

GENERAL SCIENCE

Score Your Aptitude in Science

Hundreds of high school students, boys and girls, recently completed an aptitude exam as the first step to qualify them in the 19th Annual Science Talent Search.

For a complete aptitude examination, send 15¢ in coins to Science Clubs of America, 1719 N St., N.W., Washington 6, D. C., and ask for the test.

By SHIRLEY MOORE

IN A FEW minutes you can get some idea of whether you have the kind of scientific aptitude that wins national recognition and college scholarships for talented high school students.

As an experiment, try this shortened version of the famous Science Talent Search test on yourself and on your family and friends. This 20-minute version will give you a quick indication of the scientific possibilities of anyone from a high school student to an octogenarian.

The full length, two-and-a-half-hour Science Aptitude Examination, like this sample, is designed to measure "ability to think and reason in terms of scientific concepts and vocabulary," according to the authors of the annual test, Dr. Harold A. Edgerton, New York consulting psychologist, and Dr. Stuart Henderson Britt of Northwestern University.

(Allow yourself 20 minutes to complete the sample, then check your answers with those given in the answer box on p. 94.)

If you have answered all of these questions correctly, you fared better than any of 203 Science Talent Search contestants selected at random.

Awarding two (2) points for each correct answer in Parts A and B, and one (1) point for each in Part C, a high score on the short version would be 22 or more out of a possible total score of 38. Of the 203 random selections, 58 students did this well or better. A low score would be 13 or less. Forty-three students did this poorly.

Based on the results of this random sample of contestants, the easiest questions were 5, 50, and 71. Each of these was answered correctly by 77% or more of the 203 students. Questions 72, 73, and 101.6 were the hardest. Each of these was answered correctly by 13% or less of the students.

The most difficult question was 72, which was answered correctly by only 8.8% of the students. The easiest, 50, drew correct answers from 83% of the 203.

You should not be discouraged if your score is not "glittering" in comparison with those made by these unusually able teenagers. The test is intended to qualify only the best among thousands of students, and no one ever has made a perfect score. In addition, you probably are not as thoroughly in the test-taking groove as a high school senior who has just finished college entrance examinations and a number of qualifying tests for various purposes.

All the selection techniques of the Science Talent Search for the Westinghouse Science Scholarships and Awards, conducted for 19 years by Science Clubs of America,

PART A

DIRECTIONS: Four possible answers are given for each question. Choose that answer which is *most nearly correct*. Record your answer by putting an X in the answer box corresponding to your chosen answer.

3. In the northern hemisphere, the direction of winds around a high-pressure center and around a low-pressure center are respectively
 1. clockwise : clockwise
 2. clockwise : counterclockwise
 3. counterclockwise : clockwise
 4. counterclockwise : counterclockwise
4. At the lowest known temperature (almost absolute zero), every element and every compound except one is a solid. Which one is it?
 1. helium
 2. hydrogen
 3. nitrogen
 4. oxygen
5. The term "molecular engineering" refers to
 1. control of chemical reaction through electronic computers
 2. designing of nuclear reactors
 3. developing chemical compounds to fit specific needs
 4. developing industrial materials from farm crops
19. A level of 160 decibels, a very loud noise, has been found lethal for some animals. This occurs through
 1. causing malfunction of the liver
 2. impairment of hearing
 3. raising body temperature
 4. reduction in sleep
20. Yttrium's advantage in the nuclear field is "its relatively low thermonuclear cross section." This means that
 1. it has less resistance than many other materials to the passage of neutrons needed to sustain a nuclear reaction
 2. it is highly resistant to the passage of neutrons
 3. it takes very little of this material to contain an active reactor cell
 4. its melting point is high enough to withstand reactor temperatures
21. A Venn diagram is the graphical representation of
 1. a cross section of a plant's stem or leaves
 2. the air flowing over an airplane wing
 3. the efficiency of a pump
 4. the relationships between sets
22. Zeolite crystals are not useful as
 1. carriers for volatile catalysts
 2. dehydrating devices
 3. semi-precious gems
 4. separators for different types of molecules

PART B

52. On the basis of the paragraphs, which of the following statements is *most nearly true*?

1. More people have poor yellow-blue discrimination than have poor red-green discrimination.
2. Older adults have less adequate color discrimination than persons in their thirties.
3. Poor color discrimination in early childhood does not mean poor color discrimination as an adult.
4. There is greater age difference than sex difference in ability to discriminate color.

53. "Color discrimination is congenitally determined and hence it remains fairly constant throughout the life of an individual." According to the paragraphs this statement is

1. consistent with experimental results
2. false
3. generally accepted but not true
4. true

SECTION N

There is a number system whose numbers are of the form (a, b) where "a" and "b" can be any positive integers including zero. Two numbers in this system, (a, b) and (c, d) , are equivalent if $a + d = b + c$. There are two operations in this system, "K-ing" and "Q-ing" as follows:

$$(a, b) K (c, d) = (a + c, b + d)$$

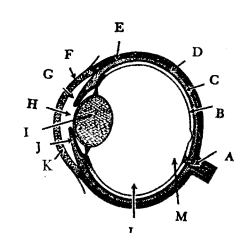
$$(a, b) Q (c, d) = (ac + bd, ad + bc)$$

QUESTIONS ON SECTION N

71. $(5, 9) Q (7, 3)$ is equivalent to
 1. $(12, 12)$
 2. $(50, 90)$
 3. $(62, 78)$
 4. $(78, 62)$
72. $(7, 2) K (4, 15)$ is equivalent to
 1. $(4, 10)$
 2. $(11, 18)$
 3. $(58, 113)$
 4. $(22, 34)$
73. $[(9, 12) K (16, 11)] Q (x, y)$ is equivalent to
 1. $(5 + 2x, 5 + 2y)$
 2. $(23x + 25y, 23y + 25x)$
 3. (x, y)
 4. $(25x, 23y)$

PART C

101. Below is a diagram of a vertebrate eye. A number of parts are indicated by arrows, each identified by a letter. For each part in the list on the answer sheet, put the letter of one of the arrows in front of the name of the part indicated by the arrow.



1. aqueous humor
2. cornea
3. iris
4. lens
5. retina
6. sclerotic coat

103. Select the number of the achievement mentioned in Column II and write it in the parentheses at the left of the name of the scientist (Column I on Answer Sheet) associated with it.

<p>COLUMN II</p> <ol style="list-style-type: none"> 1. developed theory of electrolytic dissociation 2. devised the quantum theory of light 3. discovered argon, neon, xenon, krypton 4. discovered methods of tissue culture 5. formulated electromagnetic theory of light 6. initiated the periodic table of the elements 7. measured the charge of the electron 8. produced first wireless waves 	<p>Column I</p> <p>() 1. Svante Arrhenius</p> <p>() 2. Alexis Carrel</p> <p>() 3. Heinrich Hertz</p> <p>() 4. Dimitri Mendeleev</p>
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MEASURE YOUR TALENT—This is a short version of the two-and-one-half-hour examination for the 19th Annual Science Talent Search.

have been developed to discover and encourage the most promising young research scientists among the nation's high school seniors.

Scores on the Science Aptitude Examination represent the first hurdle in the judging procedures. There is no predetermined "passing" grade and scores are plotted on a curve to discover which contestants may be qualified for further judging. This qualifying score for boys in the 19th Search was 143, 130 for girls. This allowed a large margin, for the highest score among the boys was 211 out of a total possible score of 244. Highest score among the girls, who made up 22% of the entrants, was 198.

As the next step, detailed scholastic records of each student who "passed" the examination were evaluated. Then evidence presented by the student and by his faculty sponsor concerning his activities, drives, hobbies, personality traits and attitudes was weighed carefully to find any of a number of combinations of achievement and promise.

Each entrant is required to submit a written report of an individual research project, usually consisting of a thousand or so words of text, plus relevant diagrams, theorems, pictures, etc. The papers of all students who had survived the first hurdles of the Search were read critically by a board of professional scientists which included specialists in the many fields explored by the student-scientists. This board worked its way through everything from an idea for a flat video display panel for television to the use of dithioacids to trace esterification reactions with primary, secondary and tertiary alcohols.

Then these professional opinions were added to the other evidence for and against each candidate.

Correlating all of these evaluations, the board of judges selected an Honors Group of 448 students (ten percent of those with complete entries) who showed outstanding scientific potential and who will be recommended to colleges and universities for admission and scholarship aid.

To choose 40 top winners from this Honors Group, each detail was re-examined and weighed on an even more precise scale of values. During the Science Talent Institute, to be held March 3 through March 7 in Washington, D. C., the known data on each of these 40 will be supplemented significantly by personal interviews and weighed again in selecting the five who will be awarded Westinghouse Science Scholarships ranging from \$7,500 to \$3,000. (See p. 86.)

Some of the traits and abilities prominent among these outstanding young people are intense intellectual curiosity, ingenuity, self-discipline, wide scope of interest and an intuitive grasp of why and how facts may relate to each other.

During the five-day Science Talent Institute in March, the 40 winners will meet eminent scientists, visit scientific laboratories of unusual interest, and be interviewed by the judges. The Westinghouse scholarships and awards are announced at a banquet at the close of the Institute.

The five scholarships of \$7,500, \$6,000, \$5,000, \$4,000, and \$3,000 and 35 awards of \$250 may be used at any accredited college or university and will help to assure

these young pre-scientists of professional training in their fields. Recognition in the Science Talent Search brings many thousands of dollars in other scholarship offers to the Honors Group. In addition, 34 states and the District of Columbia conduct State Science Talent Searches in cooperation with Science Clubs of America, awarding some \$600,000 in scholarships to students from their states who were qualified entrants in the national Search.

Science News Letter, February 6, 1960

OCEANOGRAPHY

Bathyscaph Descends To Deepest Part of Ocean

THE U.S. NAVY bathyscaph Trieste has descended to a record depth of 37,800 feet to the bottom of what is believed to be the deepest part of all the world's oceans.

The descent, well over seven miles, is considerably farther below the surface of the sea than Mt. Everest, at 29,028 feet, is above.

The dive was made Jan. 23 in the Marianas Trench in the Pacific, an area previously believed to have been only 35,000 feet deep. Aboard the Trieste were Navy Lt. Don Walsh and scientist Jacques Piccard, whose father, Auguste, designed and built the bathyscaph.

The descent took 4 hours and 48 minutes and the ascent, 3 hours and 17 minutes. During the half hour spent at the bottom the bathyscaph's hull was under a pressure of 16,883 pounds per square inch, yet no difficulties were reported encountered during the dive.

This record penetration of the ocean's unknown areas was the third in a series of dives made in recent months. The other two dives were descents to then record depths of 18,600 feet and 24,000 feet.

The series of dives is providing the Navy with scientific knowledge of sunlight penetration, underwater visibility, transmission of man-made sounds and marine geological studies. Results are expected to have wide scientific and military implications.

Science News Letter, February 6, 1960

Questions

ASTRONOMY—How is night glow caused? p. 85.

ELECTRONICS—How is molecular electronics expected to replace transistors? p. 87.

MEDICINE—What important disease is very rare in the Bantu people? p. 89.

PUBLIC HEALTH—What is interferon? p. 83.

ZOOLOGY—What does the word "yeti" mean in the Sherpa language? p. 84.

Photographs: Cover, Hughes Aircraft Company; p. 83, General Electric Company; p. 85, U. S. Navy; p. 87, Westinghouse Electric Corporation; p. 90, Science Service; p. 96, Shade Pulls, Inc.

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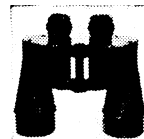


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