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ABSTRACT

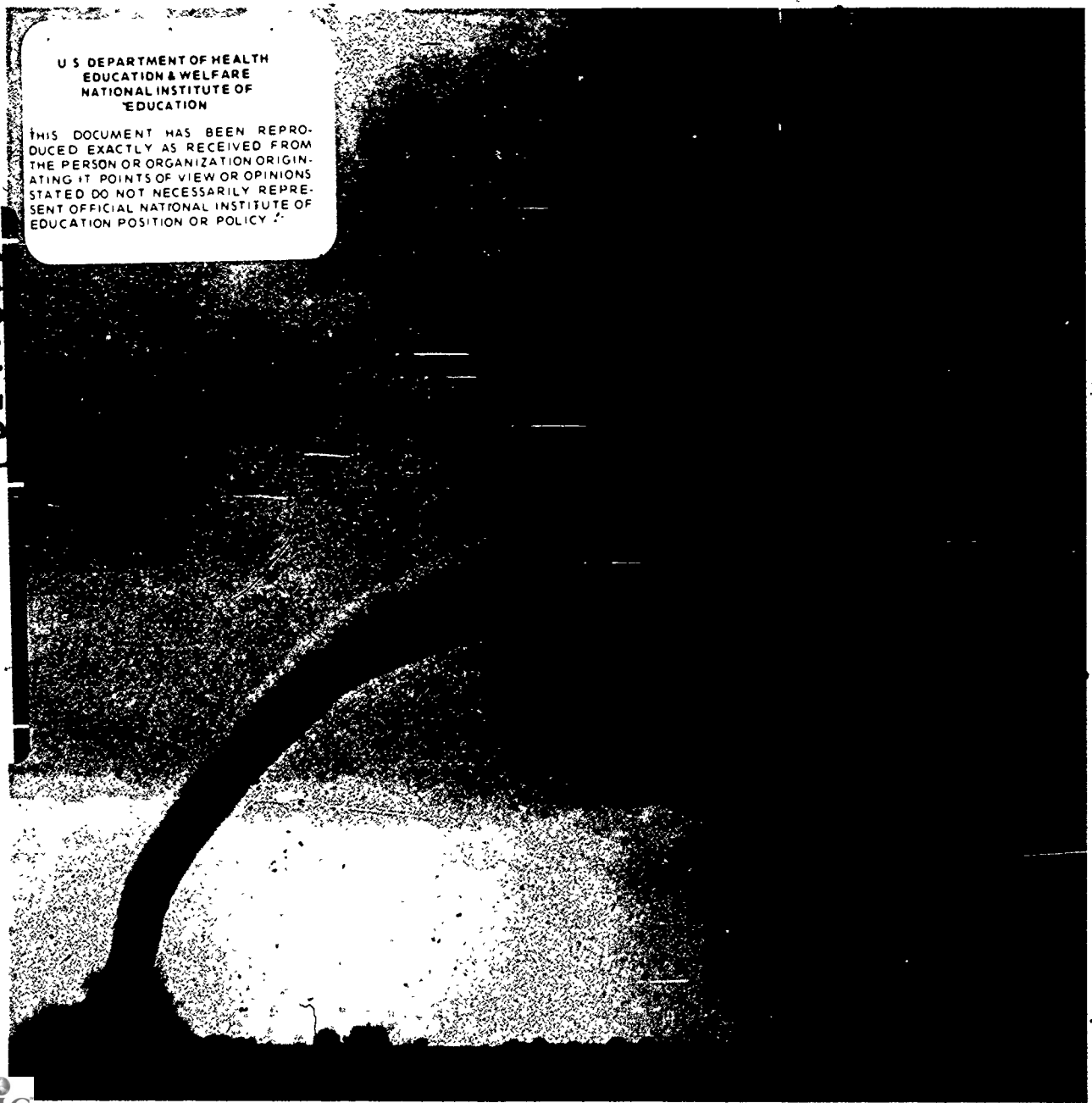
This guide is designed to assist personnel working in the National Weather Service's Severe Local Storm Spotter Networks in identifying and reporting severe local storms. Provided are pictures of cloud types for severe storms including tornadoes, hail, thunder, lightning, heavy rains, and waterspouts. Instructions for key indications to watch for and detailed reporting procedures are also included. (SL)

U.S. DEPARTMENT OF COMMERCE • National Oceanic and Atmospheric Administration

SPOTTER'S GUIDE

for Identifying and Reporting

SEVERE LOCAL STORMS



A residential street is smashed to matchwood by the Topeka, Kansas, tornado of June 8, 1966.

Photo by H. E. Hammerli, Christopher Studio.

Cover—A killer tornado stalks Tracy, Minnesota, June 13, 1968. This storm traveled 13 miles along the ground, and killed nine people, injured about 100 more, and caused several million dollars' property damage. A member of Lyon County's effective Severe Local Storm Spotter Network sighted the tornado and alerted Tracy's community warning center, which sounded the Civil Defense sirens for seven minutes before the twister struck the town. Those seven minutes kept the death toll down in Tracy. As a Severe Local Storm Spotter for the National Weather Service you may give your community this gift of time—the seconds that save lives.

Photo by Eric Lantz, Walnut Grove (Minn.) Tribune

To the Severe Local Storm Spotter:

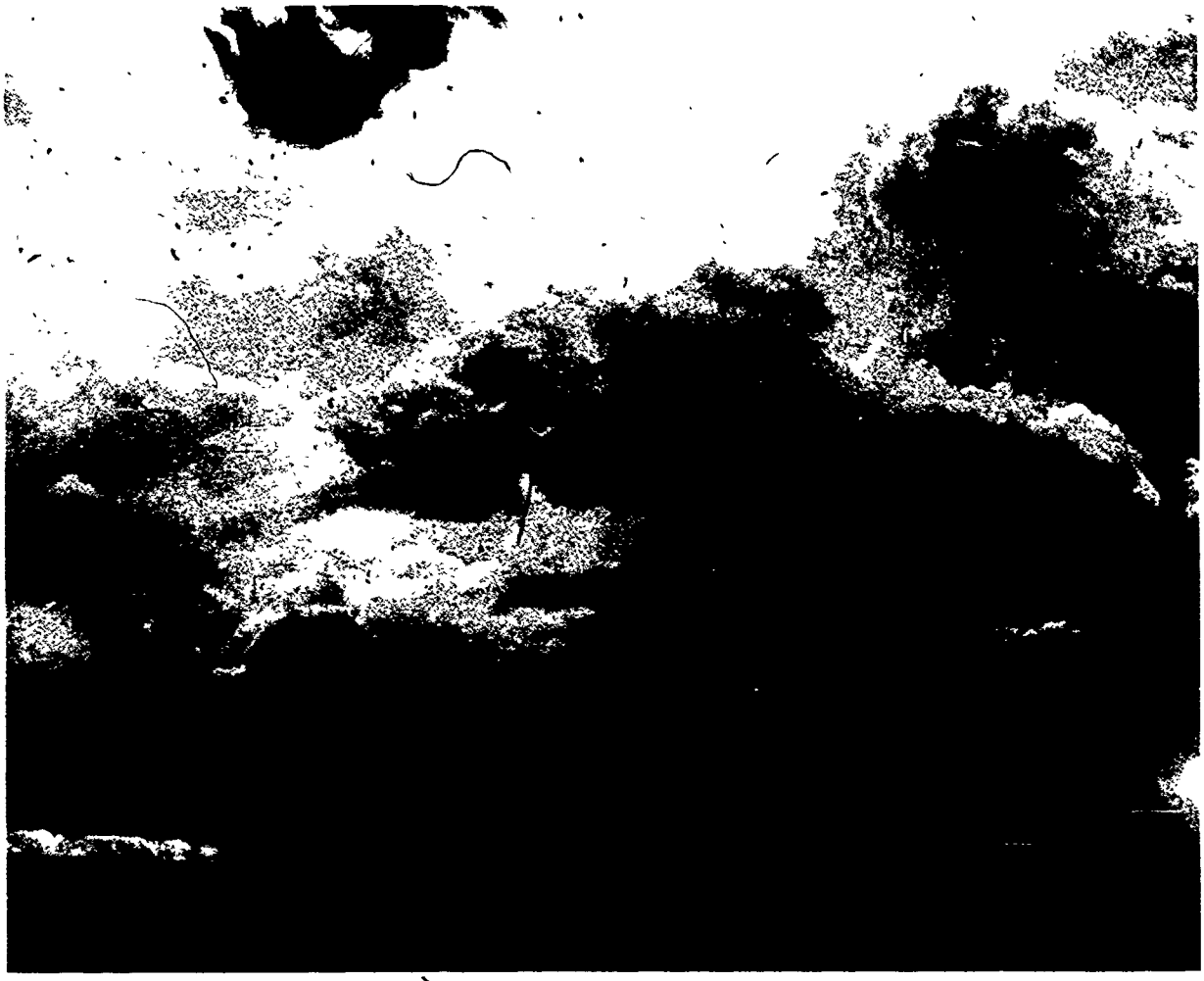
The National Weather Service of NOAA, the U.S. Commerce Department's National Oceanic and Atmospheric Administration, and cooperating organizations have established Severe Local Storm Spotter Networks in order to secure critical information on severe local storms. This Guide is designed to assist you, the spotter, in identifying and reporting these severe local storms. The severe local storm forecaster analyzes the weather and identifies the general areas favorable for severe local storm development. He then issues a severe thunderstorm or tornado *watch*. However, a specific *warning* can be made only after a severe storm is in progress and a report has been received on its type, location, and direction of movement.

This is where you come in. Radar is very important, where available, but it is not the whole answer. We need your reports. Then we can warn others. You are a vital member of the team. Thank you for helping us—and, more importantly, your fellow citizens. Your only compensation will be the knowledge that your vigilance may save lives and property.

Sincerely yours,

George P. Cressman

George P. Cressman
Director, National Weather Service



SEVERE LOCAL STORMS

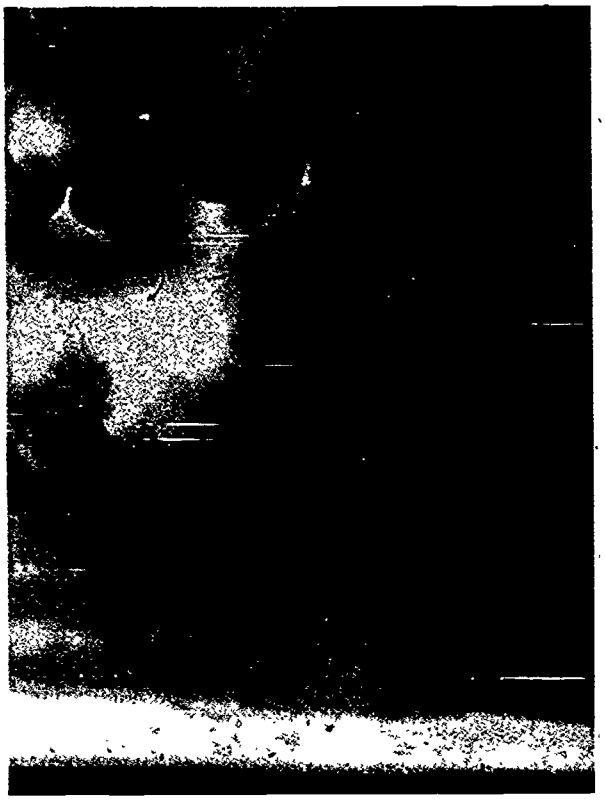
begin as thunderstorms, the great Cumulonimbus towers built by unstable conditions in the lower atmosphere. Like most storms, thunderstorms run on heat energy converted into wind, electrical discharge, and violent upward motion of the air. Severe local storms may develop from local heating of the ground or radiational cooling of cloud tops—anything which puts dense, colder air above warm, moist, less-dense air.

The Cumulus family of clouds represents such instability. Sometimes one or several fair-weather Cumuli will develop vertically until they become thunderheads; further development causes the thundershower to intensify into a severe local storm.

These disturbances are perhaps most severe when they occur along squall lines, which are generated when cold dense air and warm moist air fight along boundaries called fronts. The greater the contrast in temperature and moisture across the front, the greater the energy content, and the more violent the ensuing thunderstorms.

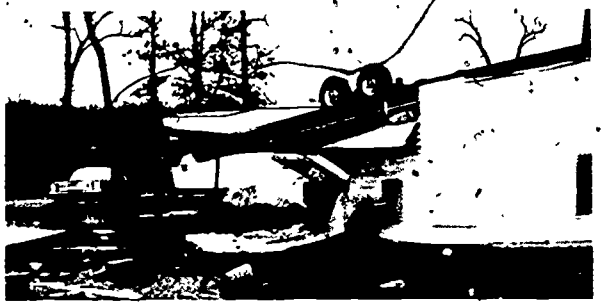
Because thunderstorms may extend from near the earth's surface into the stratosphere, they may literally blot out the sun. Remember, the darker the sky, the greater the vertical extent of the cloud, and the more likely the storm will be severe. Remember also that, given the proper season and geographic location, severe thunderstorms may develop from shallower cloud systems.

Viewed from below, the ragged bases of a squall line or large thunderstorm are windtorn, twisting, and rolling. This random motion should not be confused with the definite, sustained pattern of rotation about a central point that produces a funnel.



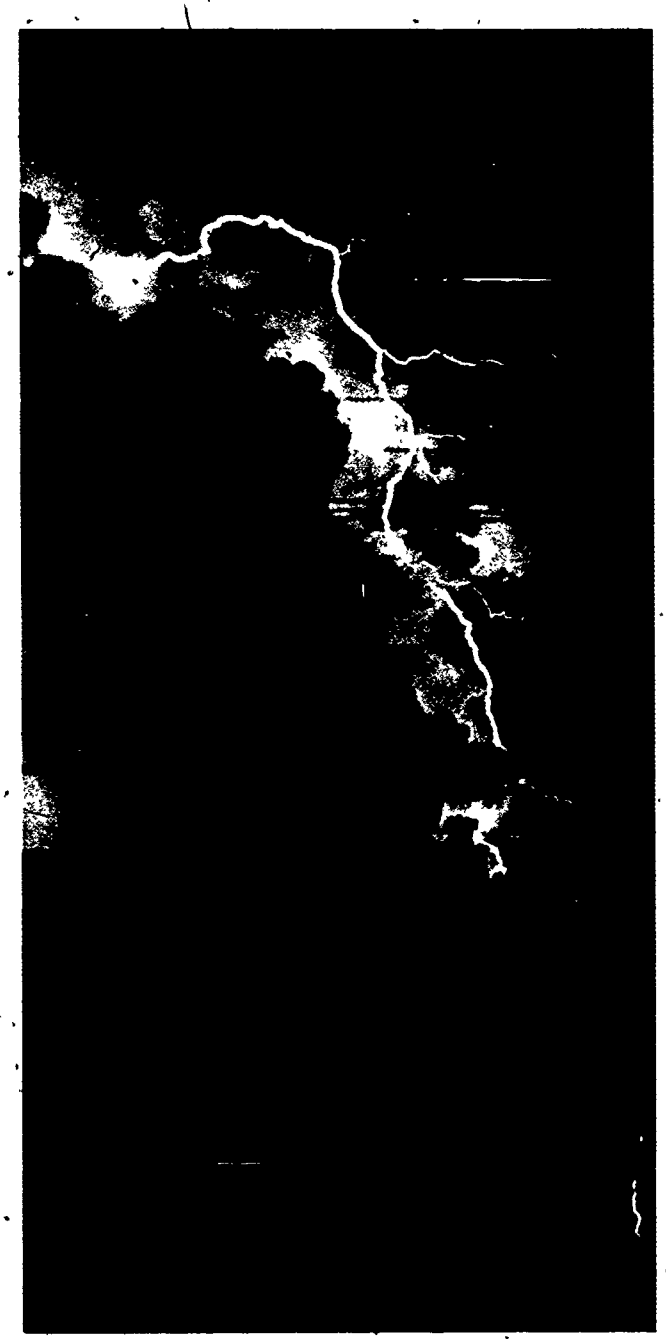
Mammatus cloud forms are series of pouches projecting downward from the base of storm clouds. These pouches are usually uniform in size and shape, appear and flatten gradually, and have no spinning motion.

Although these thunderstorm formations are not tornadoes, they are often observed under tornado-producing severe storm conditions. A storm with developing rotary circulations and mammatus clouds is a storm to watch carefully.



SEVERE LIGHTNING, HEAVY RAINS, DESTRUCTIVE WINDS, AND LARGE, HEAVY HAIL ARE OFTEN "ADVANCE MEN" FOR THE MOST VIOLENT STORM ON EARTH—THE TORNADO.

SKYWARN



You can tell something about a thunderstorm's severity by observing the intensity of its rain and the strength of its winds, and by watching for the occurrence of certain unique, destructive phenomena.

LIGHTNING is the discharge produced when differences in ground and atmospheric electrical charge are large enough to overcome the insulating effect of air. The discharge may occur within the cloud, between clouds, or between the cloud and ground. Usually, the more lightning observed in a thunderstorm, the more intense the storm system. Be careful. Remember that lightning kills more Americans annually than hurricanes or tornadoes.

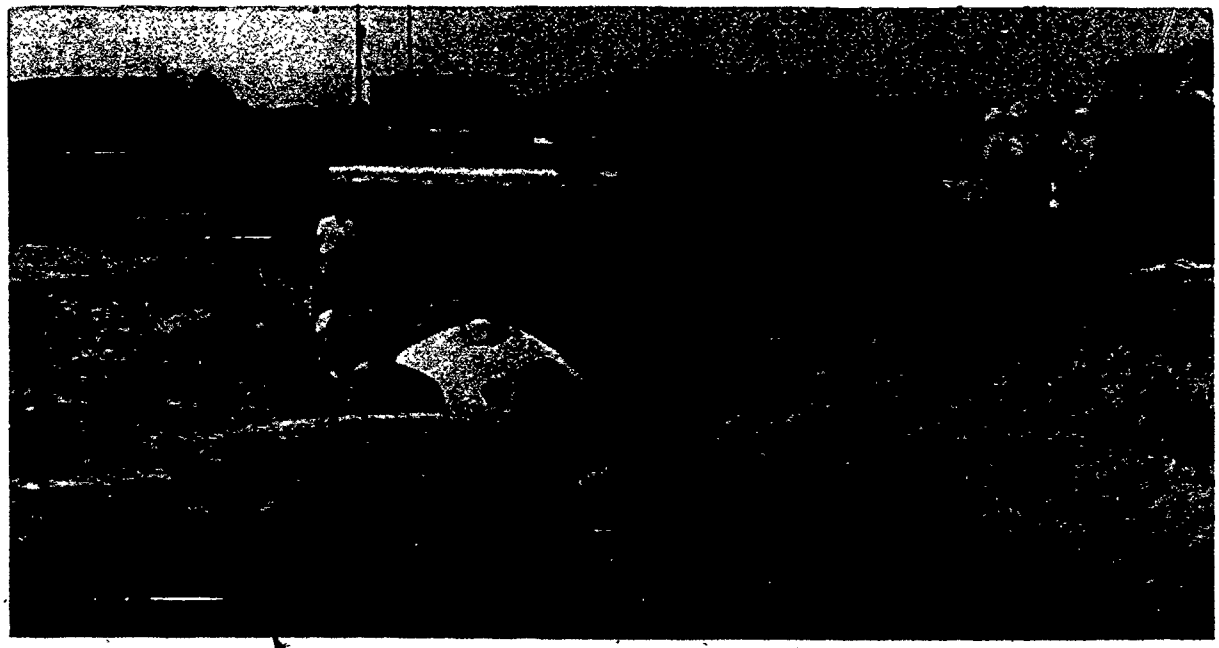
THUNDER is the sound produced by expansion of air heated by the high-amperage lightning stroke. The distance in miles to the lightning flash can be estimated by counting the number of seconds between lightning and thunder, and dividing by five.

HAIL is precipitation in the form of lumps of ice, called hailstones. The size of hailstones is an indicator of thunderstorm intensity.

HEAVY RAINS mark the mature stage of a thunderstorm, and may produce dangerous flash floods even before precipitation ceases. Stay out of dry creek beds during thunderstorms. If you live along a river, listen for flashflood warnings from the National Weather Service.

SKYWARN

REPORT THE DISTANCE AND DIRECTION TO INTENSE, FREQUENT LIGHTNING AND THUNDER AND DESCRIBE THE TYPE OF DISCHARGE: GROUND-TO-CLOUD, CLOUD-TO-CLOUD, CLOUD-TO-GROUND.



REPORT HAILSTONES MORE THAN
¼-INCH IN DIAMETER.

REPORT HEAVY RAIN AND
ALL FLOODING

SKYWARN

TORNADOES

are violently rotating columns of air that descend in the familiar funnel shape from thunderstorm cloud systems. A tornado vortex is normally several hundred yards in diameter, whirls usually in a counterclockwise direction (in the Northern Hemisphere), and contains winds estimated to be near 300 miles per hour. Tornadoes occur on all continents, at any time of year, at any hour of the day. They have occurred in every state of the Union.

Their greatest frequency is in the spring, when large contrasts exist between warm air from the south, and cold air from the north; and in the middle and late afternoon, when a warm day is at its warmest. Because they are often accompanied by heavy rain, hail, lightning, and the obscuring cloud system of the thunderstorm or squall line, these violent storms are sometimes difficult to identify. This difficulty is of course much greater when tornadoes occur at night.

You can be an effective spotter if you know what to look and listen for.

LOOK FOR

ANY PROTUBERANCE OR ROTARY MOTION AT THE BASE OF A THUNDERCLOUD SYSTEM

The ragged trailing clouds of squall lines, and certain other harmless phenomena (see pages 14, 15) are frequently mistaken for tornadoes. *Organized rotary motion* about a vertical axis is the clue to distinguishing harmless clouds and the funnel of a developing tornado. In the random motion of thunderstorm clouds, funnel clouds appear as highly organized, rapidly rotating systems. Funnel clouds are violently rotating columns of air, usually pendant from a Cumulonimbus cloud, that do not touch the ground. They become tornadoes only when they reach the surface.

ANY ROTATING CLOUD OF DEBRIS OR DUST NEAR THE GROUND.

Some tornadoes drop from a thunderstorm cloud without developing a visible funnel-shaped cloud of their own. These invisible whirlwinds first become visible when the violently spinning column of air begins picking up debris or dust from the ground. The longer such a tornado touches the ground, the darker it becomes as pieces of material are lifted toward the thunderhead. These whirlwinds should not be confused with "dust devils," which are rarely associated with clouds.

LISTEN FOR

THE ROAR OF THE TORNADO'S WINDS

A tornado at night, or one hidden by low-hanging clouds, heavy rain, or buildings can still be detected—its winds have a distinctive roar which can be heard for several miles. Some people have described the sound as that of a big jet aircraft, others, as the sound of trains. When Hurricane Carla (1961) struck Galveston, Texas, some thought the sound of a nighttime tornado Carla spawned was an amphibious tank used in rescue operations. In the January 1969 disaster in Hazelhurst, Mississippi, one survivor thought the pre-dawn twister was the mill whistle, until the house began to shake. The roar of a tornado increases as the funnel nears the ground, and is loudest when the tornado moves across the surface.

REPORT FUNNEL-SHAPED, ROTATING CLOUDS IMMEDIATELY. IF YOU SUSPECT, BUT CANNOT CONFIRM, A SIGHTING, REPORT YOUR SUSPICIONS.

National Weather Service and community warning centers can contact other observers for a better view of the storm. A questionable report, when supported by radar and other observations, can provide enough confirmation for a tornado warning to be issued.

SKYWARN

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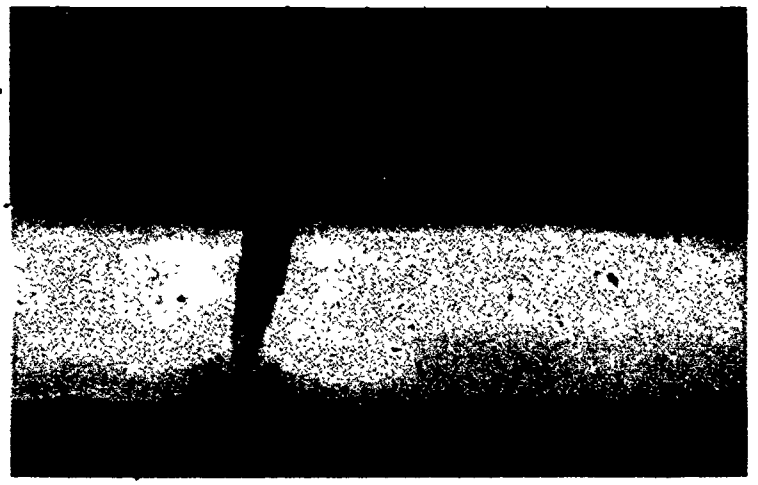
Life Cycle of a Tornado

A vertical cloud formation (1, to right of Quonset building) descends from the chaotic cloud system of a severe thunderstorm near Freeman, South Dakota, June 1, 1965. Spotter Willis Wipf, who took these pictures, correctly identified the formation as an incipient tornado. A tornado funnel forms (2), and drops toward the surface (3), then lifts and almost disappears before descending to earth (4).

The tornado lifts once more (5), then descends, as a second funnel begins to form (6, behind windmill); the second funnel becomes better defined (7), then dissipates as the tornado begins to lengthen (8), and finally disappears.

2



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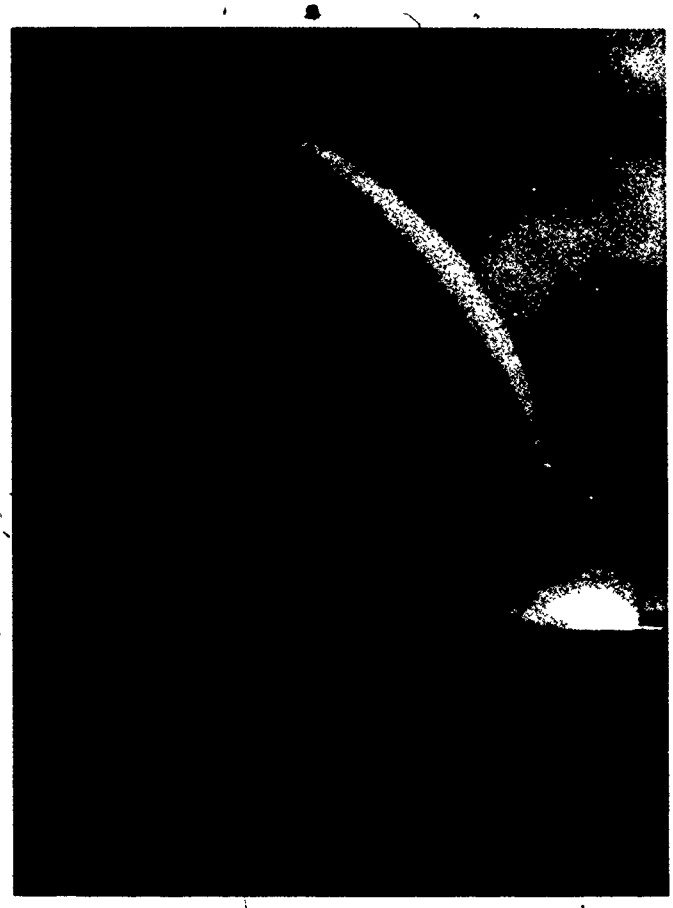
Mature Tornadoes

assume a variety of shapes and thicknesses, some of which are shown here. In general, mature tornadoes are soon glutted with dust and debris collected in the lower portion of the funnel cloud. The width of the surface cloud of dust and debris is usually much greater than the width of the actual water droplet cloud.

The tornado which struck Dallas, Texas, April 2, 1957 (1) appears as a "typical" funnel-shaped tornado; it is shown at its maximum strength and width (about 500 feet). The Scottsbluff, Nebraska tornado (2) of June 27, 1955, is much fatter than the Dallas storm. The ropelike twister (3) occurred near Enid, Oklahoma, June 5, 1960. The photograph is by Leo Ainsworth. Twin funnels (4) were photographed by Paul Huffman east of Elkhart, Indiana; these were part of the April 11, 1965, "Palm Sunday" tornado outbreak.



Report All Waterspouts

A tornado may pass from land to water or water to land without materially changing its appearance or intensity. A funnel cloud which forms over a body of water and then touches the water is called a waterspout. While over water, the funnel is a cloud of spray instead of the dust and debris found over land. Waterspouts have been observed in conjunction with developing Cumulus clouds as well as thunderstorms.

Fairweather waterspouts resemble their tornado cousins, but appear to develop at the surface, like dust-devils, and rise into the air. Usually a small, isolated cloud forms over the fairweather waterspout.

Shown here as part of a waterspout spectacular in the Bahamas, two spouts run a race across the sea surface as others twist down from thunderclouds.

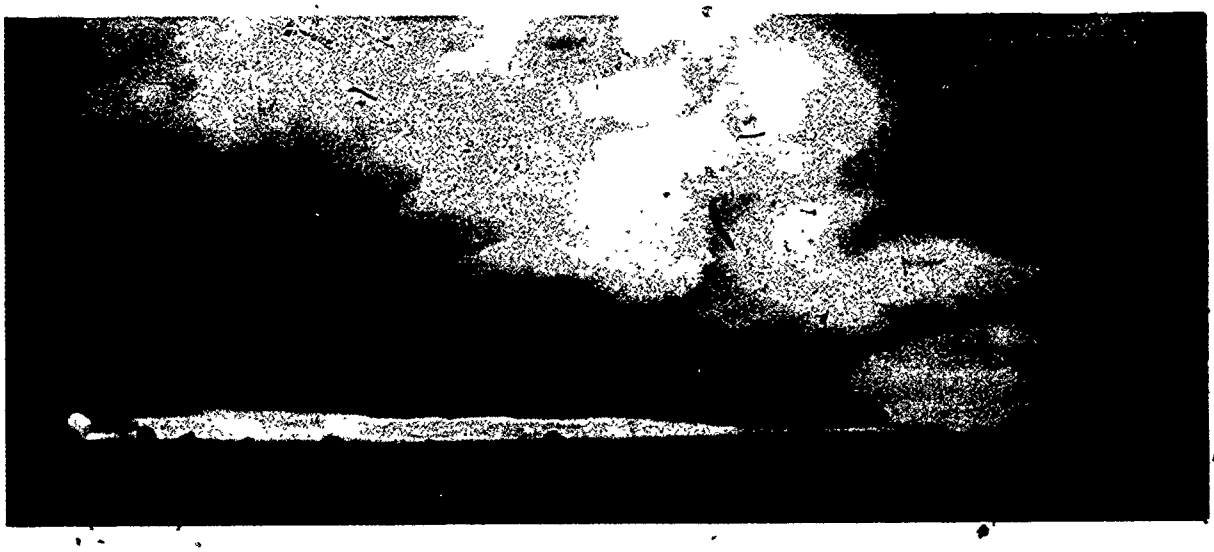
Thunderstorm weather generates many cloud shapes, circulations, and precipitation patterns which resemble tornadoes—when a severe thunderstorm or squall line is passing your position, the sky sometimes seems to be full of potential tornadoes. Some of these comparatively harmless look-alikes are described below.

Virga, rain or snow falling from a cloud but evaporating before reaching the ground, often suggests a V-shape, broad and diffuse at the cloud base and gradually disappearing downward. In contrast to the vertically drifting rain in this slow-moving formation, a tornado funnel has rapidly twisting particles moving about the funnel cloud.

The rain column of a thunder-shower, viewed from a distance, may appear as a dark, solid base between the cloud and ground. From the same distance, a tornado appendage would be narrower, and more distinctly outlined.

Often, a low-hanging, ragged accessory cloud is observed on the approaching side of a squall line or large thunderstorm. This cloud extends horizontally over a long distance, and may assume the shape of either a horizontally rolling cylinder or a flat shelf.

The roll cloud, or arcus, is the most common accessory cloud. It appears to be detached from the parent cloud and has a slow, rolling motion about its long, horizontal axis. By contrast, a tornado funnel is attached to the parent cloud and has a fast rotation about its short, nearly vertical axis.



The shelf-shaped accessory cloud has a well-defined upper edge and a ragged base. Because this type of cloud projects forward, a side view may reveal isolated protuberant features. Here, the absence of any twisting motion about a vertical axis eliminates the shelf cloud as a possible tornado.

U.S. DEPARTMENT OF COMMERCE / National Oceanic and Atmospheric Administration

SEVERE LOCAL STORM SPOTTER

Reporting Procedures

1. Telephone severe weather observations *immediately* to the National Weather Service or alternate agency. Place your call through the telephone operator and tell her you have an *emergency call.* If the call is long distance to the National Weather Service, it can be made *collect.* Report promptly; the storm may interrupt communications.

Law enforcement and Civil Defense spotters—report to the National Weather Service via NAWAS, radio, or other direct communications links as prescribed.

From radio-equipped vehicles, report severe weather observations to a central collection point and request them to relay it to the National Weather Service.

2. Tell us briefly

what you have seen: a tornado, waterspout, funnel cloud, heavy hail, destructive wind, or thunderstorm accompanied by frequent lightning.

where you saw it: the direction and distance from a known position to the storm, *e.g.,* 3 miles south of Beltsville.

when you saw it: make sure you note the time of your observation.

what it was doing: describe the storm's direction and speed of travel, intensity, and destructiveness.

3. Give your name and address, or spotter code number, each time you report.

WHEN IN DOUBT, MAKE YOUR REPORT ANYWAY

WHEN A DESTRUCTIVE STORM IS OBSERVED, report by telephone to:

NOAA National Weather Service _____

at _____ (telephone)

Alternate Agency: _____

at _____

_____ (your name)

_____ (your address) (telephone)

_____ (your Spotter Code number)

SKYWARN

For further information, call or write to the National Weather Service office shown above.

NOAA

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CHART A-2

National Science Foundation Summer Training Programs
For High-Ability Secondary School Students
By Geographical Distribution

Geographical Area (1)	No. of Programs	Per Cent of Total
Me., Vt., Mass., Conn.	11	9.4%
N.Y., N. J., Penn.	20	17.1
Md., Va., D. C., W. Va.	5	4.3
N. C., Tenn., Miss., Ga., Fla., Ark., La.	20	17.1
Wisc., Ill., Mich., Ind., Ohio, Ky.	17	14.5
S. D., Minn., Kans., Mo., Okla.	13	11.1
Tex., N. Mex., Ariz., Calif.	22	18.8
Ore., Mont., Utah, Colo.	6	5.1
Alaska	1	0.9
Puerto Rico	2	1.7
Totals	117	100.0%

(1) 13 states had no programs. The number of programs per state ranged from zero to 16 (New York). Median number of programs per state was 1.4.

CHART A-3

National Science Foundation Summer Training Programs
For High-Ability Secondary School Students By Duration

Duration (1)	No. of Programs	Per Cent of Total
2 weeks	11	9.4%
3 weeks	5	4.3
4 weeks	15	12.8
5 weeks	15	12.8
6 weeks	32	27.4
7 weeks	8	6.7
8 weeks	14	12.0
9 weeks	11	9.4
10 weeks	5	4.3
11 weeks	1	0.9
Totals	117	100.0%

(1) Median duration: 5.9 weeks.

CHART A-4

National Science Foundation Summer Training Programs
For High-Ability Secondary School Students
By Number of Students

No. of Students (1)	No. of Programs	Per Cent of Total
1- 10	7	6.0%
11- 20	21	18.1
21- 30	33	28.5
31- 40	20	17.2
41- 50	7	6.0
51- 60	8	6.9
61- 70	1	0.9
71- 80	5	4.3
81- 90	1	0.9
91-100	5	4.3
101 and Over	8	6.9
Totals (2)	116	100.0%

(1) Number of students ranged from 2 to 420. Median number of students per program was 29.6.

(2) Number of students not given for one program.

CHART A-5

National Science Foundation Summer Training Programs
For High-Ability Secondary School Students
Research Vs. Non-Research

Type of Program	No. of Programs	Per Cent of Total
Research	10	8.5%
Non-Research	107	91.5
Totals	117	100.0%

CHART A-6

National Science Foundation Summer Training Programs
For High-Ability Secondary School Students
Commuter Vs. Non-Commuter

Type of Program	No. of Programs	Per Cent of Total
Commuter	31	26.5%
Non-Commuter	86	73.5
Totals	117	100.0%

CHART A-7

National Science Foundation Summer Training Programs
For High-Ability Secondary School Students
In Terms of National Science Foundation Proposal Rating

Proposal Rating	No. of Programs	Per Cent of Total
A/A	11	9.4%
A/B	29	24.8
B/B	26	22.2
B/C	45	38.5
C/C	6	5.1
Totals	117	100.0%

APPENDIX B

Exhibits B-1 through B-3

Observer's Schedule
RBN Personal History Questionnaire for High School Boys (Form A)
Summer Science Program Student Questionnaire

EXHIBIT B-1:

OBSERVER'S SCHEDULE

SUMMER SCIENCE PROGRAM FOR SUPERIOR SECONDARY SCHOOL STUDENTS

Prepared by

Richardson, Bellows, Henry & Co., Inc.

I. OBJECTIVES

1. Why did the institution want to present this type of experimental program?

2. Why did the institution select the particular areas of study covered by your present program? (e.g., importance, recommendation of HS or college teachers, availability of teachers, etc.)

3. Why did your institution select the particular teaching methods and program used?

4. What does the institution expect the program to accomplish?

   A. For the students? (e.g., supplement HS program, inspire interest, motivation, get into college sooner, more individual research, broaden participation in science activities, etc. Please be specific.)

   B. For the High Schools to which these students will return? (e.g., better teaching programs, more interest in science, better ties to your science program, etc.)

   C. For the institution? (e.g., making it a center for promoting better science programs, public relations, draw better students, create more faculty interest in secondary programs, etc.)

   D. For the colleges or other educational institutions which these students will soon enter?

   E. For the faculty members participating in the program?

II. PROGRAM

5. Describe the program in detail. (Courses, how presented, special features, degree of sophistication, text books, use of "newer" approaches, scheduling, class periods, opportunities for creative work, etc.)

6. What are the special features of the program?

7. Describe the extracurricular program: entertainment, sports, etc. How well do these "go over"?

III. THE STAFF

8. What was (unless given in materials RBH now has) the academic training and qualifications of the directors, instructors, counselors, administrative assistants, etc.?

9. Characterize briefly the teaching experience of each person mentioned above. Kinds of courses, kinds of schools, other duties, etc.

10. What kinds of non-academic experience have the instructors had? (Note experiences which seem to have no bearing on present job as well as those which are more pertinent.)

11. How do you rate the quality of the teaching staff?

12. What experience have the teachers had in teaching younger students?

13. Do the teachers appear to be really interested in working with younger students?

IV. TEACHING METHODS AND PROCEDURES: Describe and comment on each of the following:

14. Number of students in class, lab group or research unit.

15. How much "teaching load" and other duties does each teacher carry?

16. What methods of instruction and teaching are being used? About what proportion of time is devoted to each?

17. Nature of coverage of course or project materials and concepts.

18. What new methods are being used? Are new techniques being tried out? Is experimentation taking place?

19. Organized-directed student activity versus self-initiated activity.

20. Classroom learning versus laboratory-research experience.

21. "Homework" required and conditions under which it is done.

22. Information sources: textbooks, technical source references, etc. (Are these texts HS, college or other?)

23. How are field trips or visits utilized?

24. Are guest speakers utilized? What is student reaction to them?

25. What kinds of visual aids are utilized?

26. What opportunity is available for "round-table" discussion and teacher-student conference?

27. How do you rate the:

    A. Quality of teaching.

    B. Sophistication of teaching.

V. FACILITIES

28. Describe and comment on each of the following:

    A. Classroom size and arrangement.

    B. Study facilities.

    C. Library and reference facilities.

    D. Quantity and quality of laboratory and experimental apparatus and equipment available.

    E. Off-campus facilities used.

29. What equipment and facilities are available to the student to use that are not available in his home high school?

30. Living arrangements: adequacy of rooms, general living conditions, food and basic services.

31. Recreation: sports outlets, games available, lounge or student center facilities, movie, TV or radio facilities.

VI: RECRUITMENT AND SELECTION

32. What kind of person should attend this summer program?

33. How often should any students attend a summer program?

34. What grade-age level is most desirable?

35. What per cent of a high school class could really profit by this science program? Explain.

36. How was recruiting done? (Brochures, news releases, letter to high schools, be sure we have complete set of copies of materials.)

37. When was recruiting program done? How early was it started? How long continued?

38. From what geographical area were students sought?

39. How many applications were received? (Comments on kind, numbers, quality of applications.)

40. How many selected? _____ (Boys_____ Girls_____)

41. Was there any pre-set ratio of Boys to Girls? Why?

42. How did you select among the applicants? Describe procedure (if standard tests were used, get name of test, form number and frequency distribution of scores for two groups: those selected and those not selected. Note especially reasons for rejection. Note also the relative importances of scholastic record, school and personal references, etc.)

43. How do you think each of the following factors influenced applications:

Subjects offered

Encouragement of HS teachers

Stipends offered (e.g., inclusion of board, room, travel, etc.)

Reputation of your institution

Specific dates of sessions

Other (specify)

44. Does grade-age level overlap constitute a problem in the selection procedure?

VII. PERFORMANCE

45. About what percentage of a normal High School 11th or 12th grade class might be expected to profit from this type of summer program?

46. About what percent of the students now in this program are really benefiting from it?

47. What are the negative effects resulting from a program of this type?

48. What evidence of good performance can students show: (e.g., examinations - reports - group participation - work habits - reading - paying attention to business.)

49. How are performance standards set and maintained?

50. What records of individual student performance are maintained? If such records are kept, to whom are they sent and what use is made of them?

51. What is the general quality of student work and study habits? Describe. Do they "stick-to-it" or is loafing and horseplay in evidence? Do they ignore prescribed procedure?

52. Is discipline a problem? How?

53. Compared with high school students, to what degree do the summer students in the program display above-average initiative and resourcefulness?

54. What outward manifestations do students show indicating that the program is having an impact upon them? (Attitudes, changes in plans.)

55. Are experienced counselors available to the students and do the students know they are available?

56. To what extent is the advice and guidance of the counselor sought out by the students.

57. What kinds of problems do the students bring up when talking with the counselor?

VIII. PLANS FOR FOLLOW UP

58. What formal plans have been made to study the impact of the program on the students, the schools involved, and the community at large?

59. What provision has been made for "keeping in touch" with students attending the program?

IX. SPECIAL PROBLEMS

60. What "adjustment" problems are the students likely to have to face as a result of attending the summer institute program? (e.g., have covered material of HS courses, think they really know science, etc.)

61. What problems will the high schools to which the students return have as a result of the students' summer institute experience?

62. What problems will the colleges which these students attend have as a result of the students' summer institute experience?

63. What evidence is available indicating that the high schools and colleges are changing their thinking as a result of this type of program?

64. What effect on community or public opinion has the summer institute type of program had?

65. What other methods for dealing with the superior science or math student should be tried? How do these compare with the summer institute approach?

66. Should High Schools take over the summer institute type of activity? Advantages and disadvantages?

67. To what extent should the summer institute approach be used in dealing with gifted students in other subject matter areas? Describe.

68. Are there any comments regarding the financing of the summer institute programs?

69. What problems have arisen, in the administration of the program, which have affected the achievement of the desired goals?

70. What problems are foreseen involving high school or college acceptance of credits acquired through summer institute programs?

X. FINANCING - COSTS

71. Total budget for Program.

72. What is furnished to students? (e.g., board, room, transportation.)

73. Which of the budget items, now supplied to the students should be borne by them? Why? Effect on recruitment?

74. To what extent are each of the following sources of budget for this institute?

Host Institution

NSF

Community

Student

Other

75. How do you see the future financing of this program?

XI. OVERALL

76. Characterize or describe the "feel" or "spirit" of the program.

77. How well does this program seem to live up to its aims and purposes?

78. In what ways does it fail to live up to its purposes?

79. What are the tough problems of this school's program?

80. Overall, how good a job is being done? Give evidence supporting your estimate.

81. What evidence of "effects" should one look for in students and in local HS by which such programs could be judged.

82. What is attitude of HS principals, HS science teachers regarding your program?

"THE RBH PERSONAL HISTORY QUESTIONNAIRE FOR HIGH SCHOOL BOYS (FORM A)"

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EXHIBIT B-3:

SUMMER SCIENCE PROGRAM

1 2 3 4 5
6 7 8 9 10 11

Student Questionnaire

Prepared by

Richardson, Bellows, Henry & Co. Inc.

Date _____

1. Name:
Print in
CAPITAL
Letters _____ _____ _____ 2. Sex _____
Last Name First Name Middle Name M or F

3. Home Address _____ _____ _____ _____
Number and Street City Zone State

4. Name of Your High School _____ Address of High School _____ _____
City State

5. Age at Last Birthday _____ 6. Date of Birth _____ _____ _____
Month Day Year

7. Grade Completed Spring 1959 _____ 8. Grade Entering Sept. 59___

9. When do you expect to graduate from High School? _____ _____
Month Year

10. What course of study do you plan to follow in college or professional school _____

_____

11. What occupation do you actually expect to follow?

A. First Choice _____ B. Second Choice _____

12. If you could do just as you please, what would you really like to be doing ten or fifteen years from now? Why? _____

_____

_____

13. What quality of marks have you earned in High School (Check the highest that applies)

A. In my class, I stand in the: Top 5%_____ Top 25%_____ Top 50%_____ Lower 50%_____

B. What is the average of your High School grades now?_____

14. What Science and Mathematics courses have you had in High School?

Name of Course	Grade Earned	Expect to take	Name of Course	Grade Earned	Expect to take
MATHEMATICS			SCIENCE		
Algebra, through quads.....			Physics.....		
Algebra, beyond quads.....			Chemistry.....		
Geometry, Plane.....			Physical Geography.....		
Geometry, Solid.....			Botany.....		
Trigonometry, Plane.....			Physiology.....		
			Zoology.....		
			Agriculture.....		
			Biology.....		
			General Science.....		
			.....		
			.....		
			.....		

15. What studies in high school have you liked least?_____

_____

16. What studies in high school have you liked most?_____

_____

17. LIST HERE special recognitions, prizes, honors, and scholarships (e.g. valedictorian, honors in state scholarship contests, National Honor Society, medals cups, presidencies, managerships, athletic awards, science fair honors, etc.) _____

_____

_____

_____

18. What foreign languages have you studied?_____

_____

19. What foreign languages do you read readily?_____

_____

20. What is your father's name and occupation? (If deceased ___, or retired ____, check and state his occupation prior to death or retirement.) _____

21. What college or professional school (if any) did your father attend; and what degree or degrees (if any) did he obtain? If none, write "none". _____

22. What is your mother's name and occupation? (If deceased ____, or retired _____, check and state her occupation prior to death or retirement.) _____

23. What colleges or professional schools (if any) did your mother attend; and what degree or degrees (if any) did she obtain? If none, write "none". _____

24. Have you had any scientists in your family? If none, write "none". If answer is "Yes", give their names, relation to you, and contributions to science. _____

25. What one person has been most influential in the development of your interest in science or math? _____ (Name) _____ (Position)

_____ (Organization)

_____ (Mailing Address)

In What ways? _____

26. LIST HERE the hobbies in which you have engaged since entering secondary school (e.g. photography, aviation, cryptanalysis, etc.) _____

_____

_____

27. LIST HERE, and briefly describe any special scientific or professional apparatus or other mechanical devices which you are competent to use. _____

_____

_____

_____

28. CHECK HERE the extra-class activities (outside the classroom) in which you have participated, and the organizations to which you have belonged:

Formerly	Now	
_____	_____	School Publications
_____	_____	Music (specify) _____
_____	_____	Athletics (specify) _____
_____	_____	A Mathematics Club
_____	_____	A Science Club
_____	_____	A Science Fair
_____	_____	Science Clubs of America
_____	_____	Junior Academy of Science
_____	_____	Boys Clubs of America
_____	_____	Boy Scouts (give rank) _____
_____	_____	Future Farmers of America
_____	_____	Hi-Y
_____	_____	Tri-Y
_____	_____	Quill and Scroll
_____	_____	Girl Scouts (give rank) _____

Formerly	Now	
_____	_____	Campfire Girls
_____	_____	4-H Club
_____	_____	Girl Reserves
_____	_____	Other (specify) _____
_____	_____	_____
_____	_____	_____

29. Give the author and title for each of the last 3 books you have read (not for school)

A. _____

B. _____

C. _____

30. What magazines do you read regularly? _____

_____

31. What magazines do you read just once in a while? _____

_____

32. Where do you get your books and magazines to read? _____

_____

_____

33. Do you have a Science Library of your own? _____
No or Yes

34. How many books in your Science Library? _____

35. Do you have a laboratory at home? _____
No or Yes

Describe it briefly _____

_____

_____

36. How did you first hear about the Summer Science program? _____

_____

_____

37. Why did you select this particular school? _____

_____

38. Who was most influential in making up your mind to apply to the Summer Program?_____

_____

39. How were you selected?_____

_____

40. What factors seemed to be most important in your selection?_____

_____

41. Why did you want to attend this summer program? (For example: to get science training not available in my high school, to have something worthwhile to do this summer, to prepare for advanced standing examinations in college, etc.) _____

_____

42. Would you have attended a Summer Science Program this summer if

(1) You had to pay for your expenses? _____

(2) You had to pay expenses and tuition? _____

What would you have done this summer if you were not attending this program?_____

_____

_____

43. Did you experience any financial hardships in attending the Summer Program? Explain:

_____

_____

44. What were your parents' feelings concerning your attendance at the Summer Program? _____

_____

45. What have you done during the summers of:

1958_____

1957_____

1956_____

46. What do you like best about this Summer Program?_____

_____

47. What do you like least about the Summer Program? _____

_____

48. What effect do you expect this Summer Program to have on your high school work?
(e.g. earlier graduation, better qualified for college entrance, change in courses or curriculum, entering science fairs, applications for college scholarships, etc.)

_____

_____

_____

49. What effect do you expect this Summer Program to have on you personally?
(e.g., changes in hobbies, reading, friends, vocational aims, college plans, etc.) _____

_____

_____

_____

50. Has Summer Program lived up to expectations? In what ways did it not? _____

_____

_____

51. In your Summer Program, give briefly your opinion of each of the following:
(e.g., how good they are and what makes them good or inadequate):

A. Facilities (space, laboratory, library, etc.) _____

_____

_____

B. Students (ability, teamwork, etc.) _____

_____

C. Teaching (quality, methods, etc.) _____

_____

D. Textbooks, reference books, lecture summaries, etc. _____

_____

E. Program (courses, content, etc.) _____

_____

_____

F. Entertainment _____

_____

_____

52. If you have friends who wanted to attend a Summer Program but could not, explain why they could not attend. _____

_____

53. What improvements would you recommend in running the program next summer? _____

_____

_____

54. Please give the name of the Science or Math teacher in your own High School who knows you ~~best~~?

Name _____ Subject _____

Address _____

_____

55. Give the name of a student in your High School of the same sex, age, class, ability and interests as you, but who did not attend a Summer Science (or Math) Institute.

Name _____

Address _____

_____

APPENDIX C

Charts C-1 through C-69

CHART C-1

Student Distributions By Sex In The High Schools From Which Drawn

Male-Female "Mix"			No. of	Total No. of Students Represented		
No. Males	No. Females	No. Total	High Schools Represented	Males	Females	Total
7	9	16	1	7	9	16
6	1	7	1	6	1	7
3	3	6	1	3	3	6
5	0	5	1	5	0	5
3	2	5	1	3	2	5
2	3	5	1	2	3	5
4	0	4	1	4	0	4
3	1	4	3	9	3	12
1	3	4	1	1	3	4
3	0	3	4	12	0	12
2	1	3	4	8	4	12
1	2	3	2	2	4	6
0	3	3	1	0	3	3
2	0	2	12	24	0	24
1	1	2	7	7	7	14
0	2	2	11	0	22	22
Single student only			261	200	61	261
Totals			313	293	125	418

CHART C-2

Distance From Host Institution To Student's Home

Distance	Number	Per Cent of Total
Same city	113	27%
Less than 100 miles	197	47
100 or more miles	108	26
Totals	418	100%

Note: Only 7 students attended high schools not located in their home towns.

CHART C-3

Age of Student Participants

Age	Males	Females	Total	Per Cent of Total
12 years	1	-	1	1%
13 years	7	-	7	2
14 years	12	6	18	4
15 years	46	21	67	16
16 years	140	57	197	46
17 years	81	32	113	27
18 years	6	8	14	3
19 years	-	1	1	1
Totals	293	125	418	100%
Average Age:	16.0 yrs.	16.1 yrs.	16.0 yrs.	

CHART C-4

High School Grade Completed

Grade Completed	Males	Females	Total	Per Cent of Total
8th grade	10	-	10	2%
9th grade	13	1	14	3
10th grade	40	17	57	14
11th grade	209	78	287	69
12th grade	21	29	50	12
Totals	293	125	418	100%

Note: (1) 13 students in one program planned to graduate from high school one year early.

(2) 5 students included above were actually at mid-year status. These were counted in the following year -- i.e., a mid-year junior was counted as having completed the junior year.

CHART C-5

Do You Plan To Go To College?

Response	Males	Females	Total	Per Cent of Total
Yes, parents will send	106	65	171	41%
Yes, I will pay part of way	187	58	245	58
Other	-	2	2	1
Totals	293	125	418	100%

CHART C-6

Anticipated College Course Of Study

Course of Study	Males	Females	Total	Per Cent of Total Responding
Mathematics	59	30	89	21%
Science	58	30	88	21
Biological Science	7	17	24	6
Physical Science	61	18	79	19
Engineering	37	-	37	9
Engineering				
Chemical	7	-	7	2
Mechanical	3	-	3	1
Electrical	14	-	14	3
Electronic	7	-	7	1
Aeronautical	2	-	2	1
Other	1	-	1	1
Architecture	5	-	5	1
Medical	43	20	63	15
Liberal Arts	22	14	36	9
Languages	3	6	9	2
Law	10	2	12	3
Teaching	3	8	11	3
Other Studies	14	15	29	7
Undecided, Don't Know	6	7	13	3
Totals	362	167	529	
Ave. No. Responses Per Student	1.2	1.3	1.3	

CHART C-7

Have You Decided What Kind Of Work You Are Going To Take Up?

Response	Males	Females	Total	Per Cent of Total
No	52	21	73	18%
Yes, but uncertain of it	38	17	55	13
Yes, fairly sure of it	176	66	242	58
Yes, don't think I'll change it	27	21	48	11
Totals	293	125	418	100%

CHART C-8

Anticipated Occupation - First & Second Choices

Occupation	First Choice				Second Choice			
	M	F	Total	%	M	F	Total	%
Science	19	6	25	6%	25	5	30	7%
Pure	55	16	71	17	40	15	55	13
Applied	6	3	9	2	7	2	9	2
Mathematics	13	7	20	5	14	5	19	5
Pure	2	1	3	1	2	1	3	1
Applied	4	2	6	1	6	3	9	2
Medical-Research	8	3	11	3	4	2	6	1
Medical-Applied	39	30	69	16	9	15	24	6
Engineering	21	-	21	5	16	-	16	4
Electrical	14	-	14	3	6	-	6	1
Electronic	11	-	11	3	5	1	6	1
Civil	2	-	2	1	3	-	3	1
Chemical	7	-	7	2	8	-	8	2
Mechanical	3	-	3	1	3	-	3	1
Aeronautical	5	1	6	1	4	-	4	1
Other	4	-	4	1	5	-	5	1
Architecture	5	-	5	1	2	-	2	1
Law	5	4	9	2	10	4	14	3
Teaching	15	17	32	7	19	22	41	10
Business	3	-	3	1	4	-	4	1
Other Occupations	10	20	30	7	26	27	53	13
Undecided, Don't Know	10	5	15	4	14	7	21	5
No Answer	32	10	42	10	61	16	77	18
Totals	293	125	418	100%	293	125	418	100%

CHART C-9

Areas Of Anticipated Occupation - First vs. Second Choices

Occupational Area 1st choice-2nd choice	Males	Females	Total	Per Cent of Total
Science-Science (same)	15	10	25	6%
Science-Science (dif.)	29	16	45	11
Science-Mathematics	15	2	17	4
Science-Engineering	29	-	29	7
Science-Non-Science	27	30	57	14
Mathematics-Mathematics	6	1	7	2
Mathematics-Science	12	2	14	3
Mathematics-Engineering	2	-	2	1
Mathematics-Non-Science	2	6	8	2
Engineering-Engineering	14	1	15	4
Engineering-Science	22	1	23	5
Engineering-Mathematics	6	-	6	1
Engineering-Non-Science	12	-	12	3
Non-Science-Science	9	10	19	4
Non-Science-Mathematics	2	4	6	2
Non-Science-Engineering	5	-	5	1
Non-Science-Non-Science	10	18	28	6
Incomplete	76	24	100	24
Totals	293	125	418	100%

CHART C-10

Forecast Of Occupational Activity 10 To 15 Years From Now

Relationship To Immediate Plans

Activity 10-15 Years Hence Agrees With:	Males	Females	Total	Per Cent of Total
1st occupational choice	171	66	237	57%
2nd occupational choice	7	10	17	4
No agreement or void	115	49	164	39
Totals	293	125	418	100%

CHART C-11

Present Class Standing

Standing	Males	Females	Total	Per Cent of Total
Top 5% of Class	223	99	322	77%
Top 25% of Class	58	22	80	19
Top 50% of Class	8	3	11	2
Bottom 5% of Class	1	--	1	1
No Response	3	1	4	1
Totals	293	125	418	100%

CHART C-12

Present Grade Average

Average Grade	Males	Females	Total	Per Cent of Total
A	112	44	156	37%
A-	82	47	129	31
B+	51	16	67	16
B	29	10	39	9
B-	5	2	7	1
C+	2	--	2	1
C	1	--	1	1
No Response	11	6	17	4
Totals	293	125	418	100%

Note: Numerical Grade Averages Converted to Letter Averages as Follows:

A : 96-99	B+: 88-91	B-: 80-83	C : 72-75
A-: 92-95	B : 84-87	C+: 76-79	C-: 68-71

CHART C-13

How Fast Have You Gone Through Grammar And High School In Comparison With Other Students?

Response	Males	Females	Total	Per Cent of Total
More Rapidly Than Most	123	56	179	43%
Took The Same Time As Most	168	68	236	56
More Slowly Than Most	2	1	3	1
Totals	293	125	418	100%

CHART C-14

In 8 th Grade, How Did Your Marks Compare With Those of the Rest of the Class?

Response	Males	Females	Total	Per Cent of Total
Top 25% of Class	274	117	391	93%
Second 25% of Class	16	5	21	5
Third 25% of Class	2	2	4	1
Bottom 25% of Class	1	1	2	1
Totals	293	125	418	100%

CHART C-15

In What Subject Are You Getting Your Best Marks?

Response	Males	Females	Total	Per Cent Of Total Responding
Marks About Same In All Subjects	99	60	159	38%
Mathematics	114	24	138	33
Science	87	17	104	25
English	28	22	50	12
Foreign Languages	20	20	40	10
History - Social Sciences	26	10	36	9
All Others	29	12	41	10
Totals	403	165	568	
Average Number Responses Per Student	1.4	1.3	1.4	

CHART C-16

Mathematics Courses Taken In High School

Course	Males	Females	Total	Per Cent Having Taken
Algebra - Through Quadratics	279	114	393	94%
Algebra - Beyond Quadratics	201	72	273	65
Plane Geometry	257	101	358	86
Solid Geometry	36	15	51	12
Trigonometry	80	20	100	24
Advanced Courses	7	--	7	2
Totals	860	322	1,182	
Average Number Courses Taken for Student	2.9	2.5	2.8	

CHART C-17

Mathematics Grade Average

Grade Average	Males	Females	Total	Per Cent of Total
A	143	55	198	47%
A-	71	25	96	23
B+	28	20	48	12
B	17	14	31	8
B-	3	2	5	1
C+	2	1	3	1
C	4	2	6	1
No Response	25	6	31	7
Totals	293	125	418	100%

CHART C-18

Mathematics Courses Yet To Be Taken

Course	Males	Females	Total	Per Cent To Take
Algebra - Through Quadratics	8	2	10	2%
Algebra - Beyond Quadratics	62	16	78	19
Plane Geometry	30	16	46	11
Solid Geometry	180	37	217	52
Trigonometry	175	44	219	52
Advanced Courses	19	[illegible]	19	5
Totals	474	115	589	
Average Number Of Courses Yet To Be Taken Per Student	1.6	0.9	1.4	

CHART C-19

Science Courses Taken In High School

Course	Males	Females	Total	Per Cent Having Taken
Physics	116	31	147	35%
Chemistry	152	81	233	56
Biology	242	120	362	87
General Science	195	90	285	8
Other Biological Sciences	21	11	32	8
Other Sciences	28	7	35	8
Totals	754	340	1,094	
Average Number Courses Taken Per Student	2.5	2.7	2.6	

CHART C-20

Science Grade Average

Grade Average	Males	Females	Total	Per Cent Of Total
A	135	48	183	43%
A-	80	36	116	27
B+	22	15	37	9
B	16	16	32	7
B-	3	4	7	2
C+	--	1	1	1
C	--	1	1	1
No Response	37	4	41	10
Totals	293	125	418	100%

CHART C-21

Science Courses Yet To Be Taken

Course	Males	Females	Total	Per Cent Yet To Take
Physics	159	47	206	49 %
Chemistry	132	39	171	41
Biology	17	1	18	4
General Science	3	---	3	1
Other Biological Science	27	15	42	10
Other Sciences	14	4	18	4
Totals	352	106	458	
Average Number Of Courses Yet To Be Taken Per Student	1.2	0.8	1.1	

CHART C-22

When Do You Do Your Studying?

Response	Males	Females	Total	Per Cent Of Total
Mostly at Home	198	84	282	67%
Half At Home; Half During Study Periods	53	31	84	20
Mostly During Study Periods	14	6	20	5
Do Very Little Studying	28	4	32	8
Totals	293	125	418	100%

CHART C-23

How Do You Divide Your Study Time?

Response	Males	Females	Total	Per Cent Of Total
Most Where Likely To Get Poor Mark	98	44	142	34%
Same Amount of Time On Each Subject	54	26	80	19
Most Where Teachers Are Strict	17	11	28	7
Most On Subjects I Like	13	2	15	4
Time Divided In Some Other Way	111	42	153	36
Totals	293	125	418	100%

CHART C-24

Do You Usually Get The School Marks You Expect?

Response	Males	Females	Total	Per Cent Of Total
Yes	266	109	375	90%
No - Lower Than Expected	8	3	11	3
No - Higher Than Expected	19	13	32	7
Totals	293	125	418	100%

CHART C-25

What Is The Relationship Between The School Marks You Get And The Amount Of Studying You Do?

Response	Males	Females	Total	Per Cent Of Total
Good Marks, Little Studying	163	61	224	54
Good Marks, Hard Work	114	50	164	39
Average Marks, Average Amt. of Study	15	12	27	6
Other Responses	1	2	3	1
Totals	293	125	418	100%

CHART C-26

How Often Have You Seriously Considered Quitting School?

Response	Males	Females	Total	Per Cent of Total
Almost never	279	120	399	95%
Seldom	10	2	12	3
All others	4	3	7	2
Totals	293	125	418	100%

CHART C-27

High School Studies Liked Most

Area of Study	Males	Females	Total	Per Cent of Total Liking
Science	237	97	334	80%
Mathematics	227	103	330	79
Foreign Languages	58	43	101	24
History	54	32	86	21
English	70	42	112	27
Social Studies	8	15	23	5
Other Studies	36	21	57	14
Totals	690	353	1043	
Ave. no. of responses per student	2.3	2.8	2.4	

CHART C-28

High School Studies Liked Least

Area of Study	Males	Females	Total	Per Cent of Total Disliking
Science	20	15	35	8%
Mathematics	18	13	31	7
Foreign Languages	98	20	118	28
History	87	41	128	31
English	92	18	110	26
Social Studies	23	21	44	11
Other Studies	43	34	77	18
Totals	381	162	543	
Ave. no. of responses per student	1.3	1.3	1.3	

CHART C-29

Which School Subjects Have Influenced You Most?

Response	Males	Females	Total	Per Cent of Total Marking
Science	236	85	321	77%
Arithmetic or Mathematics	232	82	314	75
English	123	64	187	45
Foreign Languages	114	60	174	42
Art-Music	80	49	129	31
All Others	29	27	56	13
No one in particular	16	10	26	6
Totals	830	377	1207	
Ave. no. of responses per student	2.8	3.0	2.9	

CHART C-30

How Much Difference Did It Make To You What Subjects You Took When You Entered The 9th Grade?

Response	Males	Females	Total	Per Cent of Total
Tried hard to get certain subjects	186	77	263	63%
Mild or little interest	35	10	45	11
Had no choice in school I attended	72	38	110	26
Totals	293	125	418	100%

CHART C-31

In Which Of The Following Ways Has A Teacher Influenced You?

Response	Males	Females	Total	Per Cent of Total Influenced
Caused interest in certain subject	218	94	312	75%
Caused dislike of certain subject	102	33	135	32
Caused dislike of school	18	10	28	7
Influenced high school choice of subjects	55	36	91	22
Teachers had very little influence	46	17	63	15
Totals	439	190	629	
Ave. no. of responses per student	1.5	1.5	1.5	

CHART C-32

What Kind Of Teachers Have You Liked Best?

Response	Males	Females	Total	Per Cent of Total
Teachers taking interest in my personal affairs	167	49	216	52%
Teachers not paying attention to my personal affairs	82	40	122	29
I have noticed little difference in my teachers	44	36	80	19
Totals	293	125	418	100%

CHART C-33

Special Honors, Prizes, Scholarships, Etc., Won

Honor, Prize, Etc.	Males	Females	Total	Per Cent of Total Winning
Award for Scholarship	132	75	207	49%
Award for Citizenship	56	13	69	16
National Honor Society	107	58	165	39
Scholarship winner	68	29	97	23
Science Fair honors	101	27	128	31
Science-Math honors	86	35	121	29
Non-Science-Math honors	111	94	205	49
Officer - Science-Math club	39	5	44	11
Officer - Non-Science-Math club	53	38	91	22
Publication Editor	25	18	43	10
Officer - Student Government	60	23	83	20
Athletics officer or honor	50	11	61	15
Totals	888	426	1314	
Average number per student	3.0	3.4	3.1	

CHART C-34

Have You Ever Won A Scholarship Or Prize?

Response	Males	Females	Total	Per Cent of Total Winning
Yes, for excellence in athletics	55	10	65	16%
Yes, for excellence in grades	194	93	287	68
Yes, for writing or speaking ability	49	34	83	20
Yes, for excellence in art or music	35	22	57	14
Yes, for all-round excellence	67	20	87	21
Yes, for some other reason	123	57	180	43
No, I never did win one	27	8	35	8
Totals	550	244	794	
Ave. no. of responses per student	1.9	2.0	1.9	

CHART C-35

Since In High School, How Many Times Have You Been Elected To Some School Office Or Committee?

Response	Males	Females	Total	Per Cent of Total
Never	74	7	81	19%
Once	57	12	69	16
Twice	44	14	58	14
Three times	27	9	36	9
Four or more times	91	83	174	42
Totals	293	125	418	100%

CHART C-36

Which Of The Following Have You Been?

Response	Males	Females	Total	Per Cent of Total Having Been
Scout patrol or group leader	142	43	185	44%
Captain of an athletic team	71	22	93	22
Manager of an athletic team	32	4	36	9
Manager of publication, play or other non-athletic event	67	39	106	25
President of school or class	86	53	139	33
President of a school club	109	53	162	39
President of a non-school club	94	56	150	36
Secretary or treasurer of any club	151	103	254	61
Chairman of a committee	181	98	279	67
None of these	30	5	35	8
Totals	963	476	1439	
Ave. no. of responses per student	3.2	3.8	3.5	

CHART C-37

Which Things Have You Seriously Wanted To Do Or Be Since In High School?

Response	Males	Females	Total	Per Cent of Total Wanting
Be on the honor roll	157	100	257	61%
Valedictorian	164	85	249	60
Class or school president	152	66	218	52
Member of an athletic team	162	29	191	46
Act in a school play	99	71	170	41
Play in a school band	80	46	126	30
Member of debate team	88	32	120	29
Reporter on school paper	64	44	108	26
Captain of athletic team	92	15	107	26
Editor of year book	60	45	105	25
Member of glee club	50	48	98	23
Editor of the school paper	57	40	97	23
Member of fraternity	61	20	81	19
Be a cheer leader	10	56	66	16
None of these	9	3	12	3
Totals	1305	700	2005	
Ave. no. of responses per student	4.4	5.6	4.7	

CHART C-38

Foreign Languages Studied

Language	Males	Females	Total	Per Cent of Total Studied
French	118	81	199	48%
Latin	135	57	192	46
Spanish	56	21	77	18
German	47	4	51	12
Hebrew	18	1	19	4
Russian	6	3	9	2
Others	8	-	8	2
Totals	388	167	555	
Ave. no. per student	1.3	1.3	1.3	

CHART C-39

Foreign Languages Readily Read

Language	Males	Females	Total	Per Cent of Total Reading
French	62	50	112	27%
Latin	33	20	53	13
Spanish	23	13	36	9
German	21	2	23	5
Hebrew	12	1	13	3
Russian	2	-	2	1
Others	9	3	12	3
Totals	162	89	251	
Ave. no. per student	0.5	0.7	0.6	

CHART C-40

Parental Occupation

Occupation	Father				Mother			
	M	F	Total	% Total	M	F	Total	% Total
Science Professional	18	3	21	5%	8	-	8	2%
Non-Science Professional	27	4	31	8	3	-	3	1
Engineer	20	2	22	5	-	1	1	1
Business	93	30	123	29	3	8	11	3
Education	25	15	40	10	52	25	77	18
Government Worker	14	13	27	6	3	2	5	1
Wage-Hour Worker	48	30	78	19	17	17	34	8
Technician	30	7	37	9	2	4	6	1
Clerical	6	7	13	3	35	14	49	11
Military	9	5	14	3	-	-	-	-
Housewife	-	-	-	-	166	51	217	52
Omit	3	9	12	3	14	3	7	2
Totals	293	125	418	100%	293	125	418	100%

CHART C-41

Parental Education

Type of Education	Father				Mother			
	M	F	Total	% of Total	M	F	Total	% of Total
Ph. D.	14	5	19	4%	2	-	2	1%
M.A. or M.S.	28	12	40	10	17	11	28	6
B.A. or B.S.	58	19	77	19	56	27	83	20
M.D. or D.D.S.	13	3	16	4	1	-	1	1
LL.B. or LL.D.	12	1	13	3	-	1	1	1
Some College	30	21	51	12	24	26	50	12
Business College	2	1	3	1	15	3	18	4
Teachers' College	-	-	-	-	9	-	9	2
Nursing School	-	-	-	-	8	1	9	2
None	129	57	186	44	151	53	204	48
Omit or Don't Know	7	6	13	3	10	3	13	3
Totals	293	125	418	100%	293	125	418	100%

CHART C-42

Have You Had Any Scientists in Your Family.

Response	Males	Females	Total	% of Total
No	222	92	314	75
Yes	69	27	96	23
Omit	2	6	8	2
Total	293	125	418	100%

CHART C-43

Relationship Of Family Scientist To Student

Relationship	Males	Females	Total	Per Cent of Total
Uncle	25	8	33	35%
Father	19	5	24	25
Cousin	11	7	18	19
Grandfather	6	3	9	9
Brother	4	1	5	5
Mother	2	-	2	2
Others	2	3	5	5
Totals	69	27	96	100%

CHART C-44

Person Most Influential In The Development Of Student's Interest In Science Or Mathematics

Person	Males	Females	Total	Per Cent of Total
High school teacher	158	95	253	60%
Parents	43	6	49	12
Student himself	23	5	28	7
Friends	10	4	14	3
Other relatives	8	3	11	3
No one person	21	10	31	7
Omit	30	2	32	8
Totals	293	125	418	100%

CHART C-45

When You Entered The 9th Grade, Who Had Most To Do With Choosing Your Subjects?

Response	Males	Females	Total	Per Cent of Total
Chose them myself	149	64	213	51%
Had no choice	52	22	74	18
8th grade teacher or counselor	48	18	66	16
Parents or guardian	44	21	65	15
Totals	293	125	418	100%

CHART C-46

Who Or What Influenced You Most In Deciding The Work You Are Planning To Take Up?

Response	Males	Females	Total	Per Cent of Total
Parents or guardian	78	40	118	28%
Tried it and liked it	78	30	108	26
A teacher or counselor	68	26	94	22
A friend of the family	14	5	19	5
Not yet decided	55	24	79	19
Totals	293	125	418	100%

CHART C-47

With Whom Do You Discuss Your Vocational Ambitions?

Response	Males	Females	Total	Per Cent of Total Responding
With parents	164	73	237	57%
With various friends	120	37	157	38
In school	41	19	60	14
Others	22	7	29	7
No definite vocational plans	29	12	41	10
Totals	376	148	524	
Ave. no. of responses per student	1.3	1.2	1.3	

CHART C-48

When You Have A Difficult Personal Problem, Which Of The Following Do You Do?

Response	Males	Females	Total	Per Cent of Total Responding
Ask help from parents	66	79	145	35%
Work it out alone	87	20	107	26
Ask advice of close friends	50	25	75	18
Ask help of teachers	37	5	42	10
Other	47	27	74	18
Totals	287	156	443	
Ave. no. of responses per student	1.0	1.2	1.1	

CHART C-49

Apart From Homework, Which Two Things Take Most Of Your Daytime After School?

Response	Males	Females	Total	Per Cent Response Per Student
Spending time with friends	114	42	156	37%
Reading for pleasure	88	48	136	33
Radio or television	86	40	126	30
Doing chores at home	48	53	101	24
Sports	87	8	95	23
Working on hobbies	66	11	77	18
Special lessons (music, art, etc.)	36	30	66	16
Working for money	36	4	40	10
Other or none of these	25	14	39	9
Totals	586	250	836	

CHART C-50

Which Of The Following Do You Do Fairly Regularly At Home?

Response	Males	Females	Total	Per Cent Response Per Student
Cook, set table, do dishes	329	313	642	153%
Clean house, make beds, wash, iron	335	304	639	153
Tend lawn, garden	328	61	389	93
Take care of siblings, pets	210	85	295	71
Tend to furnace, ashes, etc.	225	57	282	67
Tend to family auto	172	25	197	47
Do what I like	109	21	130	31
None of these	11	1	12	3
Totals	1719	867	2586	
Ave. no. responses per student	5.9	6.9	6.2	

CHART C-51

Which Two Things Take Up Most Of Your Evening Time?

Response	Males	Females	Total	Per Cent Response Per Student
Studying	215	95	310	74%
Reading for pleasure	100	47	147	35
Spending time with friends	104	30	134	32
Working on hobbies	67	8	75	18
Talking with parents	29	34	63	15
Radio or television	40	10	50	12
Practicing music lessons	26	23	49	12
Painting or drawing	5	3	8	2
Totals	586	250	836	

CHART C-52

Hobbies Engaged in Since Entering Secondary School

Hobby or Activity	Males	Females	Total	Per Cent Per Student
Reading	35	51	86	21%
Writing	15	20	35	8%
Science Studies	80	11	91	22%
Music	68	47	115	27%
Stamp or Coin Collecting	80	10	90	22%
Science Collections	22	2	24	6%
Other Collecting	14	10	24	6%
Science Projects	31	10	41	10%
Creative Arts	19	23	42	10%
Building Models, etc.	43	--	43	10%
Radio, Hi-Fi, Electronics, etc.	57	--	57	14%
Domestic Arts (Sew, Cook, etc.)	1	30	31	7%
Gardening	7	3	10	2%
Working with Cars, "Hot Rods," etc.	15	--	15	4%
Photography	70	17	87	21%
Interpretive Dancing	1	15	16	4%
Speech, Dramatics	14	11	25	6%
Sports	117	37	154	37%
Games	39	2	41	10%
Social Activities	12	6	18	4%
Other Hobbies	7	6	13	3%
No Response	11	13	24	6%
Totals	758	324	1,082	
Av. No. Hobbies per Student	2.6	2.6	2.6	

CHART C-53

Special Scientific Equipment in Which Competent to Use

Type of Equipment	Males	Females	Total	% of Total Using
Microscope	91	20	111	27%
Physics Apparatus	76	9	85	20%
Chemical Apparatus	57	14	71	17%
Electrical Equipment	56	1	57	14%
Biological Equipment	36	16	52	12%
Balances	36	10	46	11%
Slide Rule	35	3	38	9%
pH Meter	18	6	24	6%
Telescope	9	--	9	2%
Computers	7	--	7	2%
None	15	4	19	5%
No Answer	99	15	114	27%
Totals	535	98	633	
Av. No. Responses per Student	1.8	0.8	1.5	

CHART C-54

Clubs And Extra-Curricular Activities In Which Active

Club or Activity	Formerly				Now			
	M	F	Total	%	M	F	Total	%
Sports	129	39	168	40%	183	33	216	52%
Math-Science clubs	99	32	131	31	135	33	168	40
Musical activities	104	53	157	38	99	47	146	35
School publications	62	42	104	25	89	30	119	28
Other clubs	45	27	72	17	67	40	107	26
Science Fairs	91	34	125	30	62	16	78	19
Religious groups	23	10	33	8	50	19	69	16
Scouts	152	46	198	47	33	12	45	11
Student government	23	12	35	8	28	14	42	10
Foreign language clubs	23	12	35	8	21	10	31	7
YMCA-YWCA	27	22	49	12	20	10	30	7
Dramatics	10	9	19	5	18	12	30	7
Science Clubs of America	22	5	27	6	19	9	28	7
Speech or debate	14	1	15	4	20	4	24	6
Service clubs	8	2	10	2	19	5	24	6
Social clubs	6	5	11	3	10	10	20	5
4-H Clubs	10	22	32	8	2	7	9	2
Boys Clubs of America	18	-	18	4	8	-	8	2
Miscellaneous	11	20	31	7	21	37	58	14
None	25	12	37	9	23	20	43	10
No answer	1	-	1	-	1	-	1	-
Totals	903	405	1308		928	368	1296	
Ave. no. responses	3.1	3.2	3.1		3.2	2.9	3.1	

CHART C-55

Changes In Kinds Of Clubs Or Extra-Curricular Activities In Which Active: Formerly Vs. Now

Change	Males	Females	Total	Per Cent of Total
Increase	126	56	182	44%
Decrease	116	57	173	41
No change	51	12	63	15
Totals	293	125	418	100%

CHART C-56

Who Interested You In The Particular Out-Of-Class School Activities That You Joined?

Response	Males	Females	Total	Per Cent of Total
Was interested, so looked up groups	178	75	253	61%
Some of my friends got me started	65	27	92	22
My parents got me started	16	13	29	7
My teachers got me interested	18	9	27	6
Do not take part in school activities	16	1	17	4
Totals	293	125	418	100%

CHART C-57

In Which Sports Have You Been On A First Or Second-String Team in High School

Response	Males	Females	Total	Per Cent Participating
Hardball or Softball	61	15	76	18%
Touch or Tackle Football	63	-	63	15%
Basketball	62	25	87	21%
Hockey	5	4	9	2%
Volley Ball	18	21	39	9%
Tennis	29	9	38	9%
Swimming	17	3	20	5%
None of These	169	78	247	59%
Totals	424	155	579	
Ave. No. Per Student	1.4	1.2	1.4	

CHART C-58

How Do You Compare With Your Friends In Athletic Ability?

Response	Males	Females	Total	Per Cent Of Total
Better Than Average	116	32	148	36%
About Average	95	65	160	38%
Below Average	82	28	110	26%
Totals	293	125	418	100%

CHART C-59

On The Average, How Much Time Do You Spend Reading Newspapers Each Day?

Response	Males	Females	Total	Per Cent of Total
Less Than 5 Minutes Daily	33	3	36	9%
5 to 10 Minutes Daily	41	20	61	14%
10 to 15 Minutes Daily	82	36	118	28%
15 to 20 Minutes Daily	68	36	104	25%
More Than 20 Minutes Daily	69	30	99	24%
Totals	293	125	418	100%

CHART C-60

What Parts of the Newspaper Do You Regularly Read?

Response	Males	Females	Total	Per Cent of Total Reading
News Section	241	110	351	84%
Comic Section	216	91	307	73%
Columns and Editorials				
Page	127	74	201	48%
Sports Section	174	30	204	49%
I Do Not Read Any Part Regularly	18	3	21	5%
Totals	776	308	1,084	
Average Number Responses Per Person	2.6	2.4	2.5	

CHART C-61

Magazines Read

Type of Magazine	Regularly				Occasionally			
	M	F	Total	%	M	F	Total	%
Picture	148	82	230	55%	120	38	158	38%
Light Reading	131	64	195	47	102	47	149	36
Popular Science	159	29	188	45	120	25	145	35
News	119	45	164	39	82	41	123	29
Men's-Women's	26	60	86	21	21	38	59	14
Sports	56	3	59	14	39	4	43	10
Advanced Science	30	1	31	7	23	2	25	6
Humor	27	4	31	7	22	1	23	5
Literary	21	8	29	7	27	5	32	8
Religious	5	4	9	2	4	-	4	1
Science Fiction	8	1	9	2	2	-	2	1
Business	6	1	7	2	7	3	10	2
Other	15	10	25	6	16	5	21	5
None	5	3	8	2	4	-	4	1
No answer	4	6	10	2	18	13	31	7
Totals	760	321	1081		607	222	829	
Ave. no. per person	2.5	2.5	2.5		2.0	1.7	1.9	

CHART C-62

About How Many Books Do You Read For Pleasure Each Year?

Response	Males	Females	Total	Per Cent of Total
One or More Per Week	54	32	86	21%
One Every 2 Weeks	77	38	115	27%
One Each Month	102	41	143	34%
One in 6 Months	35	11	46	11%
I Hardly Ever Read A Book For Pleasure	25	3	28	7%
Totals	293	125	418	100%

CHART C-63

Last Three Books Read

Type of Book	Per Cent of Total Read		
	Males	Females	Total
Recent Fiction	42%	52%	44%
Classical Fiction	15%	25%	18%
Popular Science	12%	3%	10%
General Non-Fiction, Philosophy	7%	5%	6%
Biography, Autobiography	4%	6%	5%
Science-Math Textbooks	4%	2%	3%
History, World Affairs	4%	-	3%
Religious	1%	5%	2%
Science Fiction	3%	-	2%
Humor	2%	1%	2%
Advanced Science	2%	1%	2%
Technical ("Do-It Yourself")	2%	-	1%
Sports	1%	-	1%
Mystery	1%	-	1%
Totals	100%	100%	100%

CHART C-64

Sources of Books and Magazines Read

Source	Males	Females	Total	Per Cent Using Source
School or Public Library	224	88	312	74%
Personal or Parent Subscriptions	152	60	212	51%
Buy at Bookstores, Newsstands	125	55	180	43%
At Home	51	32	83	20%
Borrow From Friends	36	15	51	12%
Other	7	2	9	2%
Totals	595	252	847	

CHART C-65

Do You Have A Science Library of Your Own?

Response	Males	Females	Total	Per Cent Of Total
Yes	172	36	208	50%
No	121	89	210	50%
Totals	293	125	418	100%

CHART C-66

Number of Books In Personal Science Library

Number of Books	Males	Females	Total	Per Cent Of Total
1 - 10	45	18	63	30%
11 - 20	51	7	58	28%
21 - 30	30	4	34	16%
31 - 40	12	1	13	6%
41 - 50	14	3	17	8%
51 - 100	12	-	12	6%
101 - 200	5	-	5	3%
200 or more	3	1	4	2%
Don't Know	-	2	2	1%
Totals	172	36	208	100%

CHART C-67

Do You Have A Science Laboratory At Home?

Response	Males	Females	Total	Per Cent Of Total
Yes	83	12	95	23%
No	210	113	323	77%
Totals	293	125	418	100%

CHART C-68

Type of Home Laboratory Maintained

Type of Laboratory	Males	Females	Total	Per Cent Of Total
Chemical	47	5	52	43%
Electrical-Electronic	35	1	36	30%
Biological	15	7	22	18%
Physical	4	-	4	3%
Astronomical	2	1	3	2%
Others	4	1	5	4%
Totals	107	15	122	100%

Note: "Totals" Entries do not agree with "Yes" Entries in Chart C-65 due to fact that some students listed two or more types of Home Laboratories.

CHART C-69

Social Acceptability Scores On "The RBH Personal History Questionnaire For High School Boys (Form A)"

Student Grouping	Mean	Standard Deviation
Males	88.4	18.5
Females	84.0	13.3
Grades 8, 9 and 10	84.7	18.2
Grades 11 and 12	87.7	16.9
Classroom	87.1	16.7
Classroom - Laboratory	86.1	17.8
Laboratory	88.3	16.8
All Students	87.1	17.2

APPENDIX E

Charts E-1 through E-32

CHART E - 1

Sources Through Which Students First Heard Of The Summer Science Program

Source Of Information	Percent Of Total		
	Males	Females	Total
High School Teacher	53%	38%	49%
High School Counselor	13	15	13
Local or Out-of-town Newspaper	8	16	11
Friends	5	9	6
Parents or Relatives	3	9	5
High School Principal	6	1	4
High School Bulletin Board	3	3	3
Unexplained High School Source	7	1	5
Miscellaneous Sources	2	6	3
No Answer	-	2	1
Totals	100%	100%	100%

CHART E - 2

Reasons Students Selected The Particular Host Institutions Involved

Reason For Selecting	Per Cent Of Total Males	Females	Total
General interest in program or specific courses offered. Facilities or opportunities offered. Chance to obtain early college admission or advanced study.	27%	26%	27%
Only program aware of, or only one being offered in the immediate area.	24	14	21
Closeness or convenience to home. Opportunity to live away from home.	16	18	17
Prestige of institution or staff members.	3	16	7
Only program applied to or accepted by. First program to which accepted.	7	5	6
Desire to attend same school for college. Past attendance at same school. Program offered in home high school.	4	7	5
Recommended by teacher, parent or friend.	3	3	3
Duration or timing of program.	3	-	2
Only program to which eligible due to grade level.	2	1	2
Choice made for student by high school.	2	1	1
Better chance for acceptance due to large number of awards being offered.	1	-	1
Miscellaneous or non-applicable responses	5	5	5
No answer	3	4	3
Totals	100%	100%	100%

CHART E - 3

Person Most Influential In Making Up Student's Mind To Apply To A Summer Science Program

Person Influencing	Per Cent Of Total		
	Males	Females	Total
High School Teacher	30%	33%	31%
Parents	25	28	26
The Student Himself	27	20	25
High School Guidance Counselor	8	7	7
Friends	2	5	3
High School Principal	3	1	2
Other Relatives	1	3	2
No Answer	4	3	4
Total	100%	100%	100%

CHART E - 4

How Student Felt He Was Selected

Selection Factor	Per Cent Of Total		
	Males	Females	Total
Test Scores	30%	31%	30%
Recommendations	20	22	20
High School Grades	17	25	20
Interest and Aspirations in Science	6	2	5
Overall, Global Evaluation	3	2	3
Extracurricular and Science Activities	1	2	2
High School Did Selecting	1	2	1
Character or Personality	1	-	1
Other Factors	1	-	-
"By Application"	5	4	5
"By A Committee"	4	4	4
"By Personal Interview"	2	3	2
Don't Know	4	2	3
No Answer	5	1	4
Total	100%	100%	100%

CHART E - 5

Factors Which Student Felt Were Most Important In His Selection

Selection Factor	Per Cent Of Total		
	Males	Females	Total
High School Grades	31%	26%	29%
Test Scores	21	16	20
Recommendations	12	17	13
Interest and Aspirations in Science	9	9	9
Overall, Global Evaluation	7	7	7
Extracurricular and Science Activities	5	5	5
Character or Personality	1	-	1
High School did Selecting	-	-	-
Other Factors	1	-	1
"By Personal Interview"	-	2	1
"By Application"	-	-	-
"By A Committee"	-	-	-
Don't Know	5	6	5
No Answer	8	12	9
Totals	100%	100%	100%

CHART E - 6

Why Student Wanted To Attend A Summer Science Program

Reason For Attending	Per Cent Of Total		
	Males	Females	Total
Desire to obtain science training not available in the home high school, or to further science knowledge or interests, or to broaden exposure to science.	49%	43%	47%
To qualify for early college admission or advanced college standing.	9	16	11
Desire to be better prepared for college work.	8	14	10
A worthwhile way to spend the summer. Something to do.	8	11	9
To learn more of occupation in which interested. General Guidance or orientation to assist in career decision. To test career interest.	9	5	8
To discover, specifically, what research work in science is like.	7	2	6
To find out what college is like. To test ability at college level.	4	2	3
To increase chances for scholarship award.	2	-	2
To better high school performance. To better study habits generally.	1	1	1
The financial benefits involved.	1	2	1
To meet new friends or interesting people.	1	1	1
Miscellaneous	1	2	1
No Answer	-	1	-
Totals	100%	100%	100%

CHART E - 7

Financial Hardships Encountered By The Student In Attending The 1959 Summer Science Program

"Did You Experience Any Financial Hardships?"	Per Cent Of Total		
	Males	Females	Total
No	84%	85%	84%
Yes	14	10	13
No Answer	2	5	3
Total	100%	100%	100%

CHART E - 8

Anticipated Effects Of Increased Student Costs On Summer Science Program Attendance

Would you have attended a Summer Science program this summer if:	You had to pay for your expenses?			You had to pay expenses and tuition?		
	Males	Females	Total	Males	Females	Total
Yes	50%	43%	48%	17%	26%	20%
Yes - Qualified	4	1	3	6	3	5
No	37	41	38	67	63	65
Not Sure	5	4	5	6	2	5
No Answer	4	11	6	4	6	5
Totals	100%	100%	100%	100%	100%	100%

CHART E - 9

Probable Student Summer Activity Had A Summer Science Program Not Been Attended

Summer Activity	Per Cent Of Total Males	Females	Total
Summer Job	61%	44%	56%
Traveling or Visiting	6	16	9
Attending Summer School	7	10	8
Studying at Home	5	7	5
Attending Another Science Program	3	3	3
Sports	3	1	3
Reading	3	-	2
Attending Summer Camp	1	4	2
Working on Hobbies or a Project	1	3	2
Other Activities	1	2	1
Nothing Special ("Loafing")	8	8	8
Don't Know or Undecided	1	2	1
	100%	100%	100%

CHART E - 10

Student Participant Summer Activities Prior To 1959

Activity	1958			1957			1956		
	M	F	Total	M	F	Total	M	F	Total
Summer Job	39%	25%	34%	29%	19%	26%	22%	16%	20%
Traveling or Visiting	15	29	19	16	24	18	16	28	20
Attending Summer School	8	10	9	3	6	4	2	2	2
Attending Camp	7	6	7	11	7	10	18	11	16
Sports	7	3	5	10	6	9	7	5	6
Studying at Home	5	6	5	2	4	3	2	6	3
Reading	3	5	4	3	6	4	3	6	4
Hobbies or Projects	1	1	1	2	1	1	1	1	1
Other Activities	-	3	1	-	3	1	-	2	1
Nothing Special ("Loafing")	14	10	13	20	19	20	23	16	20
Don't Know or Recall	1	2	2	4	5	4	6	7	7
Totals	100%	100%	100%	100%	100%	100%	100%	100%	100%

CHART E - 11

Ways In Which Students Earned Money (Non-Family Jobs)

Activity	Per Cent Of Total		
	Males	Females	Total
Baby Sitting, Care of Pets	16%	35%	21%
Mowing Lawns, Shoveling Snow	19	2	15
Running Errands	11	14	12
Paper Route or Stand	14	3	12
Housework, Window Washing	10	17	11
Helping in a Store	9	7	8
Working on a Farm	5	6	5
Delivery or Messenger Boy	3	-	3
Helping in a Gas Station	2	1	1
Helping in a Factory	1	-	1
Other Activities	6	5	6
None of these	4	10	5
Totals	100%	100%	100%

CHART E - 12

Parental Feeling Concerning Summer Science Program Attendance

Feeling	Per Cent Of Total		
	Males	Females	Total
In Favor	93%	93%	93%
Neutral	6	6	6
Against	1	1	1
	100%	100%	100%

CHART E - 13

What The Students Liked Best About The Summer Science Program

Factors Liked Most	Per Cent Of Total			
	Class	Class-Lab.	Lab.	Totals
Laboratory-research work or experience. Use of special equipment.	-	17.0%	39.2%	21.8%
Courses or program in general. Unique opportunities and variety offered. Library facilities and readings. Work in new and/or advanced areas. Conferences and seminars.	23.0%	23.4	12.0	19.0
Teachers and teaching methods. Individual attention and personal interest. Meeting and working closely with researchers.	13.1	8.9	8.8	9.8
New friendships with students of similar abilities and interests. Industry and unity of purpose towards work. Living, working and learning to get along well with students of equal or higher ability. "Bull sessions."	9.8	8.9	7.8	8.7
New knowledge. Studying and learning in concentrated fashion every day. Learning new study skills and work habits.	20.5	4.7	4.6	8.0
General academic or intellectual atmosphere. Full vigorous schedule of study. Informal, lack of pressure and grades. General facilities offered. Adult approach. A foretaste of college life.	7.4	9.8	5.1	7.5

CHART E - 13 (con't)

Factors Liked Most	Per Cent Of Total Class	Class Lab.	Lab.	Total
The lectures and other presentations.	0.8%	7.7%	9.2%	6.8%
Field trips and learning through same.	-	8.5	2.3	4.4
Organization of program. Class Planning, size, make up and scheduling. Individual help and counseling. Informality and flexibility.	5.7	5.1	1.4	3.8
The challenge of hard work. Responsibility. Competition and stimulation. Feelings of accomplishment.	12.3	0.9	1.8	3.6
Independence. Choosing own subjects and working on own problems. Studying on own and thinking for self. Working at own pace without homework and strict discipline.	2.5	1.7	3.7	2.6
"Everything"	3.3	1.3	2.3	2.1
Recreation, extracurricular activities, etc.	1.6	2.1	-	1.2
Financial rewards. Stipend.	-	-	1.8	0.7
Totals	100%	100%	100%	100%

CHART E - 14

What The Students Liked Least About The Summer Science Program

Factors Liked Least	Per Cent Of Total Class	Class-Lab.	Lab.	Totals
Courses. Too much homework with too little time in which to do it. Courses not liked or not interesting. Limited selection or lack of choice of courses or projects. Not enough formal courses. Lack of individual project. Too much extra work.	6.2%	22.2%	14.1%	15.6%
Organizational problems. Poor scheduling or lack of adherance to schedule. Lack of teacher variety. No change of classroom or break between classes. Critism of library, athletic, etc. administration - especially insufficient number of heavily used "reserve" books. Too much emphasis on grades. Excessive distances between classes.	12.4	13.8	10.0	12.1
Rigid or unrealistic discipline. Regimentation. Complete segregation of sexes. Required study halls. Strictness. Curfews too early, too late or not enforced. Rearrangement of curfews. Week-end curfews.	5.3	15.8	4.7	9.5
Lack of time. Can't complete assignments, do good job, get to details, etc. "Cramming." No time to enjoy recreational facilities. No personal free time. Too little time for meals, etc. Too little laboratory time.	9.7	10.8	1.8	7.4
Field trips. Uninteresting or poorly planned. Too many at one time. Too much travel time. Not enough time at place visited.	-	1.0	20.0	7.4
Nothing liked least. Enjoyed everything.	7.1	4.9	6.5	6.0

CHART E - 14 (con't)

Factors Liked Least	Per Cent Of Total Class	Class-Lab.	Lab.	Totals
Recreation. Mandatory or too much. Poorly scheduled. Need more recreation or less. Poor movies. Dull week-ends.	13.2%	3.9%	2.4%	5.6%
Lack of sufficient sleep.	21.2	-	1.8	5.6
Lectures not good, not interesting, too long or too frequent. Go over students' heads.	1.8	4.4	8.8	5.3
Complaints regarding food, services or general facilities.	5.3	3.4	7.0	5.1
Teachers and teaching. Pace too fast or too slow. Too routine or too intensive. Too much emphasis on basics or too narrow a field. Too much memory work. Too many tests. Certain teachers or methods disliked.	1.8	7.4	1.8	4.1
Time wasted due to faulty scheduling, on details or through repitition of material already covered. Lack of work to do.	1.8	2.1	7.0	3.7
Program too short in duration.	0.9	1.5	5.3	2.7
Too much pressure, tension, strain, rush.	8.8	1.5	-	2.7
Long commutation during "rush" hours. Too much time on train. Homesickness.	0.9	3.9	.8	2.5
Not enough time in lab. Too little participation in research projects. Dislike of work with animals.	0.9	3.4	2.4	2.5
Loss of income through lack of summer job. Inadequate stipend.	-	-	2.9	1.0