Edison's Search for Genius

Psychology

By Emily C. Davis

Can Thomas A. Edison look over the entire United States and pick out a high school boy preeminently fitted to carry on the Edison tradition of many inventions? Psychologists and the public as a whole are awaiting with interest the answer to this question.

For the quest, if successful, will be more than simply the dramatic finding of one genius by another. It will mean that human beings are advancing to the point where they can detect unusual ability in its early stages, so to speak. It will mean that perhaps at last genius can be recognized and encouraged and trained as it never has been in the world's history. In other words, dealing in human futures will be getting to be a science rather than the old game of pure chance.

Edison's project has this broader significance because he is attempting to pick his scientific boy genius, not by intuition, but by that typical device of the twentieth century, the test questionnaire. The announcement of the now familiar contest declared that each state and the District of Columbia was invited to select its candidate. That is, each state must work out a method of selecting a potential electrical wizard from among its youthful science fans. The 49 high school graduates are next to meet at the Edison laboratories and to battle for a college scholarship. They will not be turned loose with an assortment of wires and apparatus and told to invent something. It is planned that they will be faced by tests or questionnaires to probe the range of their knowledge of science and other abilities. The winner goes to college. After that—well, the announcement continued:

"As the weight of advancing years falls on the great inventor's shoulders he is seeking a youth of unusual capacities who, perhaps, will have the genius to carry on the great work he has so well started."

Psychologists who have studied the whys and wherefores of mental development have been queried as to whether Edison is likely to find his boy genius, and what aid science can render in such an undertaking. Their opinions differ widely, but on the whole they do not feel that the quest is hopeless.

"It almost takes a genius to discover a genius, especially a young one," is the epigrammatic, rather discouraging pronouncement of Dr. Arnold Gesell, of the psycho-clinic at Yale University and well-known authority on child development.

GENIUS EDISON. . . seeks his successor

Dr. Gesell has ideas, however, as to how potential genius may be spotted. There is no general type of genius, he reminds us. The Edison brand of mentality is very different from the Einstein brand or the Kreisler brand.

"Deliberately to go about finding a successor for any great man it would be necessary to make an inventory of the actual qualities desired and to specify the particular combination in which they are preferred," he states. "The qualities would include somewhat general factors like energy, pertinacity, insight, imagination, and the capacity for growth. But they would also include specific habits of work, modes of thought, fields of interest, likes, dislikes, motivations. They would include forms of skill, technical training and knowledge."

If Edison's own boyhood may be taken as a criterion for the development of another genius of the same sort, his successor would be a boy with a remarkable memory. He would not be particularly husky physically, which might result in his education being of the home-made variety. He would be an experimenter from the age of six or so. He would take an early interest in science, particularly chemistry, later electricity. He would develop a shrewd commercial capacity in his early teens, realizing that by earning money he could buy chemicals and apparatus for more interesting and exciting experiments. Altogether, he would be rather an unusual boy.

Edison's assistant, W. H. Meadowcroft, writing of this boy Edison, has said:

"To others of the family than his mother he was accounted a strange boy, some believing him to be mentally unbalanced. His mother, however, understood that his was no ordinary mind, for she had studied him thoroughly. While she watched him closely, she allowed him the widest possible sphere of action and encouraged his ever-increasing studies."

Judging by Edison's own boyhood career, a formula for his type of genius might include curiosity and interest in science, particularly chemistry and electricity; concentration and persistence; cleverness with his hands; a strong memory; practical judgment and commercial ability. The amounts of such qualities are not so significant as the pattern they form when they combine in a personality, according to Dr. Gesell. An abnormally large amount of stick-to-it-iveness if teamed up with defective knowledge of science and erratic technique is not likely to produce results of great value to civilization. The same abnormal persistence, given more favorable opportunity for an outlet, might produce work that would win the title of genius for an inventor.

Because genius comes in patterns and not in doses, Dr. Gesell believes that an informal questionnaire could scarcely provide an adequate scale for rating geniuses.

"Science is making definite progress in the measurement of mental ability," he says. "But capabilities of the highest order cannot be adequately measured by any known device. They cannot even be justly estimated except by thorough-going and judicious appraisal of numerous factors. The capacity for sustained growth is one of the most important but most difficult to assess.

Dr. Louis M. Terman, of Stanford University, who has conducted comprehensive studies (*Turn to next page*)

Edison's Search for Genius—*Continued*

of genius in children, regards Edison's search for genius as one of the most creative, challenging, and daring of all his undertakings.

"True, neither science nor common sense has yet solved the riddle of genius," Dr. Terman adds. "But psychology has made a beginning. There is nothing about genius that is not amenable to scientific investigation."

Dr. Terman advocated that each

TELEVISIONARY C. FRANCIS JENKINS was already an inventor when this picture was taken

state should select its most promising boy scientist with care. Every high school senior class in the state should be sifted. A small committee of psycholgists and physical scientists should conduct the search. This California psychologist, who has studied 1,000 superior children in his state, believes that the best method of picking a genius would be by first giving an intelligence test. The top rank of the survivors should then be given a test of their aptitude for science. The dwindling group of "best minds" would then go up for tests and observations as to their character and personality, including such traits as industry, persistence in the face of difficulty, unselfishness, cooperation and health. If there were still too many survivors, some weight might be given to a fine heredity record based on the qualities shown by blood relatives.

So far as Mr. Edison's final selection is concerned, Dr. Terman believes that "the whole bet should not be staked on one horse. If the ten most promising are selected and trained, the inventor will have a better chance of finding ultimately the one individual he wants."

Still more specific than Dr. Terman in his suggestions on how to pick a scientific genius, is Dr. Walter V. Bingham, director of the Personnel Research Federation. Psychological problems of men and women in relation to careers and industries are Dr. Bingham's specialty.

"There can be no successor to Edison," declares this industrial psychologist. "In his place there will be a whole group of investigators working together. The day has passed when one inventor, no matter how brilliant, can outstrip the organized cooperative efforts of a great research laboratory. But such laboratories need young men of precisely the type Edison is seeking."

To select the most promising, Dr. Bingham would allow at least two or three days for examination.

"Edison's questionnaires, to judge from those which have been published, are not reliable enough," he believes. "The inventor seems never to have applied to them the rigorous scientific standard of verification which he imposes on his physical and chemical researches. The separate items in the questionnaires need severe pruning and experimental validation."

In other words, Edison has not tested his tests so completely as psychologists do by trying them out on large numbers of individuals and closely analyzing the results. If a psychologist who is devising an intelligence test finds that children known to be bright do not make better ratings than dull children on certain parts of the test, he suspects that something is wrong with his questions. They may measure some quality of mind, but not intelligence. So, he experiments and changes until the test is standardized.

Dr. Bingham goes on to say that when the 49 young men are assembled at the laboratory in Orange, they should be given a wide range of tests.

"The competition might well make use of some of the well standardized tests of scientific and mathematical ability, mechanical ingenuity, logical memory, and constructive imagination or inventiveness," he suggests. "The battery of tests should include Zyve's tests of scientific aptitude, Thurstone's tests of special thinking, and the Minnesota mechanical ability tests, together with such measures of ingenuity as the Carnegie Imagination Test, Huger's puzzles, and O'Connor's block assembly. Three hours should be set aside for the Thorndike test of abstract intelligence. If an information test were to be included in the battery of tests, I would use the Inglies vocabulary test as revised by O'Connor. Strong's interest analysis for revealing engineering aptitude would help. The physique of the candidates should also be compared by measuring their endurance and output of energy. Finally, their individual rankings in all the separate examinations should be properly weighed and combined in a convenient and statistically sound manner."

If there is a mind like Edison's among the candidates, Dr. Bingham concludes that this is the surest way to find it.

One outstanding result to be ex-

TELEPHONE'S BELL. Would Edison's test have detected his genius?

pected from the quest for genius is that it will stimulate general interest in the subect of special aptitudes and individual differences. This is the phase of the situation which interests Dr. L. J. O'Rourke, director of personnel research of (*Turn to next page*)

Fatal Gas Used in Few Refrigerators

Engineering

Deaths as a result of gas leaks from automatic refrigerators, such as occurred in Chicago recently, are unlikely to be repeated very extensively elsewhere, in the opinion of government experts. Of 63 makes of electric and automatic refrigerators compiled in a recent list, only 23 make use of methyl chloride, the gas responsible for the Chicago fatalities, as a refrigerant. Of these, only one is a nationally advertised make. Furthermore, the only danger comes from central refrigerating plants, used in apartment houses, where the refrigererant is piped to a number of cold boxes throughout the building. Even when methyl chloride is used in a small independent home unit, a leak would not liberate enough of the gas to cause danger.

Sulphur dioxide, the choking gas that results from the burning of sulphur, is the most popular cooling compound, and is employed in the two most widely used electric refrigerators. While this is irritating to the nasal passages, it is not really poisonous, in the same sense as the poison gases used during the war. Its pungent smell is recognized before it reaches dangerous concentrations. Ammonia, used in many refrigerators, is safe for the same reason.

Methyl chloride is odorless, and, while it is not poisonous in itself, a large concentration would exclude the necessary oxygen, and death would result if a person were kept in a closed room with it. Many manufacturers use it in combination with either ammonia or sulphur dioxide, which have characteristic odors that reveal leaks. For a similar reason, manufacturers of illuminating gas, which consists largely of odorless and poisonous carbon monoxide, mix other gases with it that give the characteristic odor. One manufacturer of refrigerators makes use of ethyl chloride, which is not poisonous but is highly inflammable. Attempts have been made to mix methyl bromide with it to lessen the fire danger, but methyl bromide is truly poisonous.

Carbon dioxide, which makes up a large percentage of our very breath, is used in one make of refrigerator. This is also the refrigerant used in cooling systems of battleships.

Science News-Letter, July 13, 1929

Edison's Search for Genius—*Continued*

the U. S. Civil Service Commission. This psychologist, who directs the planning of tests for the government service, says that the varied ways of selecting a genius tried out by the 48 governors and the commissioners of the District of Columbia should present striking comparisons and contrasts, and these should serve as a challenge to research students to improve their methods of selecting individuals with talent.

Dr. O'Rourke further suggests that it would be an attractive proposition, though a difficult one, to follow the careers of all the 49 boys; to compare the contributions to science that may be made by the boys with the highest ratings on the competitive examinations with the contributions to science made by boys rating the lowest on the tests. These 49 careers, if they could be followed, might furnish valuable evidence as to the success of different methods of detecting symptoms of genius.

The boyhood of scientific genuises, past and present, offers some guidance as to the sort of boy who grows up to be a giant in the world of science and invention. When Dr. Catherine Cox of Stanford University studied the boyhood of 282 geniuses of history she found 39 scientists among the set. A striking fact about these boys is their early attraction to science. Newton, destined to make his famous observation on apples and gravity at the age of 23, was the sort of boy who spends his time with hammers, saws, and hatchets, constructing models of machines and other contrivances. Young Galileo's favorite pastime, Dr. Cox found, was the construction of ingenious toy machines. The boy Franklin had a special liking for the water, and his boyish inventions included a kite for accelerating progress through the water and pallets for rapid swimming.

Approaching more recent times, we find Alexander Graham Bell amusing himself as a boy collecting beetles, wild flowers, and minerals. He was an early pioneer in amateur photography. Being the son of a well-known teacher of elocution and authority on mechanics of speech, Bell became attracted to the problems of voice transmission at an early age, and kept up his interest in this subject all his life.

C. Francis Jenkins, one of the inventors who has made possible our moving pictures, was at his life work of inventing before he was out of baby skirts. He tells how, while still wearing dresses, he sawed a hole in the barnyard fence and solved the problem of a locked gate that kept him away from the horses and cows. As a youngster, he invented a jack to raise wagon wheels, for use in greasing axles, and so popular did the design become in his neighborhood that Francis and his brother pooled their capital and made five jacks to sell in the city. An air pump and other scientific apparatus at the district school was presented to young Jenkins on one occasion, because it was little used and "he seemed the only one liking it."

Little Carl Steinmetz had a hard time learning the multiplication table, and his early teachers thought him a dull pupil. The fact was, he had been spoiled by an indulgent grandmother and had never set his mind to doing difficult tasks. By the time he was ten years old, however, interest in arithmetic awakened, and he grew up to be one of the few scientists who could understand the work of Einstein.

Persistency of interest is a trait which has appeared again and again in the boyhood careers of the inventors of the past and present times. Among the geniuses of the past studied by Dr. Cox more than three-fourths belonged to upper, educated classes, and the average child genius had an unusually good opportunity for education and inspiring social contacts. But often the education was not of the standard classroom variety. That of Edison, the inventor that the present quest aims to match, certainly was not acquired by the usual formal methods.

After all, perhaps the best way to find another Edison would be for the inventor himself to take the most up-to-date tests that psychologists have devised. Then, using his ratings on the tests as a standard, he could proceed to give the tests to the boy competitors, and find the mind most like his, making some allowance for differences in age and experience.

Science News-Letter, July 13, 1929