitated their children's learning by capitalizing on their early interests in pleasant
ways. Of such parents, some had attended college, but some had not been graduated from high school. Procedures which seemed to be most productive of early interest and enjoyment were the provision of much reading material, the teaching of the use of reference books, having children associate with older people with similar interests, and the encouragement of curiosity and experimentation. It is likely that there was also a necessary condition which was often only hinted at—a wholesome psychological climate in the home.

The students usually felt elementary school to have been easy and pleasant; by contrast, high school was sometimes reported to have been boring and difficult. Those who had had pleasant high school experiences had usually had either a close relationship with one or more teachers or a sense of a personal and purposeful commitment to learning in special subject areas. Most of the candidates had early learned that they were academically superior, but there were a number of outstanding examples of students being unaware of the abilities until relatively late in their educational careers. In the school and college experiences of many there was also a serious lack of career planning, and this was often reinforced by the virtual certainty of two years of military service. In spite of allowing two years for service where necessary, it was still remarkable that not one of the candidates was due to complete the doctoral degree in the minimum
nineteen years of formal education. Even more remarkable was the fact that this was true although a number of the candidates had made such fast progress that they were attending college before or very soon after their seventeenth birthdays--two had actually graduated from college at nineteen. In such cases the time saved had almost invariably been the result of double promotions in elementary school; very rarely had students progressed at a faster rate than normal in high school or college. Students accelerated by double promotions sometimes believed that they had "lost something" in the process, suggesting contrary to evidence cited in the literature, that this was the only way to progress faster in learning.

In addition to family environments favorably affecting the majority of the students, the influence of high school and college teachers was extremely important; for some students such influence successfully compensated for otherwise barren intellectual stimulation in the home. Almost all of the students mentioned one or more teachers who had befriended them, stimulated them, and helped them to find a focus for their interests, in many cases only after years of exploration. Too much was left to chance, it seemed, and seldom did the students have, in high school or college, career plans which were realistic and acceptable to them. Only as their teachers helped them to become self-involved, either in learning new techniques or concepts, or in
relating themselves personally with their teachers, did the stu-
dents become highly motivated. Usually, as a result of such in-
volvement, and with further assistance, interests and abilities
began to fuse into a career plan, work became more meaningful,
new energies were released, and considerable progress resulted.

**Motivations.** Under this heading have been grouped find-
ings which could have been separately labeled motivations, incen-
tives, and assistance, but which for the sake of convenience have
been grouped together.

Most students had had a favorable early orientation toward
learning in general. Some had had such helpful encouragement and
assistance from their families in cultivating childhood interests
that they later specialized in very similar adult disciplines,
while only two had family backgrounds that did not foster intel-
lectual development.

All but a very small proportion of the students said that
a close personal relationship with one or more teachers had
greatly motivated learning, to the extent that their achievements
had to be explained largely in terms of the stimulation and as-
sistance given by such teachers. Especially in the case of
scientists, it was frequently found that the inspiring teacher
of techniques, concepts, and other components of the intellectual
task, was also a very friendly, amiable person. Although
students were imprecise about critical factors of such associations, the psychodynamic mechanism of identification seemed to characterize many of the relationships. In his value system and personal qualities, as well as in his scholarship, the inspiring teacher, like most parents with their children, seemed to epitomize for the learner the kind of person the learner himself wanted to become.

The learning of specific skills or ideas was mentioned less often than interpersonal relationships as crucial in motivation, but when it was mentioned it was usually a scientist who did so. Discovering the joys of doing independent creative research was far more common among the biological and the physical scientists than among students of any other broad division of scholarship. It was earlier suggested that this may possibly have been due to the fact that students of other areas, the liberal and fine arts for example, might have adopted the attitude of subjectively appreciating their disciplines, so that, although functioning creatively, they did not conceive of themselves as researchers in the broad sense of the term. But it may also have been the result of less emphasis in their educational careers on independent research and more on the accretion of knowledge. Difficulty with and dislike of the dissertation task might be used as an index of the extent to which research values had been adequately promoted in an individual's education.
When asked why they were doing doctoral work, as distinct from queries as to the source of their intellectual interests, the students tended to divide into two equal groups according to main emphases. A number of students said that they were taking the degree chiefly for reasons of prestige, or higher status, or because it was a requirement for promotion, thus indicating that their major interest was not in advancing themselves as scholars, although this was sometimes also mentioned. Others, mostly scientists, said that they were primarily interested in doing research that would satisfy them and leave them free to follow their own interests. This is indicative of intrinsic interest, which is generally considered to be an excellent energizing influence. However, there were many signs among the scientists that the degree was also important to them as an assurance that they would be free to cultivate their own research interests and not be bound by demands of "institutional" research. The degree was thus an entree for them as it was for the others, the chief difference being that the scientists' purposes were more closely related to the aim of developing themselves as instruments of inquiry. Several scientists said that, if they could have obtained with the master's degree positions in which they could have undertaken personally satisfying research, they would not have advanced to the doctoral level.
Implications. These findings have important implications. New approaches to educational problems are difficult to implement, involving as they do values that have deep social roots, and procedures and institutional forms that have become hallowed by tradition. Yet the need for the development of talent is great, and proposals for improvement should be correspondingly broad in scope and at the same time constructive and practicable so as to do no unnecessary violence to the cultural pattern.

The first premise of the changes here suggested is that a major goal of the school must be to promote intellectual development and to improve the means of facilitating the realization of this goal. This is not to ignore the social context within which individuals must live and the school must function, but to urge that the development of rational beings is the school's prime task.

Within this framework an attempt was made to paint in bold strokes a picture of the writer's personal ideas on the research problem. The sources of these thoughts are sometimes clearly identifiable, and at other times rather indistinct. Together, the ideas are a distillation of various experiences, such as data presented elsewhere in this report, the synthesis of impressions gained from interviewing the students, and many ideas culled from the literature and from graduate study. The presentation is chiefly in terms of broad educational policies
which, put into practice with courage, sensitivity, and imagination, should help to bring about more situations favorable to and formative of superior achievement, and which should do this in such a way that individuals thus talented may make contributions to social progress as early in life as possible.

The first suggestion is that personal interactions between teachers and students be capitalized upon more fully, and that the mechanism of identification be exploited. If it can be agreed that a good principle of learning is the acceptance of a large idea followed by a differentiating and a relating of subsidiary parts to the whole, then the value of the identification process becomes clearer. It is undoubtedly at the base of the transmission of values from affectionate parents to child, and, used judiciously, it could be very advantageous to school learning. The best early learning in schools probably occurs under such conditions, and one reason for motivational difficulties in high schools is that students at that level have conflicts between wanting to identify with adult authority, personified by the teachers, and wanting to identify with their peers. Both tendencies can be used to the advantage of academic interest and progress, and there was some evidence in this research of peer relationships having such an effect.

While student interaction should be facilitated, the teacher's role is of prime importance, in that, by exhibiting
desirable personal qualities and intense, and of course genuine, enthusiasm for learning, he may lead students to accept similar intellectual values. An important function of education is that of changing value systems in desirable directions, and the teacher as an interpreter of values, should actively engage himself in that task. The techniques of teaching remain important, but relatively more is known about them than about ways in which initial and total shifts in values occur, and thus further attention should be given to these latter processes.

The teacher as a person, in an individual psychological sense, naturally would be the most important factor in a program of using the identification process more systematically. Without a mature professional approach there could be danger of the teacher's personal needs taking priority over the educational development of the students. However, relatively little is known about the psychological makeup of superior teachers. They may be ordinary well adjusted people with certain strong values, or it may be that they have super-normal qualities, for the study of which present methods and constructs are inadequate observational tools.

Wholesale attempts to have children identify strongly with others, especially with adults, are open to the criticism that these are authoritarian practices which impede progress toward the educational goals of autonomy and critical independent
thought. But these two points of view are not mutually exclu-
sive, and, stated thus, represent an artificial dichotomy of the
educative process. Granted that it is desirable and essential
to foster self-reliance, it must then be said that so much has
to be learned in a short time that children cannot hope to encom-
pass it all through reflection upon personal sensory experiences.

The second proposal is that the cultivation of research
should supplant much of the present emphasis on the accretion
of knowledge which is characteristic of education at all levels,
and that the implied equation of learning with the accumulation
of courses be drastically reappraised. In effect, this is a
plea for greater use in education of personal inquiry, yielding
discovered learnings as distinct from methods designed to rein-
force established knowledge. Compared with other scholars in
this study, scientists gave considerable weight to the contribu-
tion of their first major research experience in making their
own learning meaningful and exciting, and they seemed to be much
more devoted than the others to the aim of sustaining and enhanc-
ing their research activity. While they had accumulated much
knowledge, this had its chief meaning in relation to their re-
search work. Whether they planned to become teachers or to
remain researchers, they perceived their major intellectual role
as developing themselves as researchers.
It was, therefore, disturbing to find that some of these people had not been introduced to significant research experience until late in their undergraduate years, or even in post-graduate employment, and then often through apparently chance circumstances. It is submitted that systematic provision should have been made for such opportunities in high school as well as in undergraduate programs, and that relatively less emphasis should have been given to regular course work. Indeed, as is usually done in sound elementary school practice, quite young children can be introduced to research experiences appropriate to their maturity. By the adoption of this general principle, especially for promising students, specialization of interest could begin earlier and learning would have much more zest and meaning.

Unfortunately, evidence from disciplines other than the physical and biological sciences as to the role of research in learning was less clear, except that non-scientists tended not to mention it as significant in their learning. It is not unlikely, however, that the only research experiences for many were the thesis and dissertation requirements for advanced degrees. Although research in the broad sense of self-involvement in intellectual growth undoubtedly has different techniques and emphases according to differences among disciplines as to content and method, the principle of a deep commitment to inquiry and creative imagination surely remains the same.
This point is well made in Whitehead's definition of education as "the acquisition of the art of the utilisation of knowledge," and in his deploring "the consequences of a plethora of half-digested theoretical knowledge."¹ Both statements are indictments of the mere accretion of facts and concepts without real meaning to the learner—meaning which comes only as the result of personally organizing knowledge for use. Such use need not be immediate and concrete; it could be "pure research," or it could be subjective and appreciative as in music, art, or literature, but it should always be deeply satisfying to the user. Present educational practice at many levels still sins greatly in its emphasis on knowledge at the expense of research, and a greater weight given to the latter would materially assist in the development of talent.

The next proposed change is that more and continuing assistance be given that would help students early to attain better self-knowledge as to their abilities, interests, and personality, and to plan their careers. Desultory career planning and long delays in achieving self-insights were too often evident in the group sampled. Because planned programs of guidance were lacking, or were ineffective, chance circumstances often became critical choice points.

Obviously, the teacher has a major responsibility in giving such assistance to students, and his convictions as to the values of close interpersonal relationships and of providing research opportunities would do much to promote in students self-knowledge, early and strong commitments to special interests, and the systematic planning of careers. Such outcomes are central responsibilities of education, and not additional functions. However, because of the special techniques involved in assisting students with full self-development, and because of the need to organize and systematize the process, professional people have been trained to implement the modern guidance movement. Because of the relatively recent development of this movement on an organized basis, many of the students observed in this research had not had the benefits of such assistance.

A well-planned guidance program, functionally shared according to the relative competencies and major responsibilities of counselors and teachers and broadly aimed at giving flexible and constructive help to all students, would do much to help able young people to realize their potentialities as early as possible and to plan ahead realistically. Many such programs are now in effect in high schools and colleges. They should be expanded further, and their major objectives should be constantly kept in mind, lest they become immersed in techniques, administrative detail, and the perpetuation of institutional rigidities.
A fourth proposal concerns the need to place more emphasis on early specialization and early career planning as criteria of the well adjusted personality in youth. It is urged that the schools take the lead in promoting these values and in giving substance to their realization, even, if necessary, at the expense of the factor of sociability. True, increasing acceptance of school policies of social promotions, strong belief in the value of general education, and the delaying through education of the final graduation to adulthood, are major hindrances to the development of early specialization, and objections are usually made in those terms.

Social values are important, but not overwhelmingly so, and, against various evidence from this research and from the literature that superior scholars tend not to be highly sociable, arguments in terms of social values lose their point, unless it be maintained that sociability per se is more important than contributing to society through research and scholarship. The literature has shown, moreover, that, even if they are not gregarious, talented people possess very desirable and necessary social skills and that they are good citizens.

Undoubtedly the greatest single block to earlier specialization and earlier beginnings of careers is the educational lockstep—the interpretation of academic progress in terms of time served and credits gained, and the institutionalization of this
in both subtle and direct forms at all levels of education. One can more safely estimate a student's grade level by his chronological age than by any of his academic accomplishments. This represents a tremendous social inertia to radical change. In various ways early specialization and early entry into adult careers and advanced studies are now very strongly discouraged at a time when intense efforts should be made to promote such movement. Although it is probable that only a great national crisis will change the present situation for all students, at least the potentially superior should be helped to specialize earlier and to enter a career as early as possible.

Closely related to this suggestion is a fifth proposal—that of urging the wider acceptance and introduction of programs of educational acceleration for the superior student. In view of evidence from this study and from the literature as to ages of doctoral students, the need for such programs is urgent. The literature also showed that there are many beneficial values in acceleration, especially in undergraduate education; there are some difficulties, but none that are insuperable with effective and flexible guidance programs and a willingness to adapt education to individual needs. The increasing sizes of schools and colleges do not necessarily constitute a handicap; on the contrary, with a greater number and variety of educational resources
available such a tendency can be turned to advantage. Nor is the maladjustment of students an inevitable concomitant, although it is often cited as such. The principle has been tried and found good, the resources are at hand, and the need is great, but again the obstacles are formidable, being substantially the same as those that impede earlier specialization.

To implement the changes which seem called for in light of the fourth and the fifth proposals would require social engineering and the changing of values, and these processes are always painful at first. But if, as a result, more people, and especially more creative people, were thereby released into adult life earlier, there might ensue greater social progress than ever before. Acceleration programs are not drastic or reactionary; above all else, they are not undemocratic in adhering to principles which state that demonstrated competence and maturity should be the measures of the rate of school progress, and that all students, but especially the superior, should be helped to complete their education as quickly as possible.

There is a sixth and final proposal. Only limited attention has been given so far to ways of developing the abilities of superior people that would be feasible in the elementary school. It could be held that the problems are less pressing at that level, except that, inasmuch as there is also strong emphasis on social promotions and general education, the same
charges could be made as were made of the high school and the college. The writer believes, however, that the modern elementary school is already dealing fairly adequately with the cultivation of interests and of a liking for learning, and evidence from the research supported this belief. Probably the most constructive measure would be for teachers to encourage and assist parents in giving to their children such experiences as would be educationally helpful, namely, introducing them to reference materials early, fostering a love of reading, encouraging questioning and experimentation, and, of prime significance, helping them to enjoy doing such things.

In summary, there have been presented six proposals for improving education in view of the demand for the development of superior talent. These were as follows:

1. Capitalizing on close teacher-student relationships and exploiting the mechanism of identification would be advantageous to interest, motivation, and academic progress.

2. Greater emphasis should be given to research at all levels of education, and in all disciplines, so that knowledge would become more meaningful and learning more personal and creative.

3. Self-knowledge, particularly as to abilities and interests, and also as related to realistic career planning, should be especially promoted both by professional guidance people and by teachers.
4. Early and strong specialization and early entry into adult careers, even at the expense of certain social values, should be more widely accepted as valid criteria of adjustment.

5. Implementation of the preceding proposal would best be carried out in an overall program of acceleration for superior students, based on a principle applicable to students of all levels of ability, namely, that education should be adapted to individual needs.

6. The values and interests gained during the child's acculturation in the home, could, if fostered by the parents according to certain simple principles and done pleasantly and with no sense of constraint, assist in the emergence of talent. It was suggested that the lead for this might well come from elementary teachers, who already do much to cultivate research and a love of learning.

It is submitted that these policies, relying as they do upon such factors as encouragement, assistance, opportunity, and self-involvement in learning, will help to produce a total environment in which talents of various kinds and in various degrees can emerge and flourish. There is no greater challenge to education.

Future research. Intensive study of problems arising from this research is highly desirable. Various possibilities
suggest themselves, but the following seem to be the most im-
portant:

1. Careful experimentation with a total educational program
at all levels and incorporating the six proposals would be the
ultimate in validation procedures, but this would be a gigantic
and protracted task. A much less ambitious research project
would be more feasible. This could be an experiment using all
of the proposals in one level of a school system, or it might
include emphasis on just one proposal at all levels of a system.

2. It would be difficult to establish priorities among the
proposals as to present practicability and probable future bene-
fit, but the writer thinks that the most pressing need is further
study of the role of research as a goal of learning apart from
the accretion of knowledge. In all disciplines and at all edu-
cational levels the importance of research is generally accepted,
but seldom is it systematically promoted as it should be.
Guilford\(^2\) and Osborn\(^3\) have already contributed to analyses of
research and creativity. These and other similar contributions
should be springboards for further work, and this should be ac-
accompanied by more experiments designed to integrate research
into education.

\(^2\)J.P. Guilford, "Creativity," American Psychologist V (1950)
444-454.

\(^3\)Alex P. Osborn, Applied Imagination (New York: Charles
Scribner's Sons, 1953).
3. The psychological process of identification by which superior teachers inspire and motivate their students, apart from their use of specific teaching techniques, invites further research and promises to add much to knowledge of the ways in which the modification of values occurs. In particular, the study by Goodrich et al. of the qualities of teachers who have stimulated many superior students could be developed further.

4. A follow-up study of the thirty-six students observed in this research suggests itself as a useful validating measure. This could be undertaken several years from now, and might include the testing of hypotheses, derived from this research, as to which of the students would make significant contributions in his field of study.

5. There could be a sharper definition of the issues involved in this study, including the improvement of the data-gathering procedures, followed by a study of another group of doctoral candidates. If a comparison were made between two groups of students which had been differentiated on the basis of age, further interesting findings might result.

6. In view of the evidence that intellectual superiority is closely associated with being first born or an only child, there should be further attempts, similar to those of Baldwin and his

colleagues, to study the psychological interactions between parents and first born as compared with later children. However, two major difficulties hinder progress here: first, the validities of predictions made in infancy and early childhood as to later superiority are very low, and, secondly and conversely, retrospective studies of the early psychic development of people of established superiority necessarily require the use of a great deal of inference.

Summary

This fifth chapter began with a brief overview of the research undertaken in order to prepare the reader for the final discussion. In the second section the central questions of the study were re-stated and the conclusions of the research presented. This section also contained discussion of six suggestions which, if put into practice, were believed to be likely to yield an educational environment which would be highly conducive to the development of talent. Finally, six future research proposals were outlined.

## APPENDIX A

### TABLE 10

PERCENTILE RATINGS ON GORDON PERSONAL PROFILE
AND GORDON PERSONAL INVENTORY

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#Traits of Profile: A (Ascendancy), R (Responsibility), E (Emotional Stability), S (Sociability), T (Total).

+Traits of Inventory: C (Cautiousness), O (Original Thinking), P (Personal Relations), V (Vigor), T (Total).

*These ratings have been approximated because of omissions.
APPENDIX B:

CANDIDATES' BIOGRAPHIES
AB Aeronautical Engineering

AB believed that he needed some competent assistance in educational and vocational choices in high school, and felt that not until he went to work did he begin to realize the full meaning of his vocation. "It wasn't till I got out working that I realized what the handwriting on the wall was." As a child he was always interested in school work, although he did not have particular encouragement from his home background. He did not learn to read very early, and frequently felt that his reading since then was rather limited, except in his technical specialty. In high school he found out very little about himself except that he was reasonably good at mathematics, and he could recognize no single teacher who seemed to have had much influence on him. After he had left high school, he realized that his teachers had failed to help students to see the applications and implications of school learning to the outside world.

At college, AB started in engineering for no particular reason except a desire to try it out, and soon he entered aeronautical engineering for two main reasons. First, he liked aeroplanes, as a "natural interest," and not from any burning passion resulting from a strong hobby. Secondly, he was good at mathematics, and had heard that "a decent standard of mathematics was required." However, despite his rather passive attitude towards his college days, AB had one significant contact with a professor in whose classes he did quite well and who seemed to take a liking to AB as a "fairly well-rounded student, not a social square."

After graduation AB entered the armed services, and then began work in a huge laboratory of an aircraft corporation doing aerodynamics and stress work. Here he soon felt the creeping paralysis of mental stagnation, being restricted to working on projects that required far less training than he had. After a year and a half of "going downhill technically," AB was given the opportunity to study for his master's degree and work for the undergraduate professor who had liked him. In the hopes of gaining more job satisfactions and of becoming "regrounded in the fundamentals," he accepted, and thus began developing a research program in an aerodynamics laboratory, with considerable stimulation and encouragement by the professor. AB gained tremendous personal satisfaction in this job, working independently with no "clock-watching," and feeling that he was right on the frontiers of knowledge. Work for the master's degree was spread over four years, and after a total of almost six years in the laboratory, AB was asked whether he wanted to teach.
This he felt was a highly critical decision. He had been happy in the laboratory, his interest in his field had become absorbing and self-sustaining, and yet he also wanted to extend his knowledge even further. Further, the character of the laboratory work had been changing so that he felt himself becoming more and more involved in administrative paper work, and this finally decided him to try teaching. He was practically required to advance to a doctorate level if he planned to stay in university work, and entering on a specific study program would, he thought, provide a setting in which he would be forced to do things he would not otherwise do if he had no deadlines to meet.

Surveying his educational history, AB reiterated the strong need he had had for guidance in high school and in college, especially guidance in the form of up-to-date information on the world of work as related to various high school courses. The time spent in industry, AB believed, was directly responsible for mental stagnation and even retrogression in that the work was more appropriate to the training that could be obtained in two years as a technician. The significant feature in AB's present status was clearly the professor who first offered him a job when he started out in industry, then repeated the offer a year and a half later, and did much to help AB realize his potentialities by encouraging him in the research laboratory and giving him a good deal of responsibility.

AC Agricultural Biochemistry

AC attributed the considerable intellectual stimulation she and her sister received to the influence of her father. Although engaged in the real estate business, he had for one year studied electrical engineering and his interests were very wide indeed. He spent a good deal of time giving scientific answers to the girls' questions and also helping them to find answers in encyclopedias, so that they felt that no question need go unanswered. The children had many reference books available, including a whole ten-volume set that cost over $100 in the 1930's. This particular set was beautifully illustrated and had some of the volumes graded for difficulty. Altogether, with a good home library of science and of novels, a fine school library, and a public library, the educational level of the home was very high.

In school AC had very little difficulty and had soon skipped a whole grade. The most unfavorable reaction she had to elementary school was that she disliked geography, history, and mathematics as they were taught in school, but she was sufficiently keen on learning to supplement her school work by reading
about these things at home. In high school she liked mathematics and the biological sciences but had trouble with analytic geometry and physics. However, she did very well in most of her work and was awarded a $100 scholarship which actually made it possible for her to go to a college in her home city.

College years for AC were times of searching for career interests and finding none, apart from general leanings toward the biological sciences. In the summer before her sophomore year she audited and thoroughly enjoyed a course in biophysics which her girl friend was studying for credit. She also became engaged at this time and thus felt that "in the space of two months major problems had been solved—a tremendously inspiring summer."

Married within a few months, AC began studying engineering physics with her husband who was an agricultural engineering student. She disliked this course so much that she decided to transfer to agronomy in order to develop a specialty that would be of interest to her and also akin to her husband's specialty. She felt that her city upbringing handicapped her somewhat in agronomy, but specialization in soil chemistry counteracted this to some extent. She graduated BS in agronomy and then took the M.S. degree in another year.

During her college years AC had two nervous breakdowns, the first coming soon after marriage and responding to treatment by sedatives. The second, a relapse from the first, occurred after master's graduation and the birth of her daughter, and was treated by psychotherapy with a psychologist. These illnesses, she believed, gave her important insights into psychiatry and the biochemical view of human pathology which later were important in focussing her academic interests on agricultural biochemistry.

In order to recoup some of the heavy expenses of these illnesses AC sought and obtained a position as a research chemist with a large corporation, rather unexpectedly, she said, because she was not really a chemist. Her first assignment was as a "trouble-shooter" in a service laboratory where she did so well that she was soon promoted to a research group devising new analyses. Since most of her associates in this group were Ph.D's, AC felt that she had to work much harder than they, but, in addition, she felt that she was much more excited by research than they were, and that in some ways they were over-educated for their jobs. AC approached her work there as though it were at a university—reading, writing, and doing research far beyond the job requirements, and feeling that she had really found herself. "I had not had so much fun in a library before."

Her husband had not wanted her to take this job, and eventually, at his urging, she agreed to leave. He spoke to her present adviser about her doing doctoral work, and the latter
remembered that she had done some fine work for him in her mas­
ter's program, although AC had forgotten this because of her
illness. Her job supervisor recommended her very highly because
of her accomplishments in the laboratory. In addition her
husband was back at graduate school for further study.

Looking back on her life from her present status, AC felt
that she had spent many years searching for an absorbing inte­
rest, finally finding it in agricultural biochemistry because it
seemed to be the focus of many sub-interests. "I groped for ten
years looking for something like biochemistry. It so happened I
kept making the right choices." She remarked on the barrenness
of some of her college experiences, and the lack of help with
vocational choices. Apart from her friends' advice to enter the
sciences, she found her career by trial and error and the gradual
cumulative effect of experience.

BC Agronomy

BC's parents were rather uneducated, but always encouraged
him in school and wanted him to go on to college. It was a farm­
ing family, and thus, although the holding was too small for BC
to have also made his living on it later, the family income de­
pended a good deal on his help. From the age of ten, his primary
chore was feeding hogs, and at twelve he began driving the new
tractor and soon was doing more and more complicated jobs. There
was little reading done at home, most of his father's improve­
ments in farming practices coming from conversations with neigh­
bors or from observations of their practices. BC did not like
farming, but could see that his help was needed, and he gained
enough confidence so that, at seventeen, he managed the place
singlehanded while his father was undergoing, and later convales­
cing from, a serious operation.

BC always did well at school, although he felt he was
never a really good student, ascribing a good deal of his success
to luck. Important factors in his liking of school were the
friends he made and the generally marked contrast with the drud­
gery of farm life. In his general course at high school BC took
the typical subjects of a small school, including the compulsory
three years of agriculture. Because of the war, the Future Far­
mers of America program broke down, and he was not at all inter­
ested in agriculture or anything to do with farming, including
his required project. Six months before graduating from high
school, BC began his studies at a liberal arts junior college.
Having heard that graduates from small high schools would have a
hard time in science and mathematics, he was quite afraid to
elect such subjects. After four quarters of college, he took the
year off to work on the farm and then went into service.
deliberately to get the G.I. bill to help him finance a college
education, even though his future vocational plans were extremely
vague.

Although BC grew to appreciate some of the values in farm
life while in service, he still had no idea of what the scope of
agriculture as a career could be, and thus it was largely on the
basis of his quite personal acquaintance with the work that he
began to select agriculture courses at the state university. To
this extent his family's occupation alone seemed to determine his
major. He continued to like college and carried right through
with his B.S. degree "just as though it was a job," with certain
requirements laid out and the regular pay check supplied by the
G.I. Bill.

After graduation BC felt that his education was rather
inadequate, and so he determined to go further and take his mas­
ster's degree. He began to do this at another university, but
soon became frustrated with the offering there and returned to
his undergraduate college. There he made the acquaintance of a
Professor G_____ who had him work part of the time with an ex­
perimental station where he was supervised by B_____. It was in
this setting and under these two men that BC really found him­
self. Except for experiences on the farm and in service, he had
never worked for anyone else, but now he found he could produce
good work himself, and also in others, and was soon assigned to
the supervision of other technicians. He had always had faith in
himself scholastically, but had developed a poor attitude toward
his M.S. program. With the confidence and enthusiasm of G_____ and
the fascination of the project, however, BC really became
interested, and began to appreciate some of the deeper signifi­
cance of his field. G_____ and B____ were both important to his
development at this time, but in different ways—the former giv­
ing BC the motivation to perform in such a way as not to disap­
point someone that was very likeable, the latter providing inspi­
ration as a researcher and promoting idealistic attitudes toward
science.

This research began as a summer job, but after BC gradua­
ted with his master's degree he went back to it for another year
and a half. Before long, however, BC began to feel somewhat
restricted by his research job because it seemed not to be per­
sonal enough to be his own project. He began to realize that if
he was going to remain an institutional researcher he would have
to have a Ph.D. degree. Thus he sought and obtained a fellowship
from G_____ who had moved to another university. From his own
experience BC believed the selection of an adviser was extremely
important, far more so than the institution. Nevertheless, even
though G_____ moved again the quarter after BC arrived and could
have arranged another fellowship, the latter stayed, chiefly
because he was very impressed with the rest of the staff.

BC summarized the effect of his farming background on his later specialization by noting that at first it meant very little because he saw little relationship between study and farming, until in college it almost seemed to decide his whole later career because he was personally acquainted with agriculture and he had no other career in mind. Lack of appreciation of the scope and depth of the field persisted even after graduation, however, and it was not until he had made the personal acquaintance of an extremely stimulating professor and had experienced the realities of research that he became truly involved in and committed to his chosen specialty.

Although status and salary factors were closely related to his motivations for taking the Ph.D. degree, the major reasons were in the desire to do research. BC hoped that his plans to work in forage crop ecology at an experimental station would not be too much frustrated by the need to do some "institutional research." He emphasized that he would soon resign if there were too little freedom for him personally.

BD  Bacteriology

The son of farming parents, BD had no strong liking for school as a child and read only those books that were assigned. He never felt that he was bright and he worried about his examinations more than was necessary. His mother has since told him that he always thought he was going to fail, but he remarked that he had had to work hard for what he got since he did not have a retentive mind. His father's education had ceased at the high school sophomore level, two years beyond his mother's school experience, and both were "rather passive" about school. While BD was in high school his father was obliged to work in a factory in order to supplement the income from the farm, and BD thus missed up to thirty days of school each year working at home chores. Although he managed to take part in some school activities such as class plays and officiating at baseball, he felt he was tied down a great deal. His father was disappointed at his lack of enthusiasm for farm work and was rather keen to have him join the Future Farmers of America in order to spark some interest, but BD was "pretty sick" of anything pertaining to farm work. In general, he took on something of his parents' passive attitudes towards school, "never disliking" it and "never contending" that he was bright.

BD believed that his grade school experiences were not at all significant for his later development and attainment, arousing little interest in learning. He took a college preparatory
course in a very small high school and felt similarly unenthusiastic, except for one course. As a sophomore he had a general biology course from a young teacher, who, he considered, may have been a "frustrated medic," to judge from his enthusiasm for biology and for the profession of medicine. The training he gave the students in careful observation and recording, the fine laboratory manual that he used, and his own excitement for the subject caught BD's imagination. He became fascinated by the scientific names, and did exceptionally well in the whole course so that the teacher took a special interest in him, giving him his first idea of a medical career. BD recalled that the teacher's manner was not entirely conducive to good learning by the students since he was extremely strict, "flighty," and easily provoked to great anger. Undoubtedly the teacher's own interests were biological rather than generally scientific, at least as far as BD was concerned, for his teaching of a physics course the following year aroused in BD no enthu­si­as­ms similar to those he had just experienced.

Graduated from high school as valedictorian of his class, BD entered a pre-medical course at a very reputable college where one could rather easily finance oneself by part-time work, and found later that he was considered lucky to have been accepted in the college. Although medicine was quite definitely his career goal, he was a rather mediocre undergraduate student, perhaps because after one year at college as a civilian, he was drafted by the navy and allowed to continue his studies in naval uniform for a further two and a half years, and this, he said, seemed to result in a lack of incentive. However, he continued to do well in biology and also in chemistry. A course in embryology was a disappointment to BD because it was so poorly organized as to sequence and arrangement of materials. He said, "If the instructor is well organized, I am happy," and recalled the satisfactions which he had later gained from using the army's manuals on teaching procedures. Just before he was due to complete his undergraduate degree, still under navy auspices, BD became ill, was classified as fit for inactive duty, and returned home to farm for his father for a year.

The war was now over and BD entered medical school, but very soon withdrew because of housing difficulties and also because his wife was found to be four months pregnant, and this, he thought, required a re-consideration of his plans. He therefore returned to the second of his two undergraduate colleges, completed a bachelor's degree with a strong chemical and biological emphasis, and went to work as a junior research chemist for a large commercial firm. After two years there he left because he could see that further opportunities would soon be denied him unless he had an advanced degree. He was not particularly interested in chemistry but nevertheless took a direct commission
in the army's chemical corps because it appeared to offer the opportunity to do some biological work.

Thus he began research on animals, especially rabbits, in the pharmacology laboratories and stayed there for two years. He was then sent to Japan for three years during the Korean War, doing liaison work between chemical research and hospitals. Toward the end of this period came a rather critical incident—a special assignment to teach the rudiments of self-defence against biological warfare. To prepare himself for this he bought a standard text in bacteriology and began some intensive study which led to a considerable interest in this field. Sent back to this country he spent a few more months in chemical research, and also took two extension courses in biochemistry from a nearby university.

At this point BD began to consider whether he should continue his education, and he decided that it was now or never. His wife was not in favor of his returning to college because he was earning a very good salary, and especially since he was on the point of gaining a promotion. However, she accepted his decision to return and helped him all she could. He was accepted for medical school, and as preparation for this between his discharge and entrance he took two quarters of graduate work in bacteriology. He felt he needed to explore his abilities and his study habits after his absence from college and was pleased to find that he did very well indeed. After summer work at a hospital doing research, he entered medical school in fall. Here he had a most disappointing experience. He felt that he was subjected to "West Point" regimentation of the worst kind, and after five years of army experience it was unbearable. The possibility that this was a rationalization of an academic failure experience was noted by BD, but he sincerely believed that the authoritarian atmosphere was the real reason. After one quarter, therefore, he returned to graduate work, and on the basis of a good performance on a preliminary oral examination was allowed to work directly towards a doctorate in bacteriology without taking the master's degree first.

BD felt that had he not married when he did that he would have been a medical doctor, and wondered sometimes whether he would have been happy as a general practitioner. He added that bacteriology was an exciting field and that he had absolutely no bad feelings that he did not make his original goal. Also, he considered that to some extent his whole career had been circumstantial, citing the navy program which helped him to complete his education as an example of this—"supposing I'd been drafted for four years, I mightn't have started out from scratch again." BD noted that he had a problem of deciding what he wanted to do
after graduation, feeling that he wanted to establish roots early in church, school and community affairs, and yet he and his wife had some hankering for foreign service also. He considered that money had never been a prime motivation in his life, but evaluated its importance by saying, "I want as much money as I can get in a job I'll be happiest with."

CD Business Organization

As a child CD always had the advantages of education pointed out to him, with particular emphasis on an older sister, who, although only an average student, had nevertheless seemed to gain a great deal from a college education. He soon found out that he, too, was a good student, being allowed to be bell monitor for two years, an honor which brought him to the attention of the elementary principal. She took a strong interest in CD and encouraged him in his school work. He later in junior high school formed a very close friendship with his home room teacher whom he helped in the setting up of apparatus in science classes, and who encouraged him to run for various offices. Although CD considered her to be a very "easy" teacher, yet he seemed to gain a great deal of confidence from the relationship, which incidentally is still maintained.

In view of these early success experiences, it is a little hard to understand CD's fears and dislikes of some high school subjects, particularly foreign languages, mathematics and chemistry. He was inclined to believe that, by requiring students to choose between shop work and Latin, all but the obviously college-bound students would elect shop because of its greater intrinsic interest. CD's parents had no strong feelings about the matter, but his sister did, believing in the later value of languages, although she did not want to influence her parents. In mathematics, CD had many failure experiences and still feels rather incompetent. His one semester of chemistry was for him a meaningless mass of formulas. CD's attitudes toward these three subjects were strong enough to induce him to look elsewhere for a major interest in high school, and he found it in business courses, "an easy way out." No particular teacher encouraged him in high school but he developed strong satisfactions from business courses, being so far ahead of the class that he could give other students a good deal of help.

Graduated from high school with the intention of going to work, CD quite suddenly decided to go to college because of his parents' urging. However, he was firmly set in planning no foreign language or mathematics because of his antipathy towards these in high school, and therefore he concentrated on business courses at a small southern college where no general education
courses were required. In the first half of his college work CD did not do very well, but later began to make high grades. When he had graduated he began almost immediately on an MS program in business management at a larger state university.

During his undergraduate days, CD had formed a great admiration for a more advanced student in the same department and this man, G, was very influential in CD's life. G was a very effective and determined individual who helped the younger man with his course work, and who, in many ways, represented for CD the ideal person. This friendship, also, has been continued to the present. It was through G's influence that CD gradually accepted the field of teaching as being more worthwhile than his original career plan which was to enter the commercial world. Thus it was that, after graduation with the M.S. degree in the middle of the academic year, CD took a series of temporary jobs in business until his friend offered him a teaching job that he himself intended to resign.

After two years of teaching at colleges, CD realized that he needed the doctorate if he was going to advance in his field, and it was as a result of this, together with the advice of his dean, that he embarked upon a doctorate program. In addition, G, who had begun a doctorate program some time earlier, had also been urging this course for CD. The latter felt that his Ph.D. program was much more prestige-laden than his friend's rather frankly professional degree although he also felt rather keenly his own lacks in broad cultural learnings. Strangely, his language examinations were not the problem he had so long anticipated, and the fact that they were not may well have been due merely to his very failure to try them out.

Since entering the doctoral program CD has been recognized in several ways--by a summer appointment to a large university, by a fellowship awarded by his professional association, and by requests to discuss his special field of insurance before business groups. CD judged that the main reason for his doing graduate work was his plan to stay in university work because he liked the conditions, the kinds of people he met, and the opportunity for administrative promotions. The social prestige and sense of accomplishment were also considered to be important motivations.
CE's father had had one year at high school before becoming a machinist and his mother had had two years and had then attended business school. CE believed that since the small amount of education his father had was received in Canada it may have been more advanced than the same amount in this country. His father always had "something of a yen for mechanical things," teaching CE how to use tools and how to do exacting things. He was, too, rather stern, a strict disciplinarian, who believed strongly in the never-say-die attitude to difficulties.

"School was a fight" for CE; "things don't come easy." He felt that he was not backward but that in grade school he was very much a daydreamer who "more or less went along with the stream." CE was aware of this at the time "but not of the dangers in it," and even the sixth grade teacher told his mother about his not paying attention. He had to learn to overcome this, and probably did not do so until well on in college. The sixth grade teacher, who had more than an average interest in children as individuals, really understood him, and she dealt with the problem by asking him about twice as many questions as usual in order to keep his attention. A later specialist teacher, "of the opposite kind," nagged so much at CE about his sloppy work and predicted that neither he nor his sister would ever get through college, that he began to work very hard.

From the seventh and eighth grades on CE had ideas about going to college which he had largely taken over from his father, but even before this he himself had decided that he first wanted to go away to a certain parochial military boarding school. This decision had come about through the close association he and his sister had made with a minister and the youth group at their church. He had heard about the school from a friend who had already been there, and the description of its particular character of tradition and rigid status lines appealed to CE. The minister's son was CE's greatest friend, and the minister himself was almost an idol, not to mention an ideal. This minister together with his old father, also a minister, "taught us how we should feel toward our parents," and believed in discipline about as much as CE's father did. Another minister was also an ideal for CE, so much so that his mother began to notice that he was imitating this man. In this atmosphere CE early wanted to be a minister himself, and became most enthusiastic about the idea of going away to school, especially since several of his friends were going, and since he had no desire to go on to the nearby public high school. It seemed to CE that this was the best thing that he could do with his life, and that it was better to go to
a school attended by fewer but more highly motivated students.

He liked the whole life at the school and fitted in very well with the upper and lower class system, even though he "moaned" all the time he was there. The discipline was hard to take, but it was similar to that which his father had always taught him. Although CE would never mention the fact at home he was often beaten by the upper classmen and he felt that he would be better for it. "There is sometimes a great deal of satisfaction in being subordinate to others," CE remarked, recalling how the lower classmen developed a strong esprit de corps. Until his junior year in high school he had fully intended going into the ministry, and indeed did not finally abandon the idea until about two years later, but as he began to have trouble with languages as a junior he started to reconsider his plans. He did not know how to study well in high school, but considered that the main reason for his difficulty was in him, and not in any of his teachers. At the time he tended to blame the teachers for his difficulties, but his father later showed him that the real problem was within himself. With his changing ideas, he started to do more college preparatory work, including physics and chemistry, and very slowly began to realize that, even though the ministry was a good life, there were other things he could do much better. Had he not been having his language difficulties, he would probably never have begun work in the sciences.

CE felt that he had no particular field of interest when he entered college, and thus he entered pre-dental courses largely because his father wanted it. In his first year he did very poorly. In English he had "extreme trouble" and in mathematics he had almost as much because although he was in a course beyond what he could really do, he "was too stubborn to give up." He failed two courses the first semester and was put on probation, and, since he had not declared his major, he was rated a "general student" and told that he would not be admitted to dental school. He then considered electrical engineering because it "somehow looked nice," but his father discouraged him because of the mathematics required. After conferring with a woman counselor who suggested careful thought and some further "shopping around," he began to consider chemical engineering. He took a reading efficiency course and when he found that both mathematics and science needed to be of high caliber in chemical engineering, re-entered the mathematics course he had failed. His chemistry grades had always been good, and in his sophomore year they were instrumental in getting him off probation. CE largely attributed this success to the quality of the teaching given by a professor who took the labs himself and was able to bring himself down to the students' level quite easily.
With this change of major to chemical engineering, CE took a new lease on life in general. He joined a fraternity and was thus closer to academic things than he had been while associating with working people who were "sort of wilder socially." Some time during this change he also underwent a complete change of attitude from wanting to "just keep off the bottom to wanting to be at the top." He had found, moreover, that the greater freedom from planned study periods at home, after high school and before joining the fraternity, was less conducive to an all-out effort. He had to learn how to make the sacrifice to study properly. Although he now still kept up with social activities, his studies did not suffer, and he really concentrated his energies.

Graduated B.S. in chemical engineering, he "picked up a great deal of confidence," and, partly because he was not greatly enthused about the jobs offered, partly because of departmental suggestions, and partly because he wanted to prove himself to others, he decided to advance to graduate work. The departmental head had had great faith in him from the start, and, because CE had had a very poor early record, it was only this man's strong recommendation that helped CE to gain a fellowship to go on to the doctorate. Once CE began his doctoral studies, everything "was pretty straightforward."

Surveying his reasons for pursuing graduate study, CE noted first the fact of the opportunity presenting itself, and also reiterated the idea of "showing them" that he could do it. The departmental head's urging him to take time by the forelock, the factor of "personal drive," and some thoughts in the back of his mind about teaching were also mentioned. Security and money were considered less important. Besides his wife, whose encouragement "could not be discounted," CE recalled that four people had had an effect on him in a total way--his father, the two ministers, and the head of the department of chemical engineering during undergraduate and early graduate days.

DE Chemistry

DE felt that his family and community transmitted to him strong values which have been important through much of his life. The youngest in his family, he felt that he grew away from his brother and sisters so that he scarcely knows them now except from childhood memories. He believed that he was an example of late awakening, being at or near the bottom of his class until tenth grade. "I see kids now that are much farther ahead than I was at that time." His family had no background of higher education and were generally rather ignorant of scientific work, but
contributed in some degree toward his pursuit of higher education by allowing him to continue. His mother had had more formal education than his father, who, while not actually lying about it, wanted everyone to think that he had attended a very reputable high school in the city.

One man for whom DE had tremendous respect was a priest whose Mass DE served from the age of twelve until eighteen. This priest "had fantastic will-power, ... tremendous influence in shaping my drive and ambition. He deliberately tried to shape my life and corrected me in my habit of standing up and contradicting people." This he did by contriving situations in which the youthful and impetuous DE found that this did not pay. DE felt that he had a great deal in common with the priest in that they faced and overcame many challenges together, as, for example, during a vacation in which as part of a group they portaged not only canoes but also rowboats for very long distances. In addition to developing him in personal-social aspects, the priest also contributed towards developing his scholastic ambitions. To a large extent, DE attributed his academic achievements to the need to meet all challenges successfully, and therefore felt that he was "more or less funnelled" into chemistry because during his college days only the best were allowed to enter that specialty.

DE counted his experiences up to the end of high school as relatively unimportant in his development as compared with the influence of the priest. However he had chosen his field in a broad sense by attending a science high school, which was "in a good part of town," rather than a classical high school, and as a result of this some scientific interests began to burgeon. During his high school years also, DE became more and more aware of the lack of understanding between his father and mother, which later developed into a separation and which largely contributed to his determination to leave home and go to a far-distant military college for his further education. The fact that this college was less expensive than those near his home was a factor also, but DE still felt that he was making a sharp break with his community traditions.

At the military college he took a general course for two years after which came specialization. As the top student of his class, DE elected to study chemistry, the program that was recognized as the hardest of all. Just as he had successfully accepted the self-imposed challenge to make the rugby team, although greatly lacking in knowledge and experience in the game, so he drove himself into chemistry. He was not ill-equipped in this subject, but nevertheless treated it mainly as a means of proving himself capable of surmounting competition.
In his first two years of college, DE encountered another man from whom he derived some important ideals. This man, a mathematics teacher, lived for his work in such a way as to help to form many of DE's ideals of the academic life. Almost all of the students had tremendous respect for this man, although neither they nor DE were ever in close association with him. Impressive, kindly, and "scholastic looking with his white hair," this man had advised DE to major in actuarial science, and although the latter did not do this, the man's recognition and bearing seemed to have been important to DE's developing scale of values. After four years of military college, DE took one more year at a large university and graduated with a degree in chemical engineering, as a kind of insurance against the possibility of not getting into graduate school.

Work as a laboratory assistant in an industrial plant for four months was important in convincing him that he could never be happy doing this kind of work. Disgusted with the level of work assigned to fully fledged engineers and with the administrative work required of scientists, DE turned further toward research work where in his eyes it was facilitated the most—in universities. This ideal has remained with him very strongly, although it has been modified to the extent that it is now centered more on research alone than on teaching as well.

DE believed that his pursuit of learning has a strong altruistic basis which has stemmed in part from his family and community values. For him a doctorate is a means toward his ultimately doing chemical research that will aid in the alleviation of illness. His wife has not detected this tendency toward promoting the well-being of others in other graduate students to the same extent. He believed that the ideal of complete self-realization was now important in motivating him, rather than the earlier ideal of pride in personal accomplishment.

DF Chemistry

DF said that as a child he felt that he was an "average Joe" in many ways. He knew what the best and the worst were in socio-economic terms and knew as a result that he was middle class. In school too he felt about average, although he thought he probably was no further down than third or fourth in his class. He liked school in general, being always good at arithmetic, but he disliked English and reading, and, of the few elementary teachers for whom he had a strong respect, one specialized in the two latter subjects. DF's father was a college graduate in mechanical engineering, and DF "went on with that idea," becoming
quite good at mathematics knowing that his father could help him if necessary. However, he felt that he had to get verbal sub-
jects by himself, and even though everyone said he could read
well he always felt that he needed to be stronger in such sub-
jects.

In junior high school the accepted thing was for the good
students to take Latin, and DF's parents supported this as a pre-
paration for college. DF thought the English and Latin teacher
in high school was poor, and, finding himself unprepared with his
next Latin teacher, he dropped the subject as soon as possible.
In senior high school it was mathematics that "did the separat-
ing," and DF was among the better students. He also studied
chemistry and physics in high school and thought then how poorly
taught both subjects were, "Chemistry made a little more sense,
physics practically none."

He believed that he was never really interested in what he
was doing at school. He "just was disciplined into it and so did
it, wasn't that hard usually." He believed that his interests
were very wide and recalled that he was very prone to enthusiasms,
as for instance stamp-collecting, a hobby in which he interested
the rest of the neighborhood boys at one time. The idea of his
being generally mediocre was contributed to by a real mediocrity
in athletics. As a small boy he practically had to play ball
with the boys of the neighborhood, whether he really wanted to or
not, but as he grew thinner and faster found that he could do
better, especially at basketball, although he was never a very
aggressive player. DF's father thought that his son's inclination
toward engineering might not be too deep, since in high school he
never seemed greatly interested in taking things apart. His
mother liked the idea of medicine, "prestige and all that," and
DF did get "mildly interested in it, but not too involved."

He went to a liberal arts college with the general inten-
tion of preparing for medicine, and found some of the courses
were "really tough," apparently to ensure that only the very best
students gained pre-medical qualifications. Biology in the second
year was the hardest for him, with the professor giving a number
of stiff tests, but DF emphasized that he thought the professor
was a "tremendous teacher." DF got a C grade in this course and
also in a subsequent biology course.

At the end of his second year, DF transferred to another
similar college, resolved to take all the chemistry requirements
as a junior and then to take all the required biology as a senior,
"and see how things came out. I suppose I had an inkling there
of the kinds of things I might be up against." In his first
chemistry course at the second college, DF found somewhat to his amazement, that he was "red-hot." His earlier chemistry courses had apparently prepared him well because the advanced course seemed to be "snowing" everyone else. For the first time, he found that he could be first in the class if he tried and studied hard, but in addition he gave a great deal of the credit to the professor teaching the course. This man made the course very interesting, and since the class was small, he tried to get to know everybody. He also would cast a little doubt on medicine now and then, and would joke that graduate work in chemistry "wouldn't cost a thing."

At his second college DF had enrolled as a premedical student with a chemistry major, his adviser was in the chemistry department, and in his junior year he had thoroughly enjoyed doing well in chemistry. Yet he "still had no great passion for anything," even though he enjoyed getting an education. "As a senior filling out requirements, I don't remember that it interested me much." After graduation and a summer's work with a large chemical company, DF started graduate work in chemistry, because, as he said, "I'd always planned on medical school and even though I'd changed my major, it seemed I should go on to graduate school." His father thought he should have kept on with medicine, and his mother was very much opposed to his decision, but after a year or so both seemed really happy about it. He always felt that his father was on his side provided that DF could prove that he was convinced, taking the attitude that it was his life "even though they tried to influence it," and in this way his father seemed more democratic than his mother.

DF believed that two pervasive and handicapping personal characteristics have been tendencies to vacillate and to have interests that absorb a tremendous amount of time and energy. After following out an interest for some time, he feels he should stop and broaden himself. His aspirations are still high, but he cannot seem to get laziness out of his system, sometimes shown by "a simple failure to turn up for work." He felt that he would never be more than a mediocre Ph.D., and hoped that he would get interested in his work.

Reviewing his reasons for doing advanced study, DF noted that the influence of the chemistry professor at his second undergraduate college was important in giving him a good view of college life, and for the first two or three years of graduate work he liked the idea of teaching at that level. He thought, also, that college work could give him the chance to do what he was interested in, besides just developing a new product for
commercial use. The cultural environment beyond the job was also considered important, in providing opportunities for recreation and for further study. However, he noted that he had become more mercenary since then, because the pay of college teachers began to look so bad in comparison with other jobs which he intended to seek. His final evaluation of this point was to remark, "If ever they raised the salaries of college teachers, I'd hop right back into it."

EF Economics

In his early life, EF's parents were coming through the worst years of the depression and he recalled that they seemed to have little time or resources to devote to stimulating him. Before entering school, however, EF could count "indefinitely," or at least over four hundred, as he once counted correctly the number of buttons his mother had in a jar. He rapidly became more aware of his capabilities as he went through school, spending just three days in kindergarten before being sent on to first grade, and soon gathering further evidence that he was rather superior intellectually. While his teachers all tended to encourage him, none did anything outstanding to stimulate him in his school work.

EF believed that, although he was in a good school system, he and two other bright boys experienced much frustration at some almost incredible overlapping of content from one grade to another, and, especially between fifth and ninth grade, at the "stupidity" of many teachers. The three stars of the class frequently set traps to prove the teachers wrong and often finished tests and examinations before they had been distributed properly or written on the board completely. This was all done, as EF put it, in the worst possible way, "within the letter of good behavior, but beyond the spirit." Later in high school EF and his two friends had their best experience with a teacher of chemistry who had previously had them in biology class and was "ready" for them. Here the three boys spent the first third of the year covering the course and then were freed to work at will from a college chemistry lab. book.

Assessing his school days further, EF added that as a child he was very shy and reserved despite his needling of the teachers. He thought that it may have been because he did not want to make excessive demands on his rather poor parents that he resisted telling what he wanted for Christmas. EF was never completely accepted by the best "crowd" in high school because they categorized him as an intellectual, and it was in large measure
to counter this attitude that he took on a heavy schedule of activities. He succeeded in football, track, and other gentler pursuits, but still never felt that he had quite "made" it with those who mattered. Thus his two intellectual peers remained his closest friends.

The move from a small rather homogeneous residential city to a big university near Chicago was a great shock to EF. This was during the height of the veteran enrollment and EF, sick before he left home, lost nineteen pounds the first week and a half, partly from the illness and partly from the emotional experience. "I guess I was a pretty naive little boy." He did average work at first and, with no negative reaction from his parents, felt that the new sensation of "anonymity in average-ness, not mediocrity, was not particularly disturbing." While his background in some respects was inadequate, and his study habits were definitely poor, he had enough ability to get by. EF first decided to major in a physical science since that and mathematics had been his best high school subjects. Then he became "wary of the extremely odd people" that he met in advanced mathematics courses, decided he wanted to change his major drastically, and entered the social sciences. His chief interest in this field was history, but he took economics since he happened to have had the basic course in that subject. EF, reflecting on the reasons for this change, believed that his family's economic background could not be discounted as a factor since he was always rather liberal in his social and political views. Then too, the impact of a busy city on the simple ideas of a small-town youth may also have been significant, as also may have been his own personal problems.

Graduated with a "rather spotty record," but a B.S. in economics nonetheless, EF entered the navy. This experience, he believed, had a dual significance in allowing him to postpone earlier decisions about a vocation, and in indirectly providing a setting in which to make a major choice. He had enough leisure time to do some further reading in economics which aroused his intellectual appetite. Further, he was greatly irked by the hierarchical rating system in the navy and, imputing this to the business community, finally decided that he would try graduate work in order to avoid going into business. Thus he began his master's program and then proceeded right on with the doctorate for the same two reasons--intellectual satisfactions and a wish to avoid the hierarchy of the business world. Having finished the master's program he was reassured in his confidence in himself intellectually and reinforced in his desire for the academic life.
EG Education

EG's mother read to him a great deal from an early age so that before he began school he was coloring pictures in books of the classics and had learned to read. He spent a great deal of time in free reading at home and became interested in reading the abridged editions of the classics such as "Treasure Island" by the time he was in sixth grade. These early interests clearly set a pattern on which EG's career has become molded. He was also quite a good singer in a church choir and with these two abilities, reading and singing, he found warm companionship with his eighth grade teacher, L____, counting it especially fortunate that this benign man moved on to the high school when EG did, and became an English teacher.

English teachers always seemed to be the most significant to EG, and, when his ninth grade teacher turned out to be a very strict disciplinarian who showed little understanding of the sensitive lad's problems, L____ helped him out by providing opportunities to sing at school assemblies. EG had another English teacher whom he disliked in tenth grade, and then for two more years he obtained tremendous satisfaction from L____'s classes in English language and literature and in Latin. Here, EG began to write a good deal of poetry and other materials which were published in the high school paper and also the local newspapers. He believed that by this age he had become very sensitive to the quality of the teaching he had been receiving and was able to discern wholesome from unwholesome classroom climates. He always liked history, mostly because it tied in so well with literature, but, apart from some trouble with mathematics and a love of the busy-work of writing up science experiments, he had no other great loves or antipathies in high school.

These were depression years and thus it was understandable that EG's father, a pharmacist by registration only, should have wanted his son to become either a physician or a pharmacist with a degree. Although he began college with a general curriculum, he felt committed to medicine and pharmacy for two years until he finally made his parents see the stupidity of it. An important reason, EG felt, was the fact that he had to work part-time to support himself, but an even more potent factor was the very pressure exerted by his father to try to force him into medicine. Early in his college work he had great inspiration from two fine teachers in literature, and, by the third year, he had really committed himself to majoring in English. The most frustrating thing for EG was the amount of time he had to spend working, thus leaving himself very little study time--he was up at 4 a.m. and
had to work and attend classes continuously until 7 p.m., leaving himself only two hours for library work. These tremendous demands on his energy and persistence would not have been possible had it not been for the encouragement he obtained from college and high school teachers, but, in addition, he believed that his family's prestige demands were also pushing him on. He believed that some early failure experiences on the debating team, with the consequent bawling out by the instructor, actually stimulated his determination to succeed in "thinking on his feet," and this he did by his senior year. A clash of personalities between EG and a supervising teacher was quite intense at the time, but had little long-term effect. Because he had to work full-time for the whole of one quarter, EG graduated three months later than his class.

The nation was only just beginning to move out of the depression, and since EG could not obtain a teaching job he looked elsewhere, finally spending two years on Broadway singing with a famous stage and screen personality. Then he returned to his southern home town and worked as a newspaper correspondent, but soon moved to a large mid-western city where he began teaching in the W.P.A. program, preparing adults for high school certificates at night and working in the literacy program during the day. After two years of this work he spent over four years in the army during the war, and then returned to a technical high school in the same city for three years. Besides teaching many different courses in English and related areas, as well as French, he graduated with an M.A. in English from the local university. During this period of study he gained a great deal of confidence in his ability to write as a result of contacts with two excellent teachers of English. EG named two professors in his doctoral program who have also greatly inspired him, and remarked that he felt that contacts with exemplary teachers had been extremely significant throughout his educational career, and that few students had had similar advantages.

Married at the end of this teaching experience in the midwest, EG then took a summer teaching job at an eastern college where his wife was studying. Then followed two years of teaching English at another college nearby, a state teachers' college, and then a further two years at a technical college. During these latter four years he became increasingly interested in library work and in writing as a result of his work, and he later joined the Library of Congress as a bibliographical researcher annotating archival materials in various languages. As his interest and ability in writing developed along with his teaching, he began to publish articles and has continued with this to date. He did further professional writing and research by helping to edit an official history of ten volumes.
Two years ago, EG came to this university in order to obtain a Ph.D. degree. His reasons were mixed, being a combination of the fulfillment of early family expectations, the financial reason, and the desire to gain more status on college faculties than he had previously enjoyed. In addition, EG felt that it behooved him as a Negro to qualify himself as fully as possible in order to play a useful role in the racial integration movement in education, and to feel personally creative and capable. He felt that with the doctorate degree he would be able to play a formative part in the fields of teacher education, in-service training for teachers, and the teaching of English.

**FG Education**

FG was reared in a home in which belief in the value of education was a dominant feature. The children were never absent from school, and whatever was needed for school was always of first importance, no matter what the cost. The youngest of three girls, FG had the example of others thinking of school as a very pleasant place, and while still only three years old she accompanied the older sister to kindergarten and continued there because she "couldn't stay away any longer." FG never found school difficult but she was always conscientious about getting assignments completed. Although she had no particular likes or dislikes in school, finding that most subjects generated interest, she "also felt a responsibility" to do her part.

In this way, and also in general, she felt that she was something of an average between her two sisters. The eldest was very eager, serious, and hard-working, getting up at 4 a.m. to study while at medical school. By contrast the second sister was light-hearted, able to make clever remarks at the right times, and much less conscientious, having the attitude of trying to make B grades without even studying. This did not conflict openly with the values held by the parents, who merely reminded her to make the best of her opportunities. The family's educational values extended to recreation also, and FG did a good deal of reading for enjoyment of the books that were often given to the girls as presents. She also shared fully in the family arts and crafts hobbies, working at knitting, sewing, weaving, jewelry, and stenciling, and these she estimated to have been of high importance in her life, leading to the study of art as a minor area in non-credit courses in undergraduate study, and in graduate work.

FG had little comment on her elementary school days since she felt that people had not been extremely important in her life. She remembered her junior high school teachers very clearly and
noted that she still greets some of these when she sees them. In high school she took four years of mathematics because she liked it, and also four years of Latin, which she has much regretted since. There was no great issue about it—"less self-expression in those days"—and it was accepted and assumed to be just a part of the family pattern.

For the first two years of college, FG felt that she did not have to make much commitment to preparation for a career, but when a choice had to be made, it was teaching. Although her mother taught and her aunt still teaches, neither made any particular suggestions that FG should teach. She believed that she chose teaching largely because there seemed to be "not much else to do." It was, she said, "either an arts degree or a professional degree and I wasn't interested in medicine or law or things like that." She did, however, become more discerning of good teaching in college, and began to realize that the professors she liked best were stimulating, thought-provoking, and creative. Geology, art, and history were the most interesting, while the most boring courses, she added, almost shame-facedly, were those in education, and this because of their repetition. She remarked on the discrepancy between the methods advocated by college teachers for use with elementary school students, and the teaching methods actually used by the same college professors in their classes.

FG recognized in herself a strong trait of receptivity, even passivity, in all her learning. She felt that she has always tried to "absorb, to find out what they want and to regurgitate it. It is better to do what it takes to get through."

Upon graduation with a B.S. degree in education, FG began teaching in elementary school, and found it "not too marked a transition from college." The principal was willing to allow the teachers to try out anything they had thought through. In many ways this principal gave FG the feeling of working in a job with a nice balance between freedom and responsibility—"I might have minded had she done it differently." She was given responsibilities on various committees and for helping with inservice training. FG felt free and secure and stayed in the same job for 10 years, and the principal has since indicated that she would like her back. FG could not estimate whether she was really singled out for encouragement by the principal, since the teachers in that school "didn't visit around much."

As soon as she had started teaching, FG planned to take the M.A. degree and she gained it by almost continual work in
summers and in twilight school. When she did finally gain the degree, she decided to "enjoy life and take trips," and felt that, with summer travel to Mexico, Alaska, Europe and Hawaii, she was leading a balanced life.

With the idea of gaining more salary she came back for further study, planning to get forty-five hours credit beyond the master's degree. But, at the suggestion of her adviser to whom she usually looked for help in planning her study, she decided "to work with some purpose," and thus found herself taking the doctoral language requirements and then entering the university as a full time doctoral student. Her motives for doing a doctoral degree mainly centered upon self-satisfactions, FG believed, since her job certainly did not depend upon it. She supposed that it would add to her thinking ability and that it should make her a better teacher, but she did not consider it a necessity. She felt that the level of her accomplishment almost precluded her return to elementary teaching and thus virtually forced her to make another career choice, and this would probably be in school administration in elementary education. The money motive, had, she believed, always been subordinated to the motive of service, and this continued to be true of her doctoral study.

**FH Education**

FH's earliest associations with learning situations were very pleasant. His parents read to him a good deal, but he demanded more and more, until one day he suggested to his mother that if only she would teach him to read she would then be free to do the washing. She did this, and, as a former teacher, found it not a difficult task, and thus FH read two school readers before entering school. Although he was very interested in acquiring the skills of reading and in reading for recreation, he was also interested in many other things.

School was always extremely easy. FH was not able to see any faults in his grade teachers, being "deeply in love with the women teachers," except the second grade teacher who taped his mouth and sent him home for talking too much. This was the only complaint that his teachers had about him, and FH noted that although he was never in any serious trouble his conduct grades were always very low until the sixth grade. Although this was often referred to at home, neither his parents nor his teachers held it against him by giving him lower evaluations of his academic work. In the sixth grade, however, FH got two consecutive conduct grades of such an uncomplimentary nature that his parents began to
threaten him, as a result of which he "pepped up and made an effort, because nothing had ever really happened before."

At the age of seven, PH began to take piano lessons at his parent's suggestion, and then at ten, at his own instigation, he began to learn the trumpet. He became so proficient on the latter that while still in grade school he was playing in the high school band, and while only in seventh grade at junior high school, he was exalted to first chair of the trumpets. This, he believed was a huge mistake because it made him so egotistical that for two years he thought he need not work hard to improve. After one particularly atrocious performance he was "dropped down the ladder a few rungs," but by dint of hard practice he soon regained the coveted position. He played solos many times, at school and at church functions and he also played in regular dance bands.

In high school PH steadily made progress until he became known as a "wheel," a circumstance which he believed was due in no small measure to his father's comfortable financial position. These were rather hard times for most people but PH's father, although only a semi-skilled worker, was earning very good wages with a petroleum company. PH did quite well in most of his courses, especially music, science, and mathematics, and entered whole-heartedly into extra-curricular activities as well, including scholastic contests, dramatics and football. He did come to value reading and literature less than previously because of the opinions of his peers who considered them rather "sissy" interests, but he was still a highly successful all-round student, making the honor roll consistently. The band director, a mathematics teacher, and a chemistry and physics teacher were important in encouraging him to pursue his interests, although in the case of the latter two the fact that PH was on the scholastic team in those subjects largely accounted for the extra time they spent with him. By the time he left high school, PH had quite definitely made up his mind to be a petroleum engineer, partly because of the associations of his father, partly because of his adeptness in science and mathematics, and partly also because music had always been for him a recreation rather than a major interest.

College was a "normal expectation" for PH, but upon graduation he worked for his father's company for the summer and then went to a plant on war production, and also took some business courses. He spent fourteen months in this way, waiting to be drafted, even though his folks were "after" him to go to college.
During service in this country FH continued to play in dance bands as he had done in high school, and gained some experience with a nationally known combination in this way. He continued to play in off-duty hours during service in Italy, and when he had completed a combat assignment he was released from duty for six weeks to tour that country as rehearsal director with a show band. On his return home he was assigned to a service band for six weeks before being discharged. His whole service experience in association with people who had been in colleges and in schools of music had been very significant in directing FH toward music as a career, and, "as do most freshmen entering music school," he resolved to work with and write for dance bands after further study.

FH therefore began studying at the School of Music at his home state university and went through to a B.S. degree in music education in three years. He had had so many success experiences in music both in competition with others and in band work that he felt very confident of his ability, and several of his undergraduate professors added to this feeling, "predicting huge successes" for him in music. As soon as he graduated, FH, now married a year proceeded to work toward his master's degree. To do this he and his wife moved to New York, partly because one of his undergraduate professors had moved there to teach theory, for which FH now had a definite preference, and partly because they "both wanted to go to New York." FH moved rapidly through his master's program in two semesters and while doing so gained a great deal of impetus for further growth in music. He wondered whether it was because it was necessary to prepare so early for proficiency in music that he did not seem to have had many outstanding teachers in college, despite the fact that as advisers and encouragers they helped him a great deal.

After a temporary job as band director for one year at a midwestern college, FH moved to an assistant professorship at a college in a southwestern state where he taught for five years. He then began work on his Ph.D. degree, mainly because while he was teaching it was specified that advance beyond the level of assistant professor depended on possession of the doctoral degree. He had not seriously considered taking a doctorate before this, but as he was preparing to move to another college anyway, thought that he should do the study. The major alternative qualification for promotion besides the Ph.D. degree was to be very well known. Thus for FH, doctoral study was less a quest for further knowledge than a matter of a necessary qualification for promotion.
In early childhood, and indeed throughout his educational career, GH found school very easy and was always among the best in his classes. His parents gave some encouragement to him, wanting him to do well, and not demanding that he necessarily excell. Both parents read a great deal, his mother becoming a librarian, and as a youngster GH spent a great deal of time reading. He enjoyed doing it at the time, but later thought that he might not have been reading for the best motives. The public library used to sponsor contests within age-groups, giving prizes to those who turned in the most book reports in summer. GH read so many that the librarians were soon hard put to it to find materials for him. In high school he completed in one summer all the outside readings required for the next three years, but he did no more than was necessary. His overall impression was that his reading was rather misdirected and done for competitive reasons, which have always been good reasons for GH, and thus have left him with no current desire for recreational reading.

GH recalled that a third grade teacher had been very encouraging to him, but he considered her not too important since he "always felt good about" teachers. Of the two marked exceptions to this, the high school principal and the instrumental music director from the sixth through the eighth grades, the latter was frankly hated, both for his incompetence and for his unfortunate personal disposition. He was eventually fired. His successor was very largely responsible for GH's decision to make a career of music, and the two became very close friends and have remained so. Musical interests for GH dated back to when he was about seven or eight years old and was having battles with his mother over piano lessons, until, having heard and marveled at the local high school band, GH argued successfully for permission to take drum lessons. GH made such fast progress that within another year or so he was playing in the high school band, along with three close friends who had achieved similar distinction with the trumpet. From the sixth grade on, GH entered music contests and did very well indeed, reaching state championship level on several occasions.

GH's father was in the food processing business and had long been an employer of itinerant workers during the summer. GH often accompanied him on his rounds and gradually learned how to handle these people, so that by the time he was fifteen he was given complete charge of them as a "field man," and until he began his Ph.D. program occupied himself with this work each
summer, learning how to speak their language and how to understand them. His ability and interest in this work grew to mean so much to GH that he counted it as of inestimable value to him as a prospective college teacher in helping him to work with people easily and efficiently, and as making a strong contribution to the kind of person he now is.

Of the three friends who played the trumpet, one was particularly close to GH because of the similarity of their backgrounds. This friend was two years older and when GH was ready for college, he went to study engineering with his friend, largely on his advice. Although he had some difficulties in an accelerated mathematics program, he did well enough in other subjects to feel that he could have graduated as an engineer. Accounting for his feeling of something less than satisfaction in his study, GH believed it was probably a combination of the increasing threat of the draft preventing his finishing and the reactions of a small-town boy in a big university. He had completed high school one semester early and studied engineering for spring quarter, and he then left to work with his father until drafted several months later.

Service for two years was almost a complete hiatus in his life, except for a little maturing and broadening of views. On discharge, GH definitely decided to study music and threw himself into his work with a feeling of having released considerable energy. Lacking information about career opportunities in music, he decided to obtain his bachelor's degree and then begin teaching. During this undergraduate period, he had the benefit of contacts with three outstanding professors, of whom he continued to associate with one and to write to the others. It was on the recommendation of one of these men that GH obtained his first job, at a university. A major surprise came when he found that he was expected to study for his M.A. degree, and, after doing that, he then discovered that he should get a Ph.D. degree if he really wanted to achieve a satisfactory position. This trend, he noted, was becoming more marked in music, where until a few years ago, technical proficiency alone had been considered a better qualification than the doctoral degree.

GH believed, therefore, that the primary motivation in studying for the advanced degree was the desire to qualify for job opportunities in the field. In addition, there were reasons connected with the desire for personal growth, although he remarked that one cannot always work in one's favorite area. Despite his feeling of possessing a very suitable background for working with others as in college teaching, GH felt that, if it
were not for the fact that there were relatively few opportuni-
ties for professional musicians in this country, he would not be preparing for a career of college teaching.

Finally, GH testified to the tremendous influence his wife has had on him, in re-creating for him the experience of a very happy family life in his childhood. If the Ph.D. degree had meant the sacrifice of familial happiness he would not have continued with it, but at present he feels strongly the desire to achieve his goal and thus provide better for his family.

GJ Education

GJ's most vivid memories of his early years were of sheer drudgery on his father's farm. His mother and father had had little education, the family was poor, and GJ's help was needed out in the fields, especially in the spring for thinning and hoeing the beets and in the late summer and early fall for harvest. This pattern began when he was of school age and continued so long that he felt he was always about two years behind his age-mates, and in terms of average age-grade placement this was in fact the case. Although he was a good enough student to keep up with the average of his class, he was not at all self-confi-
dent in school work. He liked school, probably because of the contrast with the hard work at home, and also because of his athletic abilities which depended more on the very strength and coordination he had developed on the farm and less on prior fun-
damentals. At the time when he was in the junior and the senior high school levels, he believed himself to be of average physical maturity but not quite average in mental maturity.

By the time he had reached the eighth grade, DT had been held back twice, and then his father wanted him to leave school and work as a farm laborer. GJ felt he just could not endure that kind of life and so at the age of fifteen he left home and supported himself through high school. He believed that it was the right thing to do, if only against the judgment that none of his brothers and sisters completed high school. GJ liked ath-
letics and formed a very close friendship with the coach and his wife, living with them during the school year and working on ranches during the summer months. These "foster parents," toget-
er with the superintendent of schools, took a close interest in GJ, probably because of his circumstances, and also partly because he had a good future ahead of him. He took extra work at night, competed successfully in athletics, entered debating and dramatics, and, besides enjoying himself, he was able to graduate in three years.
After two years of military service, GJ worked in a meatpacking plant for a short time and then began his college work. He had married, and therefore attended a small university near where his wife was completing her nursing training, after which he went to a large state university. Before service he had contemplated both medicine and teaching as possible careers, but later discarded the idea of medicine and began to work towards a major in physical education. He was quite enthusiastic about it at first but rapidly got "fed up" with the poor quality of the teachers, who seemed to him to be mostly professional footballers. Early in his sophomore year he took a course in industrial arts toward a projected minor area, and such was the impact of the instructor teaching the course that he rather quickly decided to make industrial arts his major area. It was not that he had any special background in the subject--on the contrary, he had never taken it before. The important feature of this experience GJ said, was the very personal interest that the instructor took in his students, having a remarkable ability to make one feel special, "like a son," and to gain and hold one's confidence. GJ agreed that this man may have served as a kind of father substitute for him, but in retrospect seemed more like a professional model that he should follow. While the most lasting impression on GJ was through the instructor's personality and kindliness rather than through any inherent subject interest, the latter began to develop as GJ worked with his mentor for the next three years. From being an indifferent student previously, GJ became an honors student in college. He began to see that industrial arts had interesting possibilities by the concreteness of its content and that there were thus few problems of motivation and discipline. Since GJ still had enough credit hours in physical education, he did not feel that he had made a drastic change at first, but gradually, as he worked as an assistant to his instructor and helped him at his home, he became quite committed to industrial arts.

Graduated B.S. in education, GJ had a very pleasant year in a U.S. territory, teaching industrial arts in a high school and working part-time on the faculty of a junior college. Then came two years as principal of a small country high school in his wife's home town where he had lived for a short time previously. He felt that had he had this experience immediately after graduation, he would have left teaching because of the pettiness of the small community, the poor facilities and the way the local people looked upon him as a "young upstart." From this job he gained a promotion to a position as industrial arts teacher and coach in the largest high school in the state. At about this time he began to work on his M.A. degree in industrial
arts and guidance in summers at a state college. Two years after starting on this project he and a friend who was taking the same course met an instructor who told them about the doctoral program on which GJ was currently working. GJ's friend was first offered the instructorship and, when he had completed his doctorate, it was then offered to GJ.

GJ believed that he had had his ambitions directed toward the doctoral program while working on his master's degree, having then become deeply committed to making teaching his life. He thought then that he might as well get to the top, especially since there were opportunities for financial help and experience while doing so.

HJ Entomology

HJ recalled that his childhood was a period of great freedom in that a large room in his family's huge old house was set aside especially for him, and he was also given an allowance so that he could buy what he wanted for the room. He early became interested in chemistry, buying a set with which to experiment and soon making use of a high school text on the subject, although still not out of sixth grade himself. Having two half sisters very much older than himself, HJ was virtually an only child. He was not especially encouraged to read, but did a good deal of reading in chemistry nevertheless, and looked forward with great anticipation to high school chemistry courses. Arithmetic, vividly recalled in the shape of a little red book, was his difficulty in school; in other respects he was about average in his work, but felt, almost to his senior year in college, that he was dawdling and somewhat purposeless in school. He much preferred "fooling around to studying." While he spent many hours playing with other boys, the frequent rainy weather in his southern town kept him indoors a good deal. His father was a stockbroker and understood so little about chemistry that he was often completely mystified by HJ's experiments, and in this way gave some indirect encouragement to his son.

In high school only two science courses were available, physics for juniors and chemistry for seniors, and thus HJ had a long wait to get to his beloved subject. He was not disappointed, however, for in both courses he had excellent teachers who helped him understand some things that had formerly seemed rather mysterious. He believed that many of his present understandings and attitudes in both subjects have stemmed directly from these experiences.
Beginning college just before his seventeenth birthday, HJ found himself intellectually well prepared, but not really mature since he believed he overdid his social activities in fraternity, college, and city. For two years he just got by, doing very little study, until, near the end of his junior year, his father died. Now, he realized, he would have to finance himself with what he had saved from his allowance, and "the party would have to stop." He had been planning a career in medicine, but at this point, anticipating military service in addition to his college work, he did not feel obliged to decide on his future vocation with any finality. Thus HJ enrolled in a summer course in entomology with the idea of complementing his botany and zoology courses, and also partly because it was the only offering that suited him.

The course was a major event in his life and the significant thing about it was the young, vigorous, imaginative teacher. This professor, who had only just completed his doctorate, did not do things in an unorthodox fashion, but he did make himself very companionable on field trips and in laboratory work, while still demanding high standards of accomplishment from the students. Later, HJ took two more courses from this man and also did some early graduate work under his direction. As his assistant museum curator, HJ had close contact with him and gained much sound training as a result. After this first course in entomology, HJ felt that this was a good field of study, and therefore he entered graduate school as soon as he had completed his B.S. degree. The quality of his work had improved a great deal since his father's death and since the entomology course, so that in his senior year he accepted a small departmental job in zoology which provided for some teaching and tutoring in a laboratory section. On probation in the first semester because of his poor undergraduate record, HJ later forged ahead and completed his M.S. degree in what was now his true interest—entomology. Within three months of graduation he had married and entered the army.

In military service for over two years, HJ planned as to how he could do more graduate work upon his release. He felt that his interest in his subject was so strong that he wanted to do more, and also that somehow he must make the expenditure of all his savings on his master's degree pay off. The offer of a good assistantship together with his G.I. bill gave him the chance that he needed to advance his knowledge, because he knew that few entomologists got very far without a doctorate degree. While he did not especially favor any one work setting, being receptive to industry, or government, or teaching, he felt he
needed the extra qualification in order to avoid feeling restricted on the job, as frequently happened, for example, to entomologists who joined insect control companies.

HI English

The eldest of a family of eight children, HI had a highly stimulating home environment in that her mother had kept up her own scholarly interests in Latin, German, and mathematics, and her father, a teacher of English at a business college, had always encouraged HI to go to college. Although HI did not read at a particularly early age, she clearly recalled visiting the public library to get books very soon after she could read, and she also had "piles of books and magazines" to read at home. Although some of these materials were "light," none were in the category of comic books or "trash." HI's love for reading grew stronger, and by the age of twelve she was reading Jane Eyre, Jack London's and O. Henry's stories, and many others. She even tried to write a novel herself at about this age.

School was easy and pleasant for HI, and for her sisters as well, but, until her sophomore year in high school, most of the encouragement to read and study came from her father and from the library at home. However, at about this time she began taking English courses with a teacher who made her subject very interesting, so that HI began to do independent work by checking at home in editions other than the ones studied in school, and she found a tremendous satisfaction in this. She formed no personal friendship with the teacher but recognized that the latter's influence, through the satisfactions HI obtained from her classes, was profound. On the whole HI was a good and interested student at school, being top of the class, but was not outstanding in anything other than school work.

When HI graduated from high school the great economic depression was beginning and for many years she failed to realize a strong ambition to go to college, a disappointment that was deeply shared by her father. She began secretarial work, attending business college at night to improve her qualifications, and she also read a great deal. Another interest now began to wax in the form of music; she played the violin in a symphony orchestra for many years. Her mother's influence was more pronounced here, while her father was always the chief source of encouragement in her work and her academic achievements, and in fact, he still is a strong influence.
HI worked, went to business college, and played in the orchestra for some fourteen years. She then served as a tele-type operator in the navy for two years and found that she enjoyed the routine efficiency she found there. Released from service, she took a job as secretary to the president of a small college with the understanding that she could attend classes in the evenings and at least one hour per day. Using this means to realize a life-long ambition, she attained an A.B. degree in four years, and then took a graduate assistantship with some teaching at another university. The period of undergraduate work was almost crucial in her life, since it was then that she decided to devote her energies toward qualifying herself for university teaching, vowing never to return to secretarial work in the business world. As secretary to the college president she had been able to associate with faculty members of her own age and level of maturity, and, although technically an undergraduate, she felt that this was the life for her. However, her recollection of the decision as to what she was going to major in, and later teach, was that nothing else seemed possible--"English just seemed the logical thing to teach." She was clearly more devoted to the academic life than to teaching, and even now feels that if she could stay in university work without teaching she would gladly do so.

After graduating with a master's degree from the second university, HI returned to her undergraduate college to teach, agreeing at the time that she would qualify herself for the doctorate within five years. She believed that, despite this immediate cause, she probably would soon have continued with the doctorate as a result of her own attitudes.

Surveying her life, HI believed that she was not particularly interested in English, but had merely had a background of voracious reading as a child and later during her business career. However, she also recalled that in her adolescent years she had become interested in reading the literary criticism section of a magazine and had always kept up this kind of reading. She was quite certain that her father had had a most formative influence on her life, being the main driving force urging her to go to college: "if I decided to skip this degree business, Daddy would just fold up and die." The teacher who gave the first solid course in English was considered important in leading HI to delve into literary criticism. The secretarial job with the president played its part, and during this time, and also later while teaching at the same institution, her literary abilities were recognized by various assignments in public relations work. She also was recognized in the American College and Universities Who's Who when she had graduated with her baccalaureate degree.
In his boyhood, IJ lived on a ranch in the Southwest, and, as a very small child, he liked to model in clay and mud from the irrigation ditches. His mother was a piano teacher and keen to give her children cultural backgrounds if they were interested in anything that had cultural possibilities. Thus, when IJ was only seven his mother had him work with a grade school teacher who was a family friend and who had a strong interest in ceramics. For one morning a week IJ worked with this tutor, and although his attention often faltered at first, she was skillful enough to vary the program in such a way as to keep him interested. He modelled things from pictures and soon began to hunt for and dig up clay for himself. An important part of this six-year "course," IJ believed, was the help the tutor gave in finishing off his efforts by firing and glazing them, thus avoiding the frequent disappointment and discouragement of having many things only partially finished.

At school IJ was interested in art work, and painted scenery for plays from the sixth to the eighth grades. In senior high school, however, he began to develop an academic bent, becoming so capable and interested in mathematics that he began seriously to consider a career in that subject. Interestingly, his absorption with ceramics was for a long time cultural, and developed along firmly vocational lines after his liking for mathematics. Although he studied art in high school, there was no opportunity to develop in ceramics until the twelfth grade. In this last year he took a ceramics course at a nearby junior college, and, as part of a vocational exploration project, interviewed the instructor who advised him to try teaching ceramics as a career.

In the first year of junior college, IJ began to decide quite firmly on ceramics rather than mathematics as his future field of work because, although mathematics was greatly challenging, ceramics held more intrinsic fascination. Highly satisfying experiences in using a potter's wheel during the next year further confirmed the decision that this was the best field for his creative needs. Up to this point the most significant person in promoting the formation of IJ's interests was his boyhood tutor, and it was through her introduction to a celebrated ceramist at a large western university that he began a most rewarding association with this man. The latter was a "very philosophical type" and made the field of ceramics seem intensely satisfying. At the end of two years there, IJ had a bachelor's degree in fine arts.
arts with a major in art education, and, besides the personal encouragement from his teacher, which included doing some teaching for him, he had displayed his work at a county exhibition of high repute.

For the next year, IJ worked as a consultant to a city ceramics plant and taught ceramics to adults in the evenings. The following summer he went to Europe visiting some ceramics plants and studying in museums some of the originals he had read about in college. This was a valuable experience both from a broadening point of view and also for the good background it supplied for some of his later teaching duties in the history of art. A year's teaching in a junior high school followed, and although he had an interesting assignment, the setting up of a ceramics department, the many discipline problems he encountered made him rather dissatisfied with teaching and promoted greater attention toward individual creative work. Service in the army as an artillery computer for nearly two years was interesting because of the mathematics involved, but in general he became more fixed in his determination to work in industrial ceramics.

Upon release from service, therefore, IJ entered a university well-known for its ceramics department and soon graduated with a master's degree in industrial ceramics design. His advisor was very influential in modifying his values from the highly decorative to the functional, and in developing a philosophical rather than a merely technical approach. IJ found that while mechanics were important he should not become involved in them to the exclusion of the aesthetic, philosophical aspect. Partly because of this, he again began to waver about his further career plans, resolving this at first by deciding to do whatever might turn up. He did just that, teaching painting for six months at another junior high school and again experiencing problems with discipline and having a generally dissatisfying time. Then he was hired for summer teaching by his college and found it so pleasant that he decided to continue at it. A third venture into the public schools was better, but even after teaching general art to all grades of a senior high school, he decided to continue to the doctoral level. The main reasons for this latter decision were, first, that he had the G.I. bill which enabled him to finish, and secondly, that he very much wanted to teach at college.

However, IJ was still somewhat undecided about these reasons, because, although he preferred college to high school work, he had not completely abandoned the idea of industrial
work. The doctor's degree, he said, was not absolutely neces-
sary for college work, but, as he had planned it, it was far
more satisfying to him to have the degree in the subject itself
than to have it in education. He had an excellent teaching job
to enter, but, whether he stayed in teaching or changed to in-
dustrial work, he strongly desired independence and the oppor-
tunity to produce his own ideas.

IK  Geology

IK described himself in his early years in elementary
school as "an omnivorous reader, filled with natural curiosity
to find out things" for himself. To a large extent he accounted
for this by his parents' inability to answer his questions, but
they aided him by always stressing the importance of becoming
educated. "No matter what I would do later, education would help
me. I would be a better person to myself and to society." Thus,
in his elementary schooling IK read at many levels of difficulty,
often so far above his real understanding that he had to go back
later and re-read to understand some of the material properly.
Fortunately the public library was near at hand--although he
believed that it would not have mattered had it been far away--
and here he spent hours and hours of his spare time.

For IK the eighth and ninth grades were times in which he
was strongly influenced by the values of his friends from whom
he acquired the desire to leave school and work as a garage
mechanic, and as a result he took a great interest in vocational
courses. Later in high school he found his teachers more inspir-
ing and developed a real love for learning. All sciences fasci-
nated him, as did English, philosophy, and others, the one marked
exception being mathematics. After finishing twelfth grade, uni-
versity study seemed a perfectly natural thing to do.

The first acquaintance made with geology was in a general
science course in junior high school. The teacher of this course
was a keen amateur scientist, had traveled extensively overseas
before becoming a teacher, and was to IK "very different from the
average run of teachers." It is abundantly clear that this man
had a marked effect on IK, in showing him the fascinations of
science. "The wonderful anecdotes of really unusual happenings"
elicted from IK the same response that the teacher seemed to
feel. Two high-school teachers of chemistry were recalled as
significant also. The first accused him of laziness in not doing
nearly as well as he could, a challenge accepted by IK with great
improvement in work as a result. The second teacher, who had
started in geology before becoming a teacher, was important in
providing many personal contacts which served the dual function of "partially fulfilling natural curiosity" and urging that IK go on to college.

In college he studied five different fields of science in his first two years of general education, and then elected to pursue an honors B.S. degree in geology, this requiring three more years of specialized study. IK's parents were not happy with his choice of geology, preferring a more "staid" career, but made no issue of it and left the decision to IK. In the introductory course in geology the teacher presented the material well, in IK's present judgment, and although he thought it somewhat dry and difficult at the time, he also found it tremendously challenging. "There were vast fields of unknowns, with so much to be known...It was like a great big jig-saw puzzle that hadn't been solved and I wanted a piece of it." He became personally acquainted with this teacher, later became his graduate student, and soon found greater challenges in the field to pique his curiosity. Other teachers in this small geology department also had a strong influence on IK's interest.

During these three years of specialization, IK had many summer work experiences in responsible positions which served to reinforce his interest by integrating theory and practice. Further, he felt that these experiences had a stimulating effect by providing many opportunities for traveling and meeting other people in the same field. Typical of a summer job was an exploration he led into Labrador, where, although not doing original conceptual work, he felt strongly that he was making a significant contribution to geology by delimiting established concepts.

After graduation from the honors course, IK had two different jobs. One, with a seismographic company, had the effect of arousing further desire for geology because he disliked the great amount of mathematics used in geophysical work. "It helped in fact to crystallize in my mind what I wanted to be." The other job was with an oil company for six months. Here he felt that he was doing excellent work since some of his recommendations were sent down to the main office and acted upon, "and this is as far as you can get in oil companies." Between these two jobs he married and soon began to consider further study, a project which his wife strongly encouraged.

Looking back on his experience, IK felt that most of the experiences affecting his interests were good. He observed that they may possibly have been bad but said that he felt too emotionally involved in them at the time to have evaluated them
properly. His trial and error experience in geophysics, he believed, was a profitable one in that it confirmed him in his later specialty. He remarked that it was better to have done this than to have accepted someone's word for it because of the possibility of the haunting suspicion that it might really have been the best. JK's work experiences emphasized for him the limited satisfactions he could obtain with the qualifications he then had, and it was for this major reason that he continued with his M.S. degree and later his Ph.D. Although he realized the concomitant material advantages from further study, he felt a strong urge to broaden his outlook. This had in fact occurred, inasmuch as he now feels that the setting within which he may pursue his chosen field of interest—whether teaching, government, or research—is much less important than that he pursue it at a high level.

JK History

JK's father was a teacher who started his career in one-room schools and eventually became a professor of education. Although he taught all subjects, he had a special liking for history and frequently used family trips as an opportunity for passing his enthusiasm on to the two children. JK learned to read before she went to school and was very keen on reading for a long time, having a special love for the many historical novels available at home. After an elementary education that was uneventful except for the skipping of sixth grade, she went to a small practice high school attached to a southern university. Here she had good teachers, but, apart from history and literature, she developed no special enthusiasms. The history teacher aroused great admiration in JK because of the breadth of her knowledge and her interest in current affairs. Had other teachers been more challenging than this one, JK believes she might not have continued in history. JK and her younger brother were both good in school work, but she always felt that, while he was quite independent in making his decisions, she was rather "spineless" in acceding to other people's wishes. For example, she felt that she had to take Latin somewhat against her wishes, while her brother could refuse to do such things with impunity.

Both her mother and her father were quite determined that JK go to college and get an A.B. degree, after which, it was agreed, she could please herself what she did. Thus after high school graduation at the early age of fifteen, JK went to a small college for women which was quite close to her home, and here she had a very good history teacher in her freshman year. It was a
"tough" course, and, trying as usual to do what people told her, JK worked like a dog on the heavy reading list," did well, and found it more rewarding than other things. The teacher was quite impressive personally, being knowledgeable, dynamic, interesting, but quite humorless. In her second year in history an older, more scholarly professor interested her even more. The author of a standard text, he seemed to be oriented, as JK believed she and other products of the 'thirties were, toward explaining historical trends in economic terms. By the time she was a junior in college, she felt that history was a synthesis of all the basic knowledge of the universe, recognizing in addition the importance of the scientific point of view. At that time JK had no idea that an historian could do anything else but teach and this she decided to do. Earlier, however, she had also advanced in botany and was sufficiently interested in plant genetics to apply for jobs in that field, only to find that she was not being hired because she was a woman.

At nineteen she was elected to Phi Beta Kappa, had graduated with a B.A. in history, and was qualified to teach. Although she had enjoyed practice teaching, she did not like working at the junior high school level, because the students seemed almost as old as she was. After one year, therefore, she began work on her M.A. in summer school and stayed on in the regular session, partly with the idea of becoming qualified as a high school teacher, but chiefly "for want of something else to do." She was at this time studying economics as well as history and becoming quite interested in it, and in addition she was writing her thesis and corresponding with her adviser about it.

JK "did not look too hard for a job," and therefore served for over three years in the navy during the war, after which, for reasons of personal convenience, she taught biology for a semester. Then, feeling that she was in no great hurry, she began college work again with sociology and some history, graduating, "after some thesis trouble," at the end of three more years. In the meantime, after her first post-war year of college, she began teaching many different subjects--too many, she thought--at a four year junior college. She really enjoyed her work in several areas of history and other social sciences, and liked working with these students, so that she stayed on for seven years. In all her teaching, she said, she used an historical approach, especially in the social sciences, but she also tried to emphasize the principles of those sciences in the teaching of history.
As for her reasons for doing graduate work, JK believed there was nothing she sought in the Ph.D. program except to give her the kind of job she would like to have. She had "played with the idea before," two years earlier, while attending summer session, having planned to intersperse teaching with study year by year until she had the degree. Some personal reasons were significant in her selection of a university with which her mother and father had both been associated. Quite important in carrying right on with the program, however, was the offer of an assistantship soon after she had started. She believed that to a large extent her commitment had gradually matured and become irreversible. Reviewing the origins of her interest, she believed that the early and continuing influence of her father was highly significant, and said that she still "fights it out with him" on topics of mutual interest.

JL Horticulture

JL's father was a master plumber, who, like his father before him, was extremely keen on gardening as a recreation, planting almost every square foot of their relatively large plot in flowers and vegetables. JK grew to like gardening simply by sharing in the activities from a very early age, and by the age of eight was growing flowers in his own little portion. Another interest gained from his father was reading, for which there were many books available and also a continual supply of bulletins from horticultural research stations. School was usually pleasant and rather easy for JL, and he felt that he was mostly up in about the top ten per cent of his class. He developed quite wide interests in school, and recalled that he achieved well at least partly because of the competitive setting in which much of the work took place. After grade school, however, he lost some of his interest in school, and he ascribed this partly to the discouragement he felt with languages. A general science course he had in junior high school was rather dull. "Had I had another one like it, I might never have become interested in science." The main trouble, he believed, was the impression he got of science as a composite of "isolated bits of information." Thus, between about the seventh and the tenth grades, JL's academic interests were at a low ebb.

His choice of the neighboring high school was made, not on the basis of convenience, but only after seriously considering the value of a vocational agricultural high school further away, the headmaster of which lived near JL's home. Although at this point JL's career ideas were vaguely expressed as not wanting to be a farm manager, he believed that even then he had the germ of
an idea to do research, and therefore rejected the vocational school as providing inadequate preparation for a full college program. In eleventh grade at the regular high school, JL had a most stimulating course in chemistry in which, to his delight, the teacher began explaining some of the things JL "had been wondering about." These wonderings had resulted largely from his father, who, although he had no college education, talked with JL about scientific problems as the two worked together. Very soon JL requested and was given a chemistry set which he installed in the basement and which soon began to be supplemented by further chemical supplies given him by the teacher. For the whole of this year, teacher and pupil maintained a very close relationship, sparked by JL's growing interest in chemistry. In twelfth grade JL had a course in biology from another teacher who might well have stifled any scientific interest, no matter how strong. As JL expressed it, "He may have known his material, but he was terrible. He made us outline text-book material on our assignments, and I could not bring myself to do this busyness. I knew all the stuff on quizzes because of the fine text-book, but this fellow gave me D both quarters." Despite the strong negative feelings aroused by this course, JL believed that he remained intensely interested and able in botany, but less so in zoology. His high school headmaster was also significant, in giving a great deal of encouragement that meant so much to JL that the two have remained firm friends ever since.

Just as the choice of high school had been carefully considered, so too was the choice of college. Although "there was no doubt in the folks' minds" about JL's continuing at college, he himself was rather undecided. Influenced to a large extent by some friends of the family who had majored in horticulture at the university of a neighboring state, JL decided to go there also, aware only that he "wanted to do something with plants." He began in agriculture, but, finding himself getting involved in such subjects as poultry husbandry, he later switched to horticulture. One year's military service after his freshman year was of little importance, except perhaps to foster some maturity feelings as a result of absence from home, perhaps more so since he had felt somewhat immature graduating from high school just after his seventeenth birthday.

Part of JL's indecision as to a future career was due to the fact that he liked so many of the science courses. For example, he still liked chemistry so much that after service he decided on this as his major, but changed his mind when he found that two languages were required for later advancement. It was probably at the end of his sophomore year, he thought, that he began to realize that botany or horticulture was his real
interest, but he had little opportunity for work in either of these fields until his third and fourth years. He was fortunate in eventually making contacts with stimulating professors in botany, horticulture, and entomology, the last of these being particularly generous of his time. A special feature of botany was a problems course in which he reviewed the literature on certain topics and gained a great deal as a result. The biological sciences claimed more and more of his attention, even when he should have been preparing work in other courses.

In the last summer before graduation JL had worked on the university's horticulture farms and, through the head of the department of horticulture, had become interested in plant breeding. This man had advised him to do graduate work, and in the summer that he graduated he worked with another authority in plant breeding at another university and decided that that was what he really wanted to do. He had by this time become much less indecisive and thought during his senior year that he had come to know what he really wanted out of life. "I had a full head of steam and just kept going." Thus JL proceeded to his master's degree at the second university doing a great deal of theoretical work with the idea of balancing this with more practical training at a third university later.

He continued to work at this university for three years after obtaining his master's degree, knowing that the Ph.D. degree was his ultimate goal, but debating how much further experience he needed before tackling it. He then applied for assistantships at three other universities and was accepted by each. He noted that, while at the time of application he had been concerned about an assistantship for financial reasons, he counted the experience gained as an assistant as being almost as important as course work in contributing to his intellectual development.

For JL the major reason for doing the Ph.D. degree was to gain both the knowledge and the freedom to conceive and to carry through his own researches instead of doing what others required to be done. In addition, he noted that possession of the degree was necessary for college teaching and that this could scarcely be divorced from considerations of money and status, but added that in his total value system the desire to do research was primary.
By the time he was ten years old KL was an orphan, having lost his mother in that year and his father four years earlier. His father's death was very traumatic since KL understood perfectly well what had happened and could see through the euphemisms and half-truths that his relatives used to explain about his father. He had felt somewhat different from other children before this because his father had had tuberculosis and was seldom "available" in the sense that other boys' fathers were. KL recalled very clearly a certain day when his father was well enough to go for a stroll and to talk with him, "I felt wonderful."

KL never enjoyed school, and this was exemplified by the extreme difficulties he had in getting to school in time each morning. Since during most of this time his mother was not well either, KL felt that to a large extent his life at this time was dominated by women, because his maternal aunt and her two daughters began to share in looking after him. He believed that because of this feminine influence he was retarded in learning masculine skills of playing ball and using tools and had to acquire these later in life. An early preoccupation was reading, and while there were not many books available at home, he remembered reading Lamb's Tales from Shakespeare at the age of eight. As his mother's condition began to deteriorate, KL was placed in an orphanage, and by the time his mother died six months later he had already begun to carve out a new life for himself, so that although the immediate impact of her death was tremendous, he soon recovered from it.

At the orphanage there were plenty of books, and KL was able to satisfy his desire to read; in particular he began studying elementary chemistry books. He noted, "In an indirect manner it may have stemmed from feelings of insecurity, wanting to find out what life was all about. My interest went over into biochemistry." Whatever the motivation, KL soon became so competent that when he was only thirteen he was helping high school students with their chemistry. Part of his interest he felt was due to his elder cousin's job as a chemical engineer. Because of his frequent absences, KL had to repeat the third grade, but apart from this instance he progressed satisfactorily in elementary school.

When it was time for him to enter secondary school his aunt was reluctant to encourage college preparatory courses, partly, KL believed, because of her own son's difficulties in
finding work during the depression as a chemical engineer. She urged trade school, but later considered that it would be all right for him to go to the general high school. Later he often felt that he "could have skipped three years of high school and missed nothing." He liked most of his teachers, although he felt that some of the women were overly maternal to him, partly because he was a good student, and partly because of his "underprivileged" background. "There were all sorts of minimal cues for detecting the orphanage boys, the most notable of which were the brown paper bags in which we carried our lunches, and our absence from social activities." Two teachers KL strongly disliked were, first, a sarcastic physics teacher, who "generated a great deal of tension, required a lot of busywork and gave everyone an intense dislike for physics," and second, a teacher of twelfth grade English who had finicky and childish habits such as deducting marks for failure to dot "i's" correctly. A chemistry teacher, "casual and easy-going, the antithesis of the other fellow," was a favorite of KL, probably because of his already blooming interest in chemistry. At this stage mathematics was not a particular interest, for although he did quite well in it, he actively disliked some of the courses.

KL's aunt kept in close contact with him, eventually taking him into her home when he was sixteen. He had quite enjoyed being at the orphanage, having found a confidant in an older counselor who answered many of his questions, and, through his good grades at school and his performance on the orphanage basketball team, KL was given the Outstanding Boy award and offered a one year scholarship loan for college. Nevertheless, KL felt very strongly that because of his persistent shyness and his after-school work that he was experiencing only the drudgery of high school and none of the real pleasures. By the time he went to live with his aunt he believed he was "too far gone to get into the swing of things." Toward the end of his high school career KL showed such desire and aptitude for college work that his aunt consented to his accepting the scholarship offer.

No sooner had KL begun at college than he fell in love with a girl with almost as unfavorable a home background as he himself had. Their relationship grew very excited with the arousal of strong sexual tensions some of which overflowed into bickerings. As a result of taking a marriage inventory in a mental hygiene course they were advised by a psychology instructor not to get married. However, a sociology teacher, after consulting with each of them, suggested that they go ahead! They were married at the end of KL's first year.
In college KL changed majors several times, not finding anything he "could put body and soul into, so to speak." His first plan was to go into social work, but because he had not taken any courses in this area at the end of the first year, he was required to change his college, and therefore transferred to liberal arts. In his very first quarter he had found the introductory psychology course "enormously stimulating," opening whole new horizons and helping to keep him interested in the subject for some time. He had developed some interest in psychology in his last year of high school, mostly as a result of a desire to straighten himself out since he was not very happy, and he had read Freud's *Introductory Lectures* with this in mind. He became interested and competent in experimental psychology early in his sophomore year but he was rather unsettled about this time and felt that in some ways the expectations in experimental work were too great. Because of his marriage KL was unable to have his scholarship renewed, and he believed that had it not been for his wife's help and her persistent belief in him that he would have left college at this point because of financial problems. During this year he also became interested in clinical psychology, and yet, although he was greatly encouraged in this by one professor, he felt that he would have "acquired no new power over the environment."

At the end of his sophomore year, however, his financial problems were considerably helped by his appointment as research assistant to an Air Force project in psychology. He stayed on this for two years, but "was not too enthusiastic about it," never feeling that he was doing anything "personally important." Another feeling he had here, which turned out to be highly significant, was that most of the people on the project were woefully lacking in mathematical skills and understandings. His own mathematical abilities were not at all outstanding, but he thought that if he could prepare himself better in mathematics he could then return to psychology and make a very good contribution. Such a plan served another purpose also--it gave him a good reason to stall further on a vocational decision by using mathematics as a general preparation in which he might somewhere find a really heartfelt goal, probably in an applied field.

Thus, with "not too much intrinsic interest," and with "never a feeling of a career," KL entered upon mathematics, but soon began to feel that "some of the mysteries of the universe were here." He was awarded the B.A. degree with a major in psychology and then decided, almost as he had before, to go on to his M.A. in mathematics and then come back to psychology. After his first year of graduate work, his wife had a baby and this
made him feel that he could not make any wrong choices. He began work in the statistical laboratory of the mathematics department, feeling that he "could tolerate math. well enough."

Upon completion of his master's degree he was awarded a National Science Foundation fellowship which enabled him to leave the laboratory after three years of work there. This made a tremendous difference both to his academic progress (he had been allowed to take only seven hours of credit while in the laboratory), and also to his feelings about himself.

Summarizing his motivations for studying for the doctorate, KL believed that the encouragement of a professor of mathematics was highly significant. This man gave him some needed inspiration about his thesis, and, besides continuing to give him much individual attention, urged him to try for the fellowship, which KL would never have done otherwise. Parenthetically, KL added that at least part of the reason for his low spirits in his sophomore year was the contrast he found between the fine teaching by professors as a freshman and the poor teaching done by graduate students later. Besides the strongly felt need to settle once the baby was born, and the growing feeling that he could do a doctorate if the others round about him were able to, he made a strong point of his wife's belief in him. Ever since their marriage she has played a dominant role. She always wanted him to persist with school and become a college professor, not so much for status reasons as for the kind of life a college professor leads. "She was always assured that I was a genius. This is good for a man's morale if he hears it often enough."

KM Mathematics

KM's mother was a school teacher who did a great deal of individual work with him, especially during the summers. At each of the one-room schools which he attended, he was allowed to skip grades if he could pass certain tests for the grade. His mother was very poor in mathematics and thus her teaching was rather skimpy, but she worked him hard at assignments and quizzes in the tool subjects; when he was only three she taught him to recite a thirty-two line verse. KM thought that this pushing from behind should have irked him considerably, but he was not aware of this at the time. However, his two older brothers and a twin sister actively rebelled at this same prodding, one brother becoming almost a complete anti-intellectual as a result of it.
KM won county spelling bees, and by showing off his knowledge to people by asking them to spell difficult words and supply facts that he thought they would not know, he soon made himself "quite obnoxious." These values gained from his mother's influence had such a lasting effect that he has never lived down his early reputation. KM had very limited access to books at home and there was no school library so that the books a teacher aunt sent to him were very welcome. He read omnivorously and felt that he had no specialty, only "an undirected zeal toward learning." A cousin who was very able in school and who became an M.D. was often held up to the family as an example of what careful application to school work might produce, but he eventually became not at all well liked by KM's brothers.

Because of grade skipping KM found himself ready to enter the ninth grade before he had had his eleventh birthday. The family was now living in another state and he was deemed too young to enter high school with the result that he was held back a year, finishing twelfth grade just before he was sixteen. KM said, "You can't skip four grades without losing something," but in his case he was not having great difficulties, although he had to work hard to keep up to the average of his older classmates, and he had to struggle to keep up in mathematics because of lacks in basic knowledge. Then, in tenth grade a remarkable incident occurred. He burned his foot so badly that he was incapacitated for three weeks, and, feeling himself to be lagging in plane geometry, he began to study it more systematically. He felt that this was a really significant event in his career—the realization during that period of self-teaching that mathematics was a logical, systematically organized subject which could be "dug out" and understood.

After this incident he took a new and increasing interest in mathematics, getting books from the library on the subject and devoting so much attention to it that his other work began to suffer a little. Some teachers encouraged him by giving him books and he began to do very well in his new interest, tackling more and more difficult problems. He had a strong desire for recognition for a long time, but sheer interest and a sense of accomplishment played the most important role. It was, he said, "as though one had been living in darkness, and then had a new reaction to a vision." He believed that the prospect of recognition was still attractive to him, despite the great satisfactions he could still obtain from mathematics as an intellectual exercise, and despite an almost complete lack of recognition for some time.
There is another side to KM which has provided him with much recognition and in some ways even more satisfactions. Just before graduation from high school he began to study checkers in books for the first time. He had played with indifferent success before beginning high school, but in the twelfth grade he learned that there were books on the subject. He thought that he might have first been somewhat bothered by losing a number of games, but, whatever the reason, he soon began to read books on the subject at a tremendous rate, and felt his eyes opening and his mind becoming fascinated. Such was his devotion to checkers through reading and playing that he has since become recognized, in this country at any rate, as the world's champion, and as such has played leading performers on an overseas tour. In many ways, he believed, checkers has satisfied more of his needs than has mathematics, giving him aesthetic, competitive, scientific, and research satisfactions. Mathematics for KM has fewer of the "brazenly competitive" aspects of checkers, although the scientific rigor is greater and discovery comes harder.

Following high school, KM entered the university as a matter of course, feeling still greatly subject to the influence of his mother and family. Even though his interests did not warrant it, he took a pre-medical course until he was drafted. Largely because of his mathematical ability he passed a test in the navy which few were able to pass, and thus became an electronic technician. His service career he believed to be quite critical, especially since he met a mathematician who "really dropped the scales from his eyes" by showing him scholastic and vocational possibilities in mathematics far beyond his previous understanding. In the service he also met other well-educated people, made great progress in his checkers, and generally had a very educative experience. This was the revival he seemed to need after his self-initiated effort early in high school.

Back at the university after service KM began to take steps to realize his potentialities more fully. Assured now that mathematics did in fact go beyond trigonometry, he changed to a B.S. program with a major in mathematics, and continued with enthusiasm up to the present time, checkers being the only interruption. He recognized that he has since had some serious conflicts of interest between checkers and mathematics, especially since he found he could support himself by playing checkers. He has paid his way through university largely by this means, and has gained a great deal of recognition and accompanying satisfaction, and yet he had always felt that mathematics was his life's work.
Surveying his background from his present vantage point, KM believed that he had been indirectly affected by the influence of some splendid mathematicians, and has felt this to be most true of graduate work, in which he gained a great many satisfactions. He felt that his drive for recognition had largely been satisfied by checkers and that his interest in mathematics had become rather self-less.

LM Mechanical Engineering

LM was an only child whose parents were rather older than most, and he always seemed to get along better with adults than with children. He believed he was not precocious as a child although the neighbors indicated that they liked to hear him talk because he used big words. His father, educated in science in Europe, was a commercial artist and LM's home was cultured, but not especially stimulating, except that when he could read he was encouraged to read the newspaper and books. Socially, he was seldom at ease as a child and as a youth and, although still not "awfully happy with people," he is relatively more outgoing now. In this respect, he believed that his marriage was a crucial point in his self-development, since for the first time "someone really liked me for my own self without my having to work at it and build up a big case about it. I recognized this in my wife long before we were married."

LM felt that probably the two significant factors in his background that pointed overtly toward his ultimate professional interest were long years of building model aeroplanes and an intense desire to find out why things were as they were. Not especially inclined towards mechanical things, he nevertheless had a general preference for the physical sciences in school, especially physics and mathematics. In retrospect he believed he was not strongly influenced toward engineering before college apart from his liking for these basic subjects. His high school record in the college preparatory course was not particularly distinguished; neither was his early work in engineering in college.

However, after two years in college, LM could see looming up some courses in machine shop that he did not particularly care about. He believed that, lacking some self-confidence, he probably questioned his ability to perform them, and that in addition he was "less interested in 'how' courses than 'why' courses." Further, he was dissatisfied with what he had learned, and felt that he was at a crossroads where an important decision had to be made. After talking about this with his dean, he was further influenced by a graduate student instructor to enter
engineering mechanics. LM felt that this instructor, now an outstanding authority in the field, had been a major influence in his life, and, almost to prove the point, LM at that stage began to do much better work. Continuing right on with graduate work after taking the bachelor's degree, he worked in engineering research and also assisted the instructor and a professor. Here he acquired some liking for the academic life.

Graduated with the M.S. degree, he married and went to a large aircraft corporation in the west, where, although his physical working conditions were wretched and the recognition insignificant, LM was happy. It was at about this point that he became "less shy and more cocky" because, despite many misgivings about his ability to produce satisfactory work, he soon found that he "wasn't any worse than the others." The support of his wife was also important at this time. Thus for a year and a half LM gained much self-confidence and ability, working on original theoretical analysis.

His preference for the academic life had grown during this time, especially since he felt he was already working in almost that kind of setting. Thus when he was offered an instructorship by a man he had known at college, he "was just ripe for plucking." Since then he has felt more and more that he has really found himself in his teaching position—so much so, in fact, that in some respects doctoral work became just an interlude. LM rated his major accomplishments as attaining his own personal happiness, to which his marriage contributed substantially, and as feeling professionally competent in his field. In regard to the latter, work on several research projects has contributed more than either his four published articles or his election to two honor societies.

Summing up, LM felt that he was imbued with curiosity about engineering mechanics partly because of the initial impetus he obtained when he entered the field, but, more importantly, because there developed a sense of self-realization as he began to do more and more independent study. Although he felt some pressure from his senior professor and from his wife, he believed that it was mainly because of the desire for more knowledge, and because of a need to prepare well for teaching, that he was doing doctoral study.
The most obvious link between LN's present interests and those of his boyhood was the fact that his father was interested in teaching him how to swim when he was very young. LN did not remember learning how to swim; all he recalled was that at about nine years of age his father had taken him to the beach and encouraged him to play in the water so often that he could soon swim. Baseball with the neighborhood boys was another strong interest of LN's. In the elementary years at school he was a good student, and at junior high school he developed sufficient confidence in mathematics to decide on studying at a technical high school in preparation for an engineering career. However, as he progressed through the grades he became more and more interested and competent in athletics, and began to decline in his scholastic achievements. He was able to pass the special entrance examination for the technical high school; all the good students took the examination, which, he believed, was the major reason he elected to take it. In high school he got C grades and then "snapped out of it" sufficiently in his senior year to make good grades because of an interest in going to college. Thus at the end of his high school days, LN had gained major letters in athletics several times, and, although he was not a really outstanding athlete, he was still much more interested in this than school work. He had some difficulty with French in high school, and has since had further difficulty with languages.

LN's parents had always given him sufficient encouragement in his school work to remove any suggestion that he might not further his education, but they had no really strong influence on his career, apart from a hope that he would go into medicine or dentistry. As a pre-engineering student, LN entered a municipal college, but during his first year, besides having some difficulties with his college work, he found that his scores on an engineering aptitude examination were only fair, while his social science aptitudes were high. After one year, he changed to a history major in liberal arts. Then at the beginning of his junior year, he decided he wanted to go into education. A possible reason may have been the fact that about this time he began to go to camps as a counselor and to find that he could handle groups well, but he was not too sure about this as a reason. Perhaps a more potent factor may have been his successfully competing in varsity athletics and the close contacts with many physical education majors, resulting in a conviction that he too would like to study physical education. His coach in college, he believed, was a very important person in his life, not only through encouraging him in athletics, but by vouching for him
when, because of low grades, he was on the point of being sus-
pended from college; as a result of this intercession, he was
put on probation. As soon as he got well into the physical
education curriculum he began to like college much more.

During his student teaching LN found that he could be
quite successful in front of groups of students, and was told by
supervisors that he would be a good teacher. His camp coun-
seling in addition was valuable in giving him the feeling that he
had good rapport with boys and girls. While substitute teaching
in his home city for almost two years, he took courses in late
afternoon and evening and was graduated M.A. At this point he
was drafted for two years' service, which, he believed, helped
him in two ways. First, it gave him the G.I. bill which greatly
facilitated his further education, and second, he gained a more
serious and mature outlook on life through being away from home.
Upon release from the army, LN taught physical education for one
year and then spent the following summer at a camp counseling
job. The head counselor at this camp had just completed his doc-
torate in physical education and the impression he made on LN was
such that he too wanted to do something very like this--gain his
Ph.D. and teach in college. The counselor did no active encour-
ragement of LN, but rather seemed to personify some of LN's
vaguely felt aspirations, so that whereas previously he had been
writing in a desultory fashion about Ph.D. work to various col-
leges, at that time he really became enthused. Within a very
short time he had made further applications and been accepted for
the following September. It is clear that this summer was a very
important three months for LN because he had found this teaching
position very congenial and had become keen about planning his
future.

Reviewing his educational history, LN believed that his
parents, his college coach, and the idealized head counselor were
important in his development, with the last probably the most
significant of all. The G.I. bill, too, was quite an important
factor. His reasons for doing doctoral work were centered largely
on the aim of teaching in college together with the prestige of
the doctorate. Although these were probably the primary reason
for coming to do advanced study, he has since developed a real
interest in his work, largely as a result of contacts with depart-
mental people and the broader and deeper outlook he has gained.
His good physical coordination, which has served him well in
learning new sports, has naturally been of great significance in
physical education.
MN's father had a pharmacy and this fact undoubtedly influenced the three sons in their vocational choices, two becoming pharmacists and one a chemical engineer. However, MN believed that the influence was rather indirect in his case, except that it provided a setting in which general scientific activities were able to flourish. From an early age he was interested in astronomy and other sciences learned in scouting, and at thirteen he had made a telescope as a result of his own knowledge supplemented by a book on the topic. MN worked in his father's store on occasions, mostly as a clerk and his family always encouraged him to go to college, and yet factors important in the development of his later interests seemed to him to come from other sources.

Scouting was one of these, since it gave him a broad introduction to science, and a high school teacher was another. It was with this teacher of biology and chemistry, who was also the track and soccer coach, that MN felt most comfortable. There was a good deal of genuine liking between the two and MN, a rather shy boy, felt strongly encouraged and more confident that he could succeed in college after having associated with this teacher for three years. The two have maintained an intermittent association since those days. MN established a link between his scouting interests and his biology interests by becoming a nature counselor in a scout camp and felt that this was an important formative influence on his present professional interests. He began to see very clearly "the connection between biology and pharmacy through the study of plants and animals and through learning about the use of plant and animal products as drug materials."

In high school MN began studying in a broad science course in order to get a general preparation for many fields, medicine being one he had in mind. However, at the end of his second year he had decided on pharmacy. During his undergraduate days a chemistry professor who was "a very dignified man, very different from the ordinary," did much to encourage MN in a personal way, although the contacts were not comparable in effect with those with the high school teacher. With the completion of his B.S. degree, MN had accumulated more experience in his father's drug store as a pharmacy intern and had also come to appreciate the richness of biology as a field for exploration, far beyond its meaning as a discipline of study.
Following the usual year's internship required of pharmacists in that state, MN married, and soon afterwards enlisted in the Coast Guard. He believed that his wife was a significant person in encouraging him. Besides being trained in laboratory work, which gave her some sound understanding of his work and provided a common professional meeting ground, she was also an important stimulator and morale booster. MN tended to consult her very fully on his future moves. In service he had a good deal of medical work, giving physical examinations and working as a hospital corpsman. In addition he gave some instruction in pharmacy and chemistry and worked in the hospital pharmacy. Later he had one year in full charge of the pharmacy at the Coast Guard Academy where he was very happy and found himself very competent. Released from service, he spent a year as a registered pharmacist.

During his military service MN had thought more and more about graduate work. Although he felt he could make a comfortable living with the training and experience he already had, he decided to "go all the way" and learn more about some of the things of which he was uncertain. A major consideration was the desire to study, and eventually to work, at higher levels of knowledge and under conditions more like pure research than would be possible as a retail druggist.

In summary, MN counted his service experience as a major factor in his doctoral study, and at the back of this were of course the influences of his wife, his two teachers, his scouting experiences and his father's occupation. In addition, MN noted that will-power was extremely important. He believed that by setting his mind to do something, even that which he despised, he could accomplish whatever it was, but he could not tell from where he had developed this idea. At any rate, he felt it had been important in his life to date.

MO Philosophy

MO was reared in what he called the "bible belt" of a southern state where a very common religio-cultural attitude was that people with book learning turned away from God. His mother thought that learning was a thing of the devil and gave him little encouragement in his school work, viewing education only as an economic necessity and a legal requirement. MO's father died before MO was born, and his mother had to take in boarders, some of whom were teachers who were "pretty nice," and who prepared him in a general way to anticipate school.
But although he looked forward to school, and actually liked first grade, he very soon came to develop a hatred for it that lasted until twelfth grade. The teachers were "obnoxious and authoritarian," appointed children to spy on their classmates, and soon made him think of school as being boring and a place in which he became scared. He found arithmetic difficult and uninteresting because of the implicit, and also the explicit, threats behind the daily assignments. "I never remember being interested, but I surely must have been sometimes...If I could have destroyed the school I would have done it." Through most of his schooling, MO barely "squeaked through," and he was upbraided for the typical comment on his report cards, "Capable of doing much better." In retrospect he expressed regret that the teachers had to work under almost impossible conditions.

Nearby was a missionary school for wayward mountain girls, and when MO was young, two old Quaker ladies from the school used to visit him and read to him as a charitable act. They also introduced him to such classical children's authors as Grimm and Anderson and soon he began establishing his own "chain of references," through adventure stories, then Dumas, Hugo, and other authors in about the sixth through the ninth grades. He used the town library a great deal and often felt that school should have been something like his library experiences.

In eighth and ninth grades MO went to a boys' boarding school in a nearby town, a school that was non-denominational, an epithet that to MO came later to represent the worst in pettiness and puritanism. He accepted the system as a way of getting along in the place. "I was probably not conscious of my reasons for accepting it, but the ease with which I sloughed it off after I got out, I think I must have done it just for social reasons." After finishing at this school, MO within one month "dropped Christianity and started going to the movies again." There was at this time "a day or two of self-recrimination. One of the propaganda devices of this brand of religion is the idea of back-sliding. It occurred to me on the way to the movies that I had done this very easily, but I didn't lose any sleep."

In high school the pattern changed. As he progressed he had more and more fun, and also became more interested in the courses, although he still did not make good grades. "The general environment was much more relaxed and much less petty, and so, as a consequence, my outlook on life was better." He also got used to being around girls. This was a source of conflict at home, but MO never stayed home in the evenings if he could avoid it. In his senior year he became a "big wheel" in
various school activities and also began to enjoy the courses more, "but even they were stupid. Literature was only English and American literature of dull selections and expurgated Shakespeare. One of my high school teachers hadn't even read Les Misérables." In this year also, MO considered chemistry or chemical engineering as a career. "Everyone in my set was going to college, and I thought it better if I had some goal."

Parallel with his high school career, MO had some highly significant contacts with "the village atheist" who had his dinner at MO's house daily. MO's mother very strongly objected to him but was forced to accept him because she needed the money. The atheist had been to Harvard, and soon came to represent for MO the epitome of culture in the outside world, because of his taste for Dewey, Freud, Russian novelists, the Encyclopedia Britannica, and good music, and also because "it didn't upset him to talk about sex." Everyone treated this man "like scum," since the whole town and its institutions were rather solidly sectarian, and because the atheist had sufficient courage in his convictions to proselytize in their behalf. MO had extremely stimulating contacts with this man for over three years, frequently visiting his house in the evenings and gaining a great deal in information and outlook as a result. MO was at a loss to explain how it was that the two made such an acquaintance. "Maybe it was not that I was a potential scholar, but at least I was different enough to interact with him, and so mutual satisfaction resulted. He taught me the phrase 'intellectual stimulus'."

Not unexpectedly, MO's mother did not want him to go to college. She used financial difficulties as the reason, but MO believed that she would not have objected to a church related college. Finally, he was allowed to attend a state university. "With my provincial background, college was pretty hectic. I went around with the wrong people, politically, religiously, socially, morally, every way. My background would have condemned them as totally damned, and even the college, more enlightened than my home town, was still pretty provincial. I made C's on the average. I really wanted to do better, had spurts of effort, but would run out because there were so many more interesting things to do. I never had a better time in my life and really enjoyed study. A better time doesn't mean what it did in high school. I didn't do Joe College things, but spent almost all my free time in conversation--some drinking, but mostly conversation."
MO discussed the kinds of people with whom he found himself associating, wondering how it was that he had found "such weird people so soon." Some of these had homosexual tendencies and were older than MO and his girlfriend, many were faculty members, and several had been psychoanalyzed. In particular, two of the professors, the most homosexual, talked elementary philosophy a great deal, although this was not their academic specialty.

MO remained a chemistry major until the spring term when "it became impossible to go to long afternoon labs." Having become convinced also that he lacked sufficient motivation to do the mathematics required, and, further, as a result of the influence of his friends, he began to consider more "academic" subjects. History, philosophy, and psychology began to claim more and more of his attention, and in particular he became very impressed by the people studying and teaching philosophy. As he expressed it, "I had had a revulsion from underworld people, and now (late in the sophomore year) I was much more serious and less fake and flighty." As a junior he became interested in clinical psychology, but it gradually became apparent, both to MO himself and to the departmental chairman, that what MO wanted most of all to do in counseling was "to straighten out ethical systems or general outlooks rather than do psychotherapy."

As a result, the chairman suggested that MO's interests were more philosophical than psychological, and since these two branches of study were closely linked in the college, the change was easily made. Two professors of philosophy with special interests in ethics came to be very significant to MO, being almost entirely responsible for his later progress in the study of philosophy. He began to feel that the study of human values, his own and other people's, was his real curriculum. His grades now improved and he felt much more devoted to his study. Of the two professors, MO said "They were very sincere men, much interested in anybody who showed interest--didn't pull rank, but believed in co-mingling with students. Just personally very nice guys." They showed MO that the only thing he could do in philosophy was to obtain the doctor's degree and then teach the subject. This idea was not unwelcome to MO who was convinced that he should go further in school, feeling that he "hadn't learned anything yet."

MO's college status was strange and rather uncertain because he often refused to take certain courses for several sessions until the professors he wanted would be teaching. Also, he objected so strongly to physical education and military training that he refused to take either, but since he had accumulated
enough credits in other requirements, he decided to enter the divinity school of a university in a large midwestern city where the possession of a bachelor's degree was considered secondary to the kinds of subjects studied. His idea in doing this was to study philosophy to the exclusion of everything else, believing that it was possible to do this at this university because one of his two philosophy professors had also studied there. MO stayed in the divinity school for six months, leaving as soon as he found that in fact he would not be allowed to concentrate exclusively on philosophy. He noted that the professors there had an influence on his thinking in a way of which he was not aware at the time; they liberalized his attitude toward religion.

He then returned to his first university, found that it was possible to graduate without credit in the two disliked areas, and did so. He then was able to obtain a draft deferment until he had completed his M.A., and, although he had always liked university work, he only then "got right into the real swing of it, and got good grades." After the M.A. degree was completed he had two years of military service that "just emptied my head," and then he began to work towards the Ph.D. degree.

He said that if there were more courses beyond the doctorate he would take them because it was "quicker than digging it out" for oneself. The influence of the favorite phrase of his atheistic friend, "intellectual stimulus," had continued to be a powerful guide to his interest in advancing his formal education. Money, he believed, was not a factor. He added, "I believe it would be bad for me to get a taste of anything that required a lot of money."

NO Physics

NO was the sixth of seven children living on a rather poor and hilly farm in a district where "people knew nothing but farming and coal-mining." His father had a great knack for figuring out how things worked, and, although he had only eighth grade education, he was "basically a scientific thinker." NO had no scientific hobbies, nor did he have any help from anyone except his father who exemplified scientific thinking. However, NO studied the farm binder to find out how it worked, and when people gave most unsatisfying answers to such questions as, "Why can't the car go up-hill in high gear?" he had recourse to manuals showing the transmission in diagrams. Thus, for NO, as for his father, one of the most fascinating things in the world was to find out how machines worked. Before he was five years
old, NO could tell the time, and although he was not a particularly early reader he soon found out, as his brothers and sisters had already done, that he too could be "smarter than most of the people with nicer clothes." In this way school achievement was very important to the family, and all the children were encouraged to do well.

In high school, NO had a very good mathematics teacher and also a fine physics teacher. Because of his curiosity about machines, and also because of his early interest in his brothers' physics books, NO was ripe for learning physics, and the teacher, seeing this interest, went out of his way to encourage him, by answering his questions scientifically and by having him take achievement tests in physics. After high school NO entered college, an unusual thing for anyone in his family, and indeed in the local district, but he felt very strongly that he wanted to do more physics.

What he did not know was that there were other career possibilities in physics besides the teaching of it, and therefore he prepared himself to become a teacher. He was aware of engineering as a possibility, but considered that he was going to have a lean enough time supporting himself for four years without going an extra year. However, in his first quarter he concluded, as a result of a course in physics with a lively recitation instructor, that he would abandon teaching as a career and become a physicist. Soon NO began to feel very competent in his specialty and helped other students in their difficulties, although he felt he could also have done much better himself and had "no illusions about being a genius." After four years of living on a bare survival income through part-time work, NO graduated B.S. with a major in physics, married, and proceeded right on with the M.S.

He advanced to graduate work because he saw how little he really knew and how much he wanted to know, and so, aided financially by an assistantship and by his wife's working, he continued to work keenly. He did such good work that he was encouraged to carry right on with doctoral study after completing his M.S., although since he was doing a full-time research job, he carried a light course load. His decision to work toward the Ph.D. degree was governed largely by a desire to do research work with some teaching, and also by the strong feeling that if he left academic work for industry he would feel tempted to stay because of the money. He regarded his five years' research experience as a kind of investment in a university career. To some extent his career was turning out to be a realization of a boyhood
dream of being an inventor; he had long thought that this dream would have to be a subordinate activity.

Surveying his accomplishments, NO felt that he had somehow gained a powerful inner drive which, despite some seeming deterrents, was sufficient to carry him along the path that seemed to form just a little ahead of him. Although he kept gaining some recognition, he felt that no-one actually encouraged him, but, equally, he had almost no hindrances to his progress.

NP Physics

NP was born and raised on a small farm owned by his father, who was somewhat more vigorous and progressive than the average farmers in the neighborhood. His father was, too, something of a mechanic and a scientist and attempted to keep up on the best farming practices, but although he encouraged the education of his sons he had had little enough himself to feel that "he was doing pretty well to get his boys through high school." NP's mother, the daughter of a minister, had somewhat the same attitude, so that NP's early associations with school were pleasant but not highly enthusiastic. NP did quite well in the one-roomed school in the neighborhood. He was the only child in his grade and thus progressed at his own rate, skipping an early grade and picking up information from listening to the older children's lessons. After the sixth grade this school was disbanded and NP then went to a town school. He was a little disturbed about this at the time, "wondering how it was going to work." He believed that he was not as well adapted as some might have been since his family was "not social in the sense of going out to many affairs in this town," except church and farm bureau gatherings which were different social groups from those familiar to the other children. NP continued to get quite good grades, however, and settled in his new school reasonably well.

He later proceeded to the small local high school where his scientific interests first began to appear, largely because of a teacher of mathematics, physics, and chemistry. Although he also became interested in music at this time, receiving "quite a bit of individual encouragement and maybe pushing at times," science was his main interest. NP believed that the freedom that he and his younger brother enjoyed at home in tinkering with things and building many simple sorts of gadgets possibly also contributed to his fascination for physical science. At home and at school he spent many extra hours learning about things beyond the scope of the regular science courses, and, as the usual reward for
showing interest as a freshman his teacher gave him a 25¢ slide rule. Later he acquired a reputation as being a little extraordinary, and a scientific kind of student. From his reading of *Popular Science* and *Popular Mechanics* he found out about more complicated and more technical aspects of radio and electronics, and he also sent for and read books advertised in those magazines. These aspects were not taught in school, no books were available on them in local libraries, and even the teacher knew little about them, but he helped NP to understand them nonetheless.

During his high school days NP thought little about his future education, but took four years of agriculture on the assumption that he was going to help on the farm and gradually take over from his father. This rather vague understanding was actually put into effect by NP's working at home for a year, an arrangement which pleased his father a good deal, since NP's older brother had already gone to college, and, as NP's father told him later, the younger brother was not as compatible with his father as NP was. During his year on the farm NP began "to think some more about school," and realized that what he really wanted was to go to college. In addition a career plan was forming in NP's mind of entering the ministry as his elder brother had done. The family had been reared "close to the church," his maternal grandfather was a retired minister and was still alive, and the pastor of the family church also encouraged NP. Thus while it would have been very convenient for the family to have NP at home, his new decision was also entirely acceptable to them, although his father was "the least enthused about the ministry."

NP therefore entered a small liberal arts college that was sponsored by his church and had "ordinary experiences" there, majoring in physics. The professor of physics took a special interest in NP as a prospect for graduate work, a circumstance which NP said he could never quite understand, but at any rate he gave NP the idea of going on further with his study of physics and then returning to teach at the same college. As NP expressed it, "I don't know that he had sufficient knowledge to base this on, but anyhow he put this bee in my bonnet--thought we should have some of our students do something else than be ministers, but become ordinary teachers." The president of the college encouraged NP in similar fashion to give service by studying physics further and then becoming a teacher.

Upon graduation NP entered the church seminary for three years' preparation and thus "deferred the matter of further study
in physics." He spent two summers doing pastoral work in rural areas and was finally ordained as a minister and awarded the B.D. degree. At the end of his first year in the seminary NP had married, and in his third year there, he and his wife began to "take up the physics question." They considered both the suggestion about graduate work followed by teaching and also the idea of working as a pastor, since he "didn't have any great investment in physics really."

They finally decided on his undertaking further study of physics, and NP accepted an assistantship to enable him to continue. He noted that he had not needed any particular encouragement to persist with his study but added, "As I look back I had more courage than sense to go on with graduate study again. I've been here five years and it has become a grind. Seems like I've been going to school an awful long time. So far I've spent twelve years going to college." Since beginning graduate work NP and his wife have spent a good deal of time and energy in helping with the activities of a group of student members of their church. It took up some valuable study time for two years but they felt it was very useful work and on the whole NP felt good doing that. Summarizing his motives for doing doctoral study, NP re-emphasized the service motive of doing useful church work through teaching his special subject in a church college. He added that, had money been a significantly strong motive, he would certainly have planned to go into industrial research.

OP Physiology

As a child OP was quite curious about how things worked, and he recalled that he once picked up a hair pin and stuck it into an electrical outlet mainly because his mother, in cautioning him not to do so, drew his attention to the relationship. As he grew older he had many questions about radio and other appliances and these his father answered. He soon began to get information for himself from Compton's Encyclopedia and the school library, but found that many books were confusing, until he got hold of a commercial manual for radio tubes. By the age of thirteen he was strongly interested in electronics, and, through casual contacts with school friends among whom many books were shared, he became quite competent in his knowledge. Later, this competence was extremely important in his entering the field of biophysics.

In high school OP was sure he wanted to be a physical scientist, if possible an electronics engineer. Therefore he
studied no biology but concentrated on a college preparatory course centering on physical science. He was extremely humiliated and heartbroken to find that he was not accepted for the engineering college which he had planned to attend and therefore compromised by entering a pre-medical liberal arts program. After the first year of college, OP had an argument with his parents and set out to support himself by working at nights. With one summer's post-high school experience as a hospital orderly, he obtained a job as a pathology assistant for six months, following which he became the first aid assistant in a large steel plant on war production. These experiences were significant in his life since he became so curious about mutilations to the human body and so amazed at the deftness with which skilled people could repair them, that he resolved to find out more about physiology. The steel mill was such that he had heavy personal responsibilities, "doing everything except major surgery."

By studying in summers, registering for courses whose pre-requisites he had not met, and taking extra courses, OP was able to graduate with a major in physiology in a quarter less than three years. He felt that his college experiences did much less to confirm him in his liking for physiology than did his employment, and recalled no outstanding stimulating teacher. Drafted for a year and a half after graduation, he returned to his steel mill job for four more years, although he was still trying to get admitted to medical school. Finally, since this latter prospect began to appear rather hopeless, he decided to pursue his physiology, and, through some mild nepotism, was admitted to graduate work at a university where there was an extremely competent biophysicist who became his adviser.

Because of OP's sound knowledge of instrumentation, carried over from his adolescent flair for electronics, he was particularly well-equipped for the study of biophysics and besides this his adviser's enthusiasm was inspirational. When OP was well on with his doctoral program this adviser obtained another position, and because OP's G.I. bill was expiring he began to look elsewhere for an assistantship in biophysics. Relatively few departments are available at all, but he was fortunate enough to be able to work under his present adviser, whose influence he counted as significant as that of his former adviser.

OP stated that he recognized his doctorate as a "door-opener" and even a "union card," but remarked that the level of one's accomplishment and satisfaction could not be estimated merely from possession of the degree. His own motives went beyond this, he said, to his curiosity about the field and his desire for greater understanding.
OR  Psychology

The oldest of three children, OR was held up to the others as a good student as he had made a very smooth transition from home to school and was given a double promotion in the first grade. His parents, more especially his college-educated mother, gave him the idea that "school was just a good thing to do" and everyone including OR "rather expected good grades." In the first six grades he had two teachers that he liked very much: the kindly, old first grade teacher and a fine and motherly drama teacher. He also had a very strong dislike for a strict and very authoritarian third grade teacher.

Not until junior high school did OR meet his first man teacher of regular classes and he found that he liked him very much, but he disliked the physical education teacher. This latter feeling was probably due, he thought, to his lack of ability in athletics. Even as a child he wore glasses and was somewhat self-conscious about the fact, and as he progressed through school he became still more aware of his ineptness in the physical education program, a problem that he thought could have been greatly minimized by a discerning teacher helping him "on the initial break-through." Reading became a key recreation for OR and he made very frequent use of books from the family, school, and town libraries, perhaps more so because the family lived six miles from town.

In high school the business of getting an education began to change from being fairly easy and successful to a rather difficult and irksome task. Discipline began to seem oppressive, he came to dislike physical education more and more, and he began to get poor grades in foreign languages. The one bright spot in this dull picture was a teacher of political science, "a leader of boys, a real man figure who was not a physical education man, but was generally liked." In one of his classes there were four or five top boys, including OR, in whom "he seemed to recognize promise," for he encouraged them to work on individual projects. He tried to have all the students think by themselves rather than "to give back the text-book," and he made extensive use of debates on various issues and discussions of divergent points of view.

Because of his double promotion soon after starting at school, and because only a few others had had the same experience, OR became more and more aware as he progressed through school that he was somehow "out of step" in not being with those with whom he should have been. He had become about half a grade
advanced, and thus, in regard to the normal recognitions that come at the end of each year, he seemed to be neither fish nor fowl. He therefore decided to go further ahead by attending summer school, and was thus able to get full recognition as a class member in his senior year. He felt he gained an additional success in being awarded one of only three major parts in the presentation of a narrative poem at the end of his senior year.

It was assumed by the family that OR would go to college, although he himself was quite vague about any vocational plans, except that he did not want to enter engineering. This career had been suggested and considered because of local opportunities occurring in large plants, but OR "was able to reject that fairly easily" because of his dislike of mathematics in high school. He therefore enrolled in liberal arts, and considering how much he had enjoyed political science with his fine high school teacher, began his studies with the idea of majoring in that subject. He soon found out, however, that it was not what he wanted and that what he was doing was "really going for the kind of person" the teacher had been to him. In his first year of college he made poor grades, largely attributable to a lack of self-direction and assistance and partly to his youth and his participation in many activities.

After this first year of college, three years' service intervened, during which time OR began taking correspondence courses in sociology and psychology through the U.S.A.F.I., and he began to think that these two subjects represented his real interests. On his return to campus he felt that he had matured a great deal and was something of "an old hand." College became a satisfying experience and his grades "seemed to be a reasonable compromise between his potential and his many activities." He began to consider studying sociology, thinking that the field of social work would enable him to implement sociological principles, but soon found that he had to do graduate work in order to become qualified in sociology. This was a major deterrent to his plans because he was at that time engaged and he wanted to finish his studies as soon as possible and then start working and earning.

He turned, therefore, to psychology, but had done only a little work in that before he found himself facing exactly the same problem. He continued with psychology, however, but did not find real excitement in it until in his senior year he began learning how to give tests and how to deal with people. In counseling practicums, field trips to the State Hospital, and
testing in public schools, he began "to get the feel of the professional field," and found it very challenging and rewarding." Having seen the psychology majors ahead of him "scrounging around for jobs and/or trying to get into graduate school," OR was prepared for graduate work.

He had no definite career in mind apart from doing something in student personnel work in general, because he always preferred working with normal rather than clinical cases, feeling that, by applying psychological principles in this fashion, he would be accomplishing some of the goals of social work. Because he was now engaged to another girl, he began graduate work highly motivated to gain the M.A. degree quickly, and was able to complete it in three quarters, financially assisted by the G.I. bill and by some part-time work. Then he "naturally" went on to the Ph.D. degree. After beginning the doctorate program he had some difficulty over courses in physiological and in clinical psychology, and his grades in those got so low that he was put on probation. He then decided to drop course work. He had been doing some student personnel work part-time and when he stopped studying he began to work full-time at this. He "weaned" his way back into psychology three years later, getting some reassurance from his work supervisors because of the good job he was doing. When he did take up study again he had little trouble with his grades.

Reviewing his motives for doing doctoral work, OR said the Ph.D. degree was a virtual necessity just to work in the field of psychology. He added that had he had the chance to do it again, he might have turned it down in favor of work in the business school of a well-known eastern university, because he had considerable confidence in his ability to succeed in business administration. "The pathways then opening would probably have been just as satisfying as those open now." He attributed his not taking this path to sheer lack of information at the time he chose his present specialty and his present university. He believed that his own personal experiences had a considerable significance in his daily work.

PR Romance Languages

PR's parents encouraged him in reading and general school work from an early age. Since he could read before he started school he began his formal education in second grade, and from then on he made rapid progress, becoming, in fact, "as anxious about school success" as his parents were. Throughout his schooling PR was aware that he was much keener and abler scholastically
than most of those with whom he associated, although he felt no isolation from them in their non-school activities. Thus he hunted and fished and was a good swimmer, but because he was fat in those days he was poor at competitive team sports. He felt ashamed of this failure as a child because he was required to try out for several sports and would have liked to have succeeded but knew in advance that he could not.

Many satisfactions were available through reading since he usually got books as presents and had enough books available at home to satisfy him. In addition there was the public library close at hand. His interest in reading, and in language generally, had a further outlet in grammar school when a teacher interested him in Spanish. This teacher PR considered to be very good, more inspiring even than the high school teacher of Spanish under whom he first began doing extra reading out of class. Looking back on his high school days, he felt that he could have studied much harder and also that there were many distractions, but despite this, he recalled that he had little difficulty in keeping ahead of the class.

At sixteen PR entered college during summer and then at the suggestion of a professor entered a special liberal arts section in which one hundred students each year were given more intensive work. This professor was in charge of the program and later was of great encouragement to PR. However, it was a woman professor of French who proved to be the outstanding contact of his undergraduate days. A dynamic sparkling personality, part French herself, she had a thorough understanding and a deep appreciation of that whole culture and was recognized by all the students as an excellent and a demanding teacher. Students' reactions to her were violent and bi-polar--either they hated her, or they adulated her, and PR was one of the latter. He had no closer association with her than did most of the other students and yet she fired him with great enthusiasm for the study of French. An unorthodox and colorful economics professor also was "a bright light" to PR.

PR had begun college early, had attended in summers and worked very hard, and was therefore graduated B.A. at nineteen. This was contrary to his parents' wishes, since they considered he was too immature to leave college then. In PR's present judgment they were right--he was quite immature and could well have profited from a further year of growing up. His love for France led him to travel there the summer he graduated and he found the whole atmosphere so exhilarating and meaningful that he stayed for five months instead of three. This delayed his re-entering
college and necessitated money being sent over to help him out, but was vital in confirming him in the desire to make the study and teaching of French culture his life's work. Back at his undergraduate university PR entered the graduate school, completed his master's degree at twenty-one and gained a Fulbright scholarship for a year's research and study in France. Again he re-captured all the satisfactions of his earlier trip and was equally reluctant to leave.

The draft, however, was calling. Fortunately, after six months' training, he was assigned to eighteen months' duty in France where he was an interpreter in a large railroad station in Paris. At the end of this service, which he counted as a major interruption in his career, he seriously considered staying in France and working for the U.S. Government there. Family ties here and the lesser security in comparison with academic life were major factors in his decision to return and to enter on a doctoral program.

Surveying his career, PR rated as most significant events his first taste of French in college and then going to France. He felt very strongly about the fact that an academic career should be so frustrating in requiring one to wait "on the dole" until over thirty years of age before obtaining the first job, and he believed that an year or more could be eliminated without too much difficulty. His major reason for pursuing graduate study was his desire to teach French and French literature at the college level.

PS Sociology

PS, his four brothers and three sisters, all did very well at school, not, he believed, because they were more intelligent than others, but because of the orientation their parents gave them. Both were qualified teachers, the father being principal of an elementary school, and the mother "an excellent teacher of reading," and both thought the education of their children was the greatest thing. Thus, school was no novel experience for PS and the other children, for they had had a pleasant preparation for learning and reading. Although the family was very poor, there were always many books and plenty of newspapers to read, the latter being a particular interest of his father. In school PS soon found that he was able to do good work. He was particularly encouraged in mathematics by his father, and in English by the high school principal. Since his native tongue was Hindi, his early ability to read the Readers Digest "in the original" was a considerable achievement.
After high school PS entered a junior college, but, although he had done very well on the entrance examination, the absence of his mother and father seemed to have had a marked effect on his school work. For one year he was unable to afford college, but spent quite a profitable time in reading at home. Beginning at the university, he took the two year course and did very well in English and economics. He had still not decided just what he wanted to do, but because he was good at athletics, and because training in physical education was subsidized, he entered this field, becoming a director of physical education. He taught other subjects as well, but after three years found that the military atmosphere in which he was expected to perform physical education was not at all to his liking, and he therefore applied for advanced training as a teacher.

After his one year's training PS went to an administrative and supervisory job at a Borstal (an English term for an industrial or reformatory school). In this capacity he had very close contact with every boy admitted because he had to obtain a case history of each. This was a very difficult position for PS because he was the first well-educated person to act as supervisor of such an institution, and he soon found that the staff resented the "softness" of his methods of dealing with the outcasts of society. He tried hard to eliminate the formal deference typical of military disciplines and jails, and to make his institution more like a school than a jail. Although he had originally entered the service because of the high pay of government positions, he grew to obtain great satisfactions from his work, and felt when he retired after ten years because of his disgust with the staff, that he was depriving the boys of an extremely valuable service. However, the low moral standards of the staff, who stole far more commodities than all the boys together, finally sickened him.

There was also another factor in PS's resignation after ten years of service. He had been reading about juvenile delinquency and some of its sociological origins as a way of better understanding the boys committed to the Borstal, but the visit of a U.N. adviser who was a distinguished scholar in this field, and PS's meeting with him, gave the final impetus that decided him to leave the job. He and his wife were both somewhat fearful about the prospective loss of financial security, but took the step nonetheless. Then PS was elected to a church conference in this country and while there gained a summer scholarship to a nearby state university, working in the field of social administration. In the meantime the U.N. adviser had returned to this country also and PS contacted him and began his M.A. degree in
social administration. While doing this study, which necessitated some courses in sociology and contacts with students in that field, he began to feel more and more strongly that social work was composed of mechanics and techniques rather than of ideas, and that sociology, being more "fundamental" than social work, would provide greater satisfactions. Thus, when he got the chance to do doctoral study in sociology he accepted it eagerly.

PS believed that readings had been important in shaping his ideas and his philosophy of life. Religion had also played an important part. Partly from his father, a lay preacher, he developed a view of Christianity as intensely concerned with social justice, rather than as a set of dogmas. He has been very conscious of his "drift toward greater concern with larger social problems," but at the same time felt that his life has been a gradual process with specific influences difficult to isolate. Although he was not especially prepared for any one job on his return, PS felt that his qualifications in practical experience and skills, in research, and in ideas, would together help him to realize some important life goals. On the one hand he hoped that he would be able to work with youth directly and teach others how to do this effectively so that children and youth would make better use of their lives. On the other hand he was keen to play an active part in politics in his country, not, as he put it, with the idea of "stopping things, but actively promoting the welfare of the country."

RS Sociology

To RS his home circumstances were not in any way notable insofar as stimulation or encouragement was concerned. Yet there were no real obstacles to the development of his learning since his father, a watchmaker with two years of college education, seemed to RS in retrospect to have been a very intelligent man, and insightful in a mechanical sense. RS recalled that, although he himself may have done more reading than the average child, his memories are of being very much like other children in being interested in playing games. In the first three grades of school he became very competent in academic skills, mainly as a result of responding well to competitions in reading and in learning multiplication tables. After this the family moved from their small home town to a large city, and here RS continued to do well in school, becoming quite keen on reading special books, partly as a result of associating with two boys who were also "pretty
bright. Apart from this reading, the three friends were also keen on model airplane building and scouting, but RS felt he had "no really good or bad performances" to record up to this point, either in school or out.

In seventh grade, however, RS felt a tremendous pressure from his peers to become less keen in school and to drop his performance to "the gentleman's grade of C." He recalled quite vividly the day he purposely gave wrong answers on a test in order to ingratiate himself with those who had been making fun of him and shunning him as an A student. He adopted this value so thoroughly up through the twelfth grade that he became less interested in achieving in school, and, indeed, later found himself rather miserably prepared for college. During this period he "actually failed two courses," chemistry and algebra, and, as he needed to pass the former, he had to go to summer school to make it up. This was his first real failure, and it upset both RS and his family. It was not an unmixed blessing, however, in that the instructor of the make-up course got RS quite interested in doing some creative research on trying to develop a soap ingredient from normally waste oils. He obtained a clear A rating despite a down-grading on the final examination for allowing another boy to cheat. Apart from this one instance of stimulation, RS's memories of teachers were colored with mediocrity. Probably the most dominant interest during this high school period was music which came to occupy most of his waking hours. Theoretical study of music, performance in marching bands, orchestra, and a small dance band, reading of jazz and modern music magazines, and the playing of records, all fused together in an absorbing interest, and gave RS the idea of majoring in music at college.

RS believed, however, that he really had no firm career plans beyond this, and that his main reason for wanting to go to college was that his friends were going. Too, he wanted some emancipation from home, and thus, although his father could not well afford to send him away to college (there was a large state university in their home town) he knew that his father wanted to help him further his education if possible. It was a battle, but RS eventually won.

On an entrance test at college he was rated at the fortieth percentile and was therefore required to do remedial English. As part of his program in music education, he studied educational psychology as a freshman, and although both the course and the instructor were poor, he was "rather taken with the ideas." Soon after this experience he decided to major in
psychology, realizing in addition that he was really only mediocre in music. However, he soon changed again, this time to English literature, and despite strong interests in sociology, philosophy, and psychology, graduated with a major in English.

In his first year at college, RS roomed with three others, two freshmen, one a friend of long standing, and an upper classman, and the latter did a great deal to change RS's attitudes and to a large extent brought some of his intellectual abilities to fuller development. The two would argue a great deal, especially on the topic of the relativity of values, and K, by seeming to be able "in subtle ways to appraise RS's ability and also to praise it," aroused a great deal of interest in reading about and discussing men's value systems. As a sophomore, although not rooming with K, RS kept in very close contact with him, wanting very much to leave college with him in order to undertake a European tour. Association with K was "a tremendously important point" in RS's life, and from that time on he "took an intellectual, research career outlook on life." It was largely as a result of these experiences that RS had changed majors, searching for a better understanding of human beings. Although he became somewhat disillusioned with English literature both as a career and as a subject making many implicit but rather glib assumptions about the nature of man and his motivations, he was able at least to assuage his curiosity by "voracious reading," and by taking courses in philosophy, psychology, and sociology. In his first two years of college, RS's grades were "very mediocre," but later they improved a good deal, mostly as a result of some stimulating courses in sociology. There were several other students who also had much interest in sociology as a vehicle for studying human behavior, and, with them, he began to thing of continuing with graduate study. RS became rather concerned, however, because he assumed that they were an average group of students, and he did not think that all could succeed in graduate school.

At home for the spring vacation before graduation RS really "sweated out" a decision as to his future career. He recalled vividly the events of one particular day when he set for himself the goal of a Ph.D. degree and a college teaching career in anthropology. He was accepted by the state university in his home town, but still sufficiently resisted the idea of living at home to take a room near the campus. After two quarters he obtained an assistantship and studied for two years before being drafted. During this graduate work he found that his "self-image had been a little disparaging" since apart from one grade of B, he had nothing but A grades in graduate work.
Two years of foreign military service were not the period of suspended animation that they were for many, since RS gained a new perspective on his undergraduate interest, the relativity of values, through a heightened awareness of the significance of living standards. He cited the example of watching other passengers becoming incensed at a wait of several hours at an airport when he was on his way home, and found that his own feelings were of calm acceptance after appreciating how for some foreign people the very fact of daily sustenance could never be blithely assumed in advance. In addition, service experiences induced in RS a desire to settle down and establish a family, more especially because he had become engaged just before being sent overseas.

On his release from service, RS returned to his college work in anthropology only to find that his thesis project in sociology, which had been interrupted by the draft, had been completed by someone else. In the impatience that he felt in being almost four years behind in his work, he began to look for a "packaged deal" in the form of a simple thesis in anthropology. The sociology professor with whom he had previously worked now wanted some research done in that area, and RS decided to do this and then come back to anthropology. However, this move turned out to be the beginning of a move away from anthropology and toward sociology, culminating in a major in social psychology.

In summary, RS believed that a major reason for his doing doctoral work was his happiness in working in an area "where there is tolerance, searching for truth, stimulation, and the teaching of new ideas," and at a level where there was freedom from routine and rigidity. He added that all through his learning career he had realized that there were applications of his study that he could make to himself, but he believed that by the time he had gained his B.A. degree he had attained a great deal of self-insight and had become more interested in the abstract subject matter of his specialty. He also remarked on the quality of teaching, saying that once he had become so highly stimulated to study, he got something out of even the poorest and dullest lecturers.

RT Speech

RT's mother, an ex-teacher, was always interested and active in community theater work, and when RT was still in grade school she would have him take part in plays in which the cast called for a small boy. Reading and taking part in plays were RT's chief interests, for he was never athletically inclined,
and failed to persist for any length of time with any of his various hobbies. His father had not been to college, and both parents were "so busy making a living" that they had little time for reading, although RT always had plenty of books to read. He began in the public schools, but after about five grades he attended a parochial school where the nuns "really worked them hard." RT enjoyed this, and soon began to think of himself as a very bright lad, feeling far ahead of his classmates when he returned to the public junior high school where he was given a double promotion. No teachers in either junior or senior high school made any lasting impression on him. After the elementary years, school dramatics was his major interest.

When RT was in the upper elementary grades, his mother went back to work, and then after his first year in high school she separated from her husband and moved south. A famous medical specialist was a friend of the family (RT's mother had been his secretary before marriage and later returned to this work), and RT's mother and father agreed with this doctor that RT should become a physician. In fact the expectations were so firmly grounded that before RT had even started college, arrangements were set in train for him to do post-graduate work in Vienna where the doctor friend taught each summer. While RT was in high school he associated very closely with this doctor, getting a considerable insight into the nature of the profession. RT thought that his mother's pushing him into medicine was rather strange in view of the absence of such associations in her own family. It occasionally occurred to RT that her socio-economic background as a member of an "old" family gave her a feeling of having lowered herself by marrying an immigrant. She was always the stronger of the two parents, but, despite the separation, both were agreed on the future career of their son.

After high school graduation, therefore, RT entered upon a pre-medical program at a junior college, but at the end of the first year he had an illness which kept him out of school for six months. On re-entering college he found that he was no longer interested in medicine, or in anything else for that matter, and so he took courses somewhat randomly. His mother raised no great objection to his rejecting medicine, desiring most of all that he stay in college, although she did urge that he study real estate, since her family had been rather successful at this. RT did this, simply to provide himself with some goal and to please his mother. On his return to college he took some aptitude tests and found that, although he was capable of becoming a doctor, social service was more strongly indicated
as a career field. Nevertheless he continued with real estate for the next two years, thinking that whatever goal he chose did not really matter as long as he had some goal.

However, in his senior year, partly as an outcome of his continuing participation in dramatics as an activity, and partly because of some urging by people in the speech department, he decided to major in theater. He had never been greatly enthused about real estate, and although he felt that the decision to change to theater was not a momentous one, still he knew the field well enough to realize that it was something he would understand and enjoy. He therefore completed his B.A. degree in theater.

He stayed on at the same university as a graduate assistant in theater. For personal reasons he soon left to attend a midwestern university, but found that the adviser assigned to him there was much inferior to his former teachers who had been very stimulating, creative scholars. However, in the speech department RT found two other men who attracted him very strongly, both in the area of public address. Since deciding to take the master's degree, he had had the Ph.D. degree and college teaching as his further goals. He chose the college level, he said, largely because of the dissatisfaction he felt at the mediocrity of his own high school teachers. From his two new sources of inspiration, one man becoming his adviser, he developed an enthusiasm for public address, and after graduation he taught in a western university, and did some extension work at the same time. In the extension work he met a number of industrial management and union people, and, as he had them in classes for about three years, he became aware of the great number and importance of the problems of industrial communications. His superior in the university also helped him a good deal by encouraging him to develop courses as he wanted to.

RT left to begin his doctorate in another midwestern university, but stayed for only one year. It was a most unsatisfying year because of the cramping "highly authoritative" atmosphere he sensed about the university, and also because his wife, whom he had married when he had moved from the south, took the son that had been born to them and deserted him, leaving him in debt. He had felt obliged to stay at this university, however, mostly because of his sympathy toward his adviser, whose students had begun to desert him. When this man died rather suddenly in the following summer, RT realized that with his wife's departure he was a "free agent" again. He quickly got in touch with his
present adviser, whom he had met at conventions and who, he believed, was more sympathetic than anyone else to RT's ideas on industrial communications.

Reviewing his life, RT felt that since he had decided with some certainty on his career, there had been a remarkable congruence between his work and his leisure interests, although he often felt the need for other interests. In addition, he felt that he had always been whole-hearted in pursuing his goals, and thus for him the doctoral degree was "an ultimate and logical end to graduate study." He felt that it would enable him to teach in college, to pursue things that interested him, and that it was absolutely necessary if he was "going to get any place." RT has considered the possibility of taking a law degree upon completion of his doctorate because of its probable value to him in the future.

ST Speech

Both of ST's parents were educators, and, as college graduates, both encouraged their son to go a long way in formal schooling. Religion was also a very strong emphasis in ST's life, illustrated by the fact that both parents were religious leaders for over twenty years, and also by ST's report that he had never missed a Sunday until he was eighteen years of age. Many of ST's later decisions were made in the light of the extent to which his strong religious convictions would be affected. Although he felt that his father was very conservative, "but not miserly," and that he "held down" his family to some extent, ST said that he himself made his own decision about joining the church at twelve years of age.

In his early schooling ST began a pattern which long continued--that of liking school well enough and getting fairly good grades, but never studying as hard as he might have. Convinced now that teachers have a very important bearing on what children like and can do, he reported that in his elementary and secondary schooling he had several good teachers, but none who excited him a great deal. He believed that he saw the direct influences that can be given, by an elementary teacher who instilled in him a love of history, which was later stifled, and by a high school teacher who turned him against high mathematics, a subject in which he had previously been quite proficient. ST remarked that his strongest motivation in school was that he could realize the value of education, although he would probably have preferred to
be "playing ball with other kids." In fact, however, he took such an active part in extra-curricular activities at school and college that, as he said, this could have been called his major subject.

From the age of twelve when he joined the church, he had started out to be a minister, but, despite deep religious convictions, he never felt a direct call to preach or to do mission work, but had considered Y.M.C.A. work. Before this, he had been leaning toward a career in radio as an announcer, but felt "that it would not have tied in with my church beliefs--in fact, would have been the opposite." He felt that he would not have been able to announce only the types of programs he would have wanted to, and would not have known what he might have been called upon to advertise. From the time of his first church membership, ST had been active in church youth work, attending camps and speaking at conventions. At one camp during his junior year in high school, he met S____, an instructor in speech at a college sponsored by his church, and he was so impressed by the course this man gave at camp, that, after consultation with his mother, he decided to study speech at this college. ST was still not really committed to the ministry, but felt that speech would be an excellent preparation if he did decide on this as a career, and in addition it could lead to other vocations.

Graduated just within the upper quarter of his high school class, ST entered the church college with speech as his intended major. He noted that he might have made this choice anyway, because of his extensive church youth work and high school activities. He had had no real idea that speech was a college subject, and did not firmly make up his mind until the end of his first year. ST continued to take part in a great many activities at college, and felt that his first two years "did not amount to much." The constant threat of being drafted did nothing to induce any harder work.

Three years of army service followed, and this, he thought, really matured him, especially since as a boy he had never had any personal job responsibilities apart from a 4H club project of chicken raising. Unacceptable for overseas service because of an eye defect, ST was assigned to office jobs, and as he acquired experience moved up in positions of responsibility until he was in charge of five others. Still active in church work, ST would have been appointed president of a state youth organization had he not been transferred suddenly. Many of his associates in the army, however, thought him something of a freak because he did not "smoke, drink, gamble, and carouse."
these years he wondered about his later career, realizing that he had had no preparation for work in public schools now that his early ideas about the ministry had not matured. He came to no firm decision, however, until he returned to college.

He then applied himself solidly to his college studies, and after a discussion with S about his future career, decided to continue in speech with a view to college teaching of speech and theater. ST believed that he might well have been interested in professional theater work had not the themes of so many plays in that field been antithetical to his religious ideals, and had he not also been strongly opposed to the "cocktail party" way of life that so many theater people seemed to lead. Further, he strongly preferred teaching in a church-related college rather than in a state institution because the plays selected as materials of instruction could be more easily edited and adapted so as not to run counter to his religious beliefs. ST added that he could enjoy watching an unexpurgated play since he was broad-minded enough to tolerate other beliefs, and he liked to consider how he might modify such a play for educational use. In addition to these deterrents to a career in the public educational system, ST had had advice from his father to avoid such an environment because of the pressures of local politics on public school teaching and he himself also had thought that he would not enjoy teaching at the high school level. The conferences with S gave ST ideas about graduate school which he had never considered before, and he then started to work harder and succeeded in raising his academic performance to a higher level.

Graduated with a B.A. degree, ST then entered another university for two years, receiving the M.A. degree. He then found a very congenial job at another church college, where he taught for six years prior to returning to complete the doctorate. As the college required its staff either to possess or to work actively towards a doctorate in order to be eligible for promotion, ST had studied each summer until he became eligible for sabbatical leave which enabled him to do full-time study.

Summarizing his present perceptions of his career, he wondered what sort of a person he might have become had he really pushed himself. He saw himself as "not too much of a scholar... would rather be a family man," and noted that he never liked study very much but had somehow conditioned himself to it. ST strongly emphasized the importance of being with his family and doing a minimum of research and writing, and recalled that his own father had neglected his family because of a preoccupation.
with meetings and conventions. In the main, status and salary were quite minor motivational factors in his studying for a doctorate degree, the major consideration being the fact that the degree was necessary for college teaching.

SV Zoology

As a small boy, and an only child, SV had great freedom. He went on hunting and fishing trips with his father, and frequently the two took long walks in fields and woods whenever SV's father could possibly get away from the city. This desire in his father became so strong that the family moved to a quiet country district when SV was in eighth grade. SV rated these early experiences with birds and animals as extremely significant in the development of his later interests, but he thought that almost of equal importance were his reading habits. Helped to read before beginning school, he studied a great number of books about birds and animals, especially through the first six grades of school. Most of these he obtained from the local public library, and he found that his father also was very interested in reading them.

After elementary school, SV became much less enthused about school, feeling that most of the course offerings were dull, and, since he was attending a small high school, they were also limited in number. He took a college preparatory course and felt that only the introductory courses were at all stimulating. "For some unknown reason" he went straight on to college after high school graduation, although he believed that it was probably in order to postpone making any vocational decisions. In fact, he had already made one, in a negative sense, because a summer's job on an industrial assembly line had convinced him that he did not want to do that kind of work.

SV's knowledge of occupations was meager, and he entered a pre-medical curriculum in college because he thought that there was no other outlet for biological specialization. After a year in the Coast Guard he came back to college still undecided on even his immediate goals. Three years later he enlisted in the army and was sent overseas for a year, following which he was very glad to be released, although for some time he had seriously considered making military service his career. Back at college once again, he became much more active in planning his life, abandoning all thoughts of medicine, and majoring in biology and education, having decided to teach his favorite subject and
possibly earn enough to put himself through graduate school. Ten days before graduation he was recalled to active duty, this time for two years service. Before re-entering the army he married a fellow biology student.

Upon release from service he had a perfect opportunity to do graduate work since he was eligible for the G.I. bill, but he still had not narrowed down his specialization within the field of biology. After applying for entry to veterinary medicine and being turned down temporarily, he decided to take some extra summer courses. Since few were available that suited him, he began searching for summer field work and eventually spent a very stimulating and important three months at an ecological station. This experience was quite novel to SV since it was the first field work he had ever had that even slightly resembled his strong boyhood interests. He found the company of the other biologists most congenial and felt that "everything fell into its proper perspective."

After talking to the chairman of his present department, SV realized that there were indeed a great number of other career specializations within the field of zoology, and he therefore began his studies that have led directly to the doctorate without the intermediate M.S. degree. SV's main reason for his advanced study was his desire to teach in college and enjoy the additional advantages of freedom of research in a stimulating environment. He felt that the zoology in which he is interested is not a "practical" subject but is almost a pure science, and he would thus feel freer and happier than he would in a consultant job with his project supervised by others.

In summary, SV believed that, apart from his father's stimulation, admittedly an important phase, he had been influenced more by books than by people. He had clear memories of books in his field of interest read in elementary school, especially an "autobiography" with a theme of fascination for biology. By this and other examples, SV indicated that he was clearly aware of his interest at an early age but found little in his formal education that tapped this energy—in fact, nothing until the important summer experience just before graduate school. He also took cognizance of his unsettled undergraduate days, feeling that he was immature, although he later overcame this in the army, and also that he was quite uninformed about career opportunities that would have been helpful in providing some life goal for him.
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Periodicals


Unpublished Material


I, John Joseph Small, was born in Ashburton, New Zealand, on May 6, 1925. I received my secondary education at the Ashburton High School, following which I studied at the Dunedin Teachers' Training College in 1943 and 1944. From 1945 to 1954 I held various teaching positions in elementary school in the district controlled by the Canterbury Education Board. As a part-time and extra-mural undergraduate, I studied at the University of Otago and at Canterbury University College, being awarded the Bachelor of Arts degree in 1952, and in 1954 the Master of Arts degree with second-class honors in education. I was then appointed assistant lecturer in education at Canterbury University College for 1954 and 1955. In the latter year I was awarded a Fulbright Travel Grant in order to take up a position as University Scholar in the Department of Education at The Ohio State University. In 1956 I was appointed instructor in education, while completing the requirements for the degree Doctor of Philosophy.