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A follow-up survey of the 1950-1959 graduates of Flathead County High School who were enrolled in the school's 'mathematics-science' curriculum

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A FOLLOW-UP SURVEY OF THE 1950-1959 GRADUATES OF FLATHEAD COUNTY HIGH SCHOOL WHO WERE ENROLLED IN THE SCHOOL'S 'MATHEMATICS-SCIENCE' CURRICULUM

by

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CHAPTER I

INTRODUCTION

Statement of the problem. In checking a number of information sources it has been found that there has been no recent survey of the graduates of Flathead County High School, Kalispell, Montana. In particular, there has been no study of any kind concerning the students graduating with a "major" in the mathematics-science field. A large number of students follow the prescribed course involving a major portion of the math-science offerings of the school. Many of these students continue their education beyond the high school. What happens to these students? Where are they now? What are they doing? How do they feel about their high school preparation? Not knowing the answers to these questions has established a need for such information.

The purpose of the study. The need for a study of this type can be classified under two categories: (1) Good schools are constantly evaluating their curriculum trying to locate shortcomings and looking for ways to correct those shortcomings as they are found.

> To be of the utmost service to the community at all times, the school must select from the world about it those new factors worthy of being assimilated into a previously well-proved order of learning. Comment from its graduates who so recently have stepped from the school into the world must necessarily be one means of determining what of the new to assimilate into the old and what of the old to cast off.[1]

[1]Jane E. Crawford, "A Survey of High School Graduates of 1942," School Review, 53:44-9 (January, 1945).

(2) Flathead County High School has developed an excellent guidance program and a great deal of counseling has been done with students, particularly since about 1952. The guidance staff is at all times concerned with the success and effects of their efforts in counseling and this study should provide valuable information in this regard.

Since no such previous survey has been available in this field, the project could be well used by the administration and the departments involved to evaluate, in some measure, the offerings in the light of the experiences of the graduates.

> Securing information from students who have left school is one such procedure [for building better educational programs] that has proved valuable to many schools in directing curriculum building and in making the schools more responsive to the needs of the youth. The evidence shows that this approach to educational improvement not only is valid but shows promise of being used much more widely in secondary education throughout the state [Michigan].[2]

Specifically, the objectives of the study could be itemized as follows:

1. To evaluate scholastic preparation of math-science students:

   (a) By determining what per cent of the graduates enrolled institutions of higher learning;

   (b) By determining what per cent of the graduates continued in math-science related fields;

   (c) By asking the students to evaluate the subjects taken in high school, particularly the math-science area;

   (d) And by determining what changes in the high school

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[2] Michigan Study of the Secondary School Curriculum, State Board of Education, 1943, Follow-up of Secondary School Students, p. 3.

curriculum the graduates suggest.

2. To discover how effective the Flathead County High School guidance department has been in guiding students in this study.

Assumptions. It will be assumed that such information as will be obtained will be valuable to the administration, guidance staff, and the subject matter departments.

The graduates involved will compose about the upper one-third of the graduates and will be willing to cooperate in as objective a way as possible.

Delimitations. Only graduates of Flathead County High School, Kalispell, Montana, for the ten year period being considered will be included in the study. Furthermore, only those graduates who were enrolled in at least three years of mathematics and three years of science during their four years of high school will be contacted. College entrance will not be considered as a determining factor in selection, nor will completion of college or advance college work.

Limitations. In arriving at any conclusions one must consider certain limitations inherent in a study of this type. (a) The attitude and cooperation of the recipients of the questionnaires in giving truthful, unbiased and objective answers to the questions, coupled with the rate of return from the group. (b) The fact that the study involves a narrowly selected group would prevent making any generalizations about the over-all school program. (c) The early years covered by the study were during the Korean "police action" and conditions of the times may have had some bearing on the attitudes, and consequently the answers of those students graduating during that period and immediately

afterward. (d) No previous follow-up study is available for the purpose of comparison.

Definition of terms. (a) Curriculum--a group of prescribed subjects as outlined by the Flathead County High School registration guide. The curricula offered are: Liberal Arts, Math-Science, Agriculture-College Prep, Commercial-College Prep, Commercial-Terminal, Vocational, and General. (b) The courses that will be considered as mathematics are as follows: Algebra 1 and 2, Plane Geometry, Advanced Algebra 3, Solid Geometry, Trigonometry, and College Algebra 4. (c) Science courses to be considered are: Biology (required of all students), Physics, and Chemistry. In addition, some students will have taken a semester course in Earth Science, and others may have had a course in Advanced Biology. (d) Math-Science curriculum--a four year program including the following minimum sequence of subjects (plus physical education in the ninth and tenth grades):

Ninth Grade	Tenth Grade	Eleventh Grade	Twelfth Grade
English	English	English	English
Algebra	Geometry	Advanced Algebra } *	Trigonometry } *
Social Studies } *	Biology	Solid Geometry }	College Algebra }
Earth Science }	Language	Physics	Chemistry
Language		American History	American Government }
			Elective }

Many students are eligible under school regulations to take an additional "solid" each year and some also include one or more of the music courses.

*One-semester courses

CHAPTER II

REVIEW OF RELATED STUDIES

In recent years a number of papers have been written involving follow-up studies of all graduates from some of the smaller high schools in Montana. There seems to be no record available of any formal surveys by any of the state's larger schools, although such surveys may have been conducted by the schools for their own information. Also, no evidence could be found of any study involving a relatively small and highly selected group of students. The number of graduates from Flathead County High School over the period under consideration is several times greater than the numbers involved in the aforementioned studies, though the number of graduates in the group being studied is somewhat smaller than the total numbers of graduates from the other schools that were studied. There is also some difference in the periods of time involved--two of the studies being for ten year periods and three of them being for five to eight years.

By comparison, Buchholz[1] and Fitchen,[2] each using a ten year period, had total graduates to contact of only 103 and 367, respectively. If the entire number of graduates from Flathead County High School were

[1]Fred Buchholz, A Follow-up of the Graduates of Antelope High School, 1944-53 (unpublished Professional Paper, Montana State University, Missoula, 1955).

[2]Stuart Fitchen, A Follow-up Study of the Ronan High School Graduates from 1942-51 (unpublished Professional Paper, Montana State University, Missoula, 1953).

to be involved the number would be 2106. With the select group there were two hundred sixty-two graduates to be considered.

The formal papers available in this field served as guides in selecting the types of questions that have proven useful from a general viewpoint. More specific questions relating to the particular field under study in this paper were added.

The use of the follow-up study is not of recent origin, nor are they all the result of the same purposes.

> Several factors have motivated individuals or groups in making follow-up studies. Recognized purposes are usually found highly influential both as guides in conducting a given study and as bases for using and appraising the results of the study. By way of noting the variety of purposes, we might indicate that some center around the youth who have left school while others concern the school and its curriculum. There are studies that had their origin and sole function in meeting a teacher or faculty need.[3]

[3]Michigan Study of the Secondary School Curriculum, State Board of Education, 1943, Follow-up of Secondary School Students, p. 3.

CHAPTER III

DESCRIPTION OF THE COMMUNITY AND SCHOOL SYSTEM

The community. Kalispell, Montana, is located in the Flathead Valley of Northwestern Montana at the junction of U. S. Highways 2 and 93 and is the county seat of Flathead County. It is a community of some 10,000 persons in the corporate limits of the city, with a metropolitan population in the neighborhood of 17,000. In addition, the city serves a rural population in the surrounding fifty mile radius of about 25,000 persons, including three smaller communities in the vicinity. In addition to the immediate environs, the service area of Kalispell extends to many Canadian communities as far north and east as Calgary, Alberta.

The economy of the entire area is based upon the highly seasonal lumber industry, including logging, transportation, milling and finishing; and the manufacture of plywood. A related phase of the lumber industry is the harvest, bailing, and shipping of Christmas trees. Agriculture is limited to the small grains for the most part, with hay, peas, and potatoes being grown to some extent. The cherry crop of the East Shore of Flathead Lake is quite important to the economy, with many high school students depending on the packing and shipping warehouse for summer employment.

The tourist industry is not to be overlooked. Kalispell is near, and on the main highway leading to, Glacier National Park. In addition, the Big Mountain Ski Resort is at nearby Whitefish. Flathead Lake to

the south of Kalispell is an important tourist attraction. It is estmated that in an average year the tourist industry is worth about $16,000,000 to the Kalispell area.

A population of the size indicated requires a considerable number of professional people--doctors, dentists, teachers, and lawyers--as well as the usual number of support and supply services.

Due to the nature of the particular groups being studied it would be well to mention the relative numbers of these professional and technical persons in the area. There are approximately 22 doctors, 16 dentists, 26 lawyers, 145 teachers in Kalispell proper, and 56 additional teachers in 33 rural school districts. There would also be a number of persons involved in various technical fields that would also be related to science.

The Anaconda Aluminum Company reduction plant (the only truly year-round industry) plays a most important part in the economy of the city. While the industry proper is located in Columbia Falls, some twenty miles to the northeast of Kalispell, about thirty-one per cent of the employees of the plant live in Kalispell.

Kalispell has most of the usual fraternal organizations such as the various Masonic orders, including DeMolay and Rainbow for the high school age students, Odd Fellows, Elk's, American Legion, Veterans of Foreign Wars, Eagles, and Knights of Columbus. The service organizations consist of the Lions, Kiwanis, Rotary, and Junior Chamber of Commerce. The telephone book carries listing for nineteen different church denominations and there are at least five others that are not listed.

Due to the location of the community there are also numerous and

active sportsman's organizations and Granges.

The school. Flathead County High School is located in the city of Kalispell, but is not a part of the District 5 Kalispell Public School system. Being a county high school, the school operates under a Board of Trustees, members of which are appointed by the county commissioners for terms of two years. This Board of Trustees is composed of the County Superintendent, the six appointed members, a clerk, and the school superintendent as executive officer. Of the six appointed members, three represent the rural districts and three the city area. The three rural representatives at present are all engaged in farming, and one of them is chairman of the Board. The city representatives are a lawyer, a banker, and a dentist. The school is accredited by the State Board of Education and the Northwest Accrediting Association.

In recent years, through the action of the Kalispell board and the high school board, both systems have been under the supervision of the same superintendent. In addition, a third board of trustees has been formed consisting of representatives of District 5 and the High School. The purpose of this joint board is to consider matters of common concern and to coordinate a little better the efforts of the two systems.

The school serves the Kalispell city school system and thirty-three rural school districts. In addition to Flathead County High School, there are three district high schools--Whitefish, Columbia Falls, and Bigfork--in the county which also serve their surrounding rural areas. About 45% to 50% of the enrollment of Flathead County High School comes from the Kalispell system and the remaining 50% to 55%

comes from the rural districts. These rural students are transported to school by eleven buses.

Increases in enrollment and faculty are indicated in Table I, page 11. In the ten year period covered by the study, the enrollment increased 311 and the faculty increased 10, or a ratio of 31 to 1, which is generally thought to be a fairly acceptable student-teacher ratio. The faculty for the 1958-1959 school year consisted of ten women teachers and thirty-nine men teachers. Of this faculty, four were full time and one was part time in the science department, and three were full time and three were part time in mathematics (not including teachers of General Mathematics). Also indicated in Table I are the budget figures for the years in question and the per-pupil costs on the basis of the ANB (average number belonging).

To receive a diploma from the school a student must have earned credit in four years of English, one year of American History, one-half year of American Government, two years of mathematics, and one year of Biology. Except for the Biology requirement, these requirements, of course, follow the minimum state requirements.

For a number of years the guidance department has made visitations to Montana State University at Missoula, and to Montana State College at Bozeman, for the purpose of interviewing the students who are Freshmen at the two schools. These personal interviews constitute the follow-up efforts of the school and have proven quite useful to the guidance staff.

> The value of a high school to a community is judged in part by the quality of services it provides to boys and girls after they graduate or withdraw before graduation. During the last ten years,

TABLE I

FLATHEAD COUNTY HIGH SCHOOL ENROLLMENT, FACULTY, EXPENDITURES, AND PER-PUPIL COSTS FOR THE YEARS 1949-50 THROUGH 1958-59

Year	Enrollment September	Enrollment ANB	Faculty	Expenditures*	Per-Pupil Costs
49-50	952	904	39	$284,860	$315
50-51	984	941	38	272,342	289
51-52	989	1005	39	406,812	405
52-53	1040	1002	42	361,345	361
53-54	1105	1077	43	375,100	348
54-55	1122	1098	43	466,823	425
55-56	1156	1142	46	447,006	391
56-57	1209	1176	46	478,608	407
57-58	1249	1221	49	502,550	412
58-59	1263	1231	49	523,180	425

*These figures are taken from the County Superintendent's State Department reports of the "Net Amount Spent" and may represent a slightly higher figure than the actual instructional costs. Therefore, the per-pupil costs may be a little higher than those normally quoted by the school.

there has been a phenomenal increase in the number of schools that have undertaken systematic follow-up studies of former students with the purposes of (1) making available additional guidance and assistance to out-of-school youth and (2) improving the educational experiences of those still in school. These investigations have provided highly valuable leads for improving educational programs.[1]

[1]Michigan Study of the Secondary School Curriculum, State Board of Education, 1943, Follow-up of Secondary School Students, Preface.

CHAPTER IV

PROCEDURES

A follow-up study is a long-term operation that requires much advance preparation and planning. There are several guides to making follow-up studies that were published in the 1940's and very early 1950's. These guides are now out of print and only partial references have been available through other papers that have been written along these lines. One guide that was available and that has been used extensively is the Michigan Study. From this guide and papers that have been written at Montana State University, a list of general questions was formulated. Since the group under study is a select and specialized group it was necessary to formulate additional questions of a specific nature. A six page format questionnaire was devised for trial purposes and sent to two graduates for each of the ten years in question. The graduates were asked to fill out the forms to the best of their ability, keeping track of the time involved and making suggestions for change. Of the twenty trial questionnaires sent out, nineteen were returned with worthwhile suggestions. The average time for filling out the form was thirty to forty-five minutes. From the suggestions by the trial group a final questionnaire form was prepared, including some specific questions that were asked for by the school superintendent.

The list of graduates to be studied was compiled from the school's permanent record and transcript file. Upon finding that a particular individual qualified, the student's name, his IQ, his rank in class, and

his parents' name, address, and telephone number, were noted on a file card. To be sure of making contact with the graduates with the least possible confusion and delay, the parents of most of the subjects were contacted by telephone and the correct current mailing address was obtained. In many cases it was found that the subjects were to be at home for the Christmas holidays, during which time the mailing was to be made. Consequently, many of the forms that would normally have been sent out of town were very easily delivered.

Upon receipt of the completed forms, the initial index card was placed in a separate file to facilitate the sending of any follow-up letters that might be necessary. The information on the forms was then tabulated on a specially designed data card (see Appendix C, page 97) by a color code mark that was made to run off the edge of the card in the appropriate places. Data that could not be tallied along the edges of the cards were summarized in the spaces provided.

After the tabulation was completed on the cards, the totals for the various aspects of the study were determined by shifting the cards slightly to one side or the other and counting the marks that showed. The data were then set up and summarized in tabular form for reporting and analyzing purposes.

As mentioned previously, the initial mailing was made just after Christmas. This particular time was selected in part to contact as many of the graduates at home as possible. Secondly, a study by Norman has shown that questionnaires sent out before the first of a calendar

year bring somewhat higher rates of return.[1] One follow-up was made on the graduates who had not returned the forms early in June. Copies of the original letter and questionnaire were sent along with a second cover letter. A second follow-up was made in early July in the form of a postcard requesting the return of the materials. Copies of the correspondence may be found in Appendix A, page 86.

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[1]Ralph D. Norman, "A Review of Some Problems Related to the Mail Questionnaire Technique," Educational and Psychological Measurement, Summer, 1948, pp. 234-35.

CHAPTER V

PRESENTATION OF FINDINGS

Relationship of math-science students to total graduation class. During the ten year period under study there has been a distinct increase in the per cent of graduates who have been enrolled in the math-science curriculum at Flathead County High School. Table II, page 17, shows that in the graduating class of 1950 only 10.6 per cent of the graduates had enrolled in the three years of mathematics and science, while in the class of 1959 the number had increased to 15.4 per cent, an increase of 4.8 per cent. For a community that does not have the scientific and technical environment that many communities do, the writer feels that this rate of math-science education is quite satisfactory.

Rate of questionnaire return. Of the two hundred sixty-two math-science graduates in the ten year period it was possible to make contact with two hundred forty-six, or 94 per cent, of the group being considered. Addresses for fifteen could not be located and one was deceased.

One hundred eighty-seven graduates, or 76.3 per cent, returned forms (including the twenty trial forms) after the initial contact. Fifty-eight follow-up forms were sent early in June and twenty-one of these were returned, bringing the rate of return to 84.9 per cent. The last follow-up, early in July, brought in thirteen more forms, raising the over-all return to two hundred twenty-one, or 89.8 per cent, as shown in Table III, page 18.

TABLE II

RELATION OF MATH-SCIENCE STUDENTS TO TOTAL GRADUATING CLASS

Class	Graduates			Math-Science			% Math-Science		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
1950	75	95	170	15	3	18	20.0	3.2	10.6
1951	78	119	197	19	1	20	24.4	0.8	10.1
1952	89	106	195	17	4	21	19.7	3.8	10.8
1953	98	90	188	17	2	19	17.4	2.2	10.1
1954	101	117	218	25	1	26	24.8	0.9	11.9
1955	94	117	211	23	2	25	24.4	1.7	11.8
1956	117	109	226	26	2	28	22.2	1.8	12.4
1957	125	114	239	32	3	35	25.6	2.6	14.7
1958	120	108	228	29	5	34	24.2	4.6	14.9
1959	122	112	234	31	5	36	25.4	4.4	15.4
TOTAL	1,019	1,087	2,106	234	28	262	22.9	2.6	12.5

TABLE III

RATE OF QUESTIONNAIRE RETURN

Class	Number Contacted Boys	Girls	Total	Number Returned Boys	Girls	Total	Per Cent
1950	12	2	14	11	1	12	85.6
1951	17	1	18	14	1	15	83.4
1952	16	4	20	15	4	19	95.0
1953	17	0	17	15	0	15	88.3
1954	22	1	23	17	1	18	78.4
1955	20	2	22	20	2	22	100.0
1956	26	2	28	24	2	26	92.7
1957	31	3	34	28	3	31	91.0
1958	29	5	34	26	5	31	91.0
1959	31	5	36	27	5	32	89.0
TOTAL	221	25	246	197	24	221	89.8

This high rate of return probably results from the select nature of the group under study. The rate is higher than other studies that have been of a general nature and over similar periods of time. Fitchen[1] had a return of 61 per cent and Hokanson[2] had a return of 62.5 per cent.

Only one class achieved a 100 per cent return and that was the class of 1955. The class with the least return was the class longest out of school, the class of 1950. With the exception of the classes of 1950 and 1953, the rate of return from the girls was 100 per cent.

Location of respondents. During the ten years covered by this study the graduates of Flathead County High School have settled in many areas of the country. If the locations of those in the Armed Forces were listed, it might well read like the itinerary for a world tour. Tables IV and V, pages 20 and 21, indicate that the graduates are evenly divided between living in Montana and living outside of Montana. Approximately eight-tenths of the graduates living in Montana are either in Kalispell or one of the two principle college towns, Bozeman and Missoula. The state of Washington seems to have had the greatest attraction for the graduates, with California running second. Almost as many are enlisted in the Armed Forces as there are in Washington, but they are scattered throughout the world.

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[1]Stuart Fitchen, A Follow-up Study of the Ronan High School Graduates from 1942-51 (unpublished Professional Paper, Montana State University, Missoula, 1953), p. 19.

[2]Ray Hokanson, A Follow-up Study of the Graduates of Libby, Montana, High School for the Years 1946-50 (unpublished Professional Paper, Montana State University, Missoula, 1952), p. 15.

TABLE IV

LOCATIONS OF GRADUATES LIVING
IN MONTANA

Location	Number
Kalispell	33
Missoula	24
Bozeman	29
Columbia Falls	4
Butte	3
Helena	3
Great Falls	2
Billings	2
Belt	1
Bigfork	1
Cut Bank	1
Dillon	1
Havre	1
Libby	1
Olney	1
Plentywood	1
Ronan	1
Wolf Point	1
TOTAL	110

TABLE V

LOCATIONS OF GRADUATES LIVING OUTSIDE OF MONTANA

Location	Number
Washington	24
Armed Forces	21
California	16
Oregon	8
Texas	5
Utah	4
Minnesota	3
Massachusetts	3
Arizona	2
Virginia	2
Idaho	2
Illinois	2
Oklahoma	2
New York	2
Missouri	2
Colorado	1
Florida	1
Iowa	1
Kansas	1
Louisiana	1
Michigan	1
New Hampshire	1
North Carolina	1
North Dakota	1
Ohio	1
South Carolina	1
Wyoming	1
Norway	1
TOTAL	111

<u>Marital status of graduates</u>. Forty-four per cent of the graduates returning questionnaires are married. As may be noted in Table VI, page 23, eighty-four, or 42.6 per cent, of the 197 boys are married, and of the twenty-four girls returning information, fifteen, or 63 per cent, are married. In the classes of 1951 and 1952 over ninety per cent of the graduates were married, with just one person being single in each case. In each of the two most recent classes three persons were married.

<u>Graduates continuing their education</u>. In the group under consideration, being a highly selected group, it would be expected that a substantial number of them might continue their education in college or university. Of the two hundred twenty-one math-science graduates who reported, one hundred eighty-one entered college the autumn following their graduation from high school. Reference to Table VII, page 24, shows that this amounts to 82.0 per cent of the math-science graduates. In only one class, the class of 1953, did all of the graduates start college in the autumn. Three girls during the ten year period did not enter college in the autumn and it was found that these three did not enter college at any time, as indicated in Table VIII, page 25. Of the thirty-seven boys who did not enter college immediately following graduation, only fourteen were reported as never starting college. In three classes (those of 1951, 1953, and 1955) all of the math-science graduates started college some time after graduation from high school. The graduates who entered college later than the fall following graduation waited from one to six years before starting. Twenty-three students, or 10.5 per cent, are in this category. A total of 204 of the 221 math-science graduates entered college at some time, or an entrance rate for

TABLE VI

MARTIAL STATUS OF GRADUATES

Class	Married		Not Married	
	Boys	Girls	Boys	Girls
1950	9	1	2	0
1951	13	1	1	0
1952	14	4	1	0
1953	8	0	7	0
1954	8	1	9	0
1955	10	1	10	1
1956	11	2	13	0
1957	9	1	19	2
1958	1	2	25	3
1959	1	2	26	3
TOTALS	84 = 42.6%	15 = 62.5%	110	9

Per cent of 221 graduates married--44.7%

TABLE VII

COMPARISON OF GRADUATES ENTERING AND NOT ENTERING COLLEGE THE FALL FOLLOWING GRADUATION

Class	Number of Math-Science Graduates	Number Entering				Number Not Entering			
		Boys	Girls	Total	Per Cent	Boys	Girls	Total	Per Cent
1950	12	9	1	10	83.4	2	0	2	16.6
1951	15	12	1	13	86.6	2	0	2	13.4
1952	19	13	3	16	84.1	2	1	3	15.9
1953	15	15	0	15	100.0	0	0	0	----
1954	18	13	1	14	77.7	4	0	4	22.3
1955	22	16	2	18	81.9	4	0	4	18.1
1956	26	18	2	20	76.8	6	0	6	23.2
1957	31	22	2	24	77.4	6	1	7	22.6
1958	31	18	5	23	74.2	8	0	8	25.8
1959	32	24	4	28	87.5	3	1	4	12.9
TOTAL	221	160	21	181	82.0	37	3	40	18.0

TABLE VIII

SUMMARY OF TOTAL COLLEGE ENTRANCE
BY MATH-SCIENCE GRADUATES

Class	Graduates Reporting	Entered Fall Following Graduation	Entered Later	Total Entering		Never Entered		
				No.	%	Boys	Girls	Total
1950	12	10	1	11	92	1	0	1
1951	15	13	2	15	100	0	0	0
1952	19	16	2	18	95	0	1	1
1953	15	15	0	15	100	0	0	0
1954	18	14	2	16	89	2	0	2
1955	22	18	4	22	100	0	0	0
1956	26	20	2	22	85	4	0	4
1957	31	24	3	27	87	3	1	4
1958	31	23	6	29	94	2	0	2
1959	32	28	1	29	91	2	1	3
TOTAL	221	181*	23**	204	92	14	3	17

*82% of graduates
**10.5% of graduates

this particular group of 92 per cent.

In making a comparison of the college entrance rate of the math-science group with the totals of the graduating classes, Table IX, page 27, shows that the rate of college entrance has ranged from a low of 27.1 per cent in 1954 to a high of 48.4 per cent in 1958. The average college entrance rate for the eight years, 1952-1958, is 35.6 per cent. The portion of the total college entrance group that was made up of the math-science students has ranged from a low of 21.1 per cent in 1953 to 35.4 per cent in 1958. The average for the eight year period is 28.8 per cent.

Table X, page 28, makes a comparison of the rate of college entrance by all graduates of Flathead County High School with the averages for the State of Montana.

<ins>Colleges attended by graduates</ins>. As might be expected from a group of math-science students, the largest group of the graduates attended Montana State College at Bozeman the first year after graduation. Montana State College is the location of one of the principal engineering schools in the state as well as many other technical and scientific fields. Seventy-two of the graduates, or 35.4 per cent, attended Montana State College. Of the group, sixty-three were boys and nine were girls.

Montana State University attracted thirty boys and one girl or 15.2 per cent of the group. The University of Washington at Seattle is the only other school that attracted any appreciable number of the graduates. Reference to Table XI, page 29, shows that the balance of the graduates attended thirty-three different schools the year

TABLE IX

RELATIONSHIP OF MATH-SCIENCE GRADUATES ENTERING COLLEGE TO TOTAL COLLEGE ENTRANCE

Class	Total Graduates	Total Entering	Per Cent	Math-Science Entering	% Math-Science of Total Entering
1950	170	55*	32.4*	11	20.0*
1951	197	74*	37.5*	15	20.3*
1952	195	69**	35.4	18	26.1
1953	188	71	37.8	15	21.1
1954	218	59	27.1	16	27.1
1955	211	78	37.0	22	28.2
1956	226	65	28.8	22	33.8
1957	239	82	34.2	27	32.9
1958	228	82	35.9	29	35.4
1959	234	113	48.4	29	25.6

*Numbers are approximate due to questionable completeness of records used for source.
**Data from 1952 on are taken from Montana State Department of Public Instruction Guidance Division reports.

TABLE X

COMPARISON OF FLATHEAD COUNTY HIGH SCHOOL
COLLEGE ENTRANCE RATE TO THE
STATE OF MONTANA RATE

Class	Flathead County High School			State of Montana
	Graduates	No. Entering	Per Cent	Per Cent College Entrance
1950	170	55*	32.4*	**
1951	197	74*	37.5*	**
1952	195	69***	35.4	38.2***
1953	188	71	37.8	38.8
1954	218	59	27.1	40.2
1955	211	78	37.0	39.6
1956	226	65	28.8	40.9
1957	239	82	34.2	37.8
1958	228	82	35.9	38.7
1959	234	113	48.3	**
Average '52-'58			33.7	39.4

*Numbers are approximate due to questionable completeness of records used for source.
**Data not available from State Department of Public Instruction.
***Data from State Department of Public Instruction, A Report on the Activities of the 1957 Montana High School Graduates, June, 1958.

TABLE XI

COLLEGES ATTENDED FIRST YEAR AFTER GRADUATION

College	Boys	Girls	Total	Per Cent of Graduates
Montana State College	63	9	72	35.4
Montana State University	30	1	31	15.2
University of Washington	12	0	12	5.7
Montana School of Mines	7	0	7	3.4
Oregon State College	5	0	5	2.4
St. Olaf's College	4	0	4	1.9
Carroll College	2	2	4	1.9
Gonzaga University	1	2	3	1.4
Washington State College	3	0	3	1.4
California Institute of Technology	3	0	3	1.4
Western Montana College	1	1	2	Less than 1.0
Northern Montana College	2	0	2	
Pacific Lutheran College	2	0	2	
Denver University	2	0	2	
Brigham Young University	2	0	2	
Massachusetts Institute of Technology	2	0	2	
Valparaiso University	0	1	1	
Evangel College	0	1	1	
University of California at Los Angeles	0	1	1	
University of Wyoming	0	1	1	
Colorado School of Mines	1	0	1	
College of Great Falls	1	0	1	
Seattle Pacific University	1	0	1	
Whitman College	1	0	1	
Utah State University	1	0	1	
Pacific University	1	0	1	
Colorado College	1	0	1	
University of Idaho	1	0	1	
Dartmouth	1	0	1	
West Point	1	0	1	
Bob Jones University	1	0	1	
Walla Walla College	1	0	1	
Abeline Christian College	1	0	1	
San Jose State College	1	0	1	
Stanford University	1	0	1	
Clark College	1	0	1	

following graduation from high school.

Graduates in colleges at present and graduated. One hundred four of the high school graduates involved in the study were attending college at the time the study was made. This includes a number who were working on advanced degrees (to be reported in detail in a later section). Table XII, page 31, indicates that of the 104 in college presently, ninety-seven are boys and only seven are girls. This amounts to 50.8 per cent of the graduates who entered college at some time.

For the years 1950 through 1957, as shown by Table XIII, page 32, fifty boys and nine girls have graduated from college. This figure includes three persons who received two year certificates. All others received either a Bachelor of Arts or a Bachelor of Science degree. The students for 1958 and 1959 have not yet had time to complete sufficient work for any certificate or degree.

Majors in which students first enrolled. Since the graduates under study have specialized in science and mathematics in high school, it might be expected that many of them would continue in related fields in college. Table XIV, page 33, indicates that approximately 65 per cent of the group did so. The greatest number entering a particular field was ninety-four in engineering. Next most popular was chemistry with eleven, followed by pre-medical, pre-dental, nursing, geology, pre-pharmacy, mathematics, physics, medical technology, and agronomy. The two most common non-science majors were the Liberal Arts, and Business Administration. The remainder of the graduates enrolled in thirteen different fields. Nine respondents did not indicate what their major was during the freshman college year.

TABLE XII

NUMBER OF MATH-SCIENCE GRADUATES STILL IN COLLEGE*

Class	Total Number Entering	Numbers in College Boys	Girls	Total	Per Cent
1950	11	0	0	0	----
1951	15	2	0	2	13.3
1952	18	6	0	6	33.3
1953	15	2	0	2	13.3
1954	16	6	0	6	37.5
1955	22	9	0	9	40.9
1956	22	12	0	12	54.4
1957	27	17	1	18	66.7
1958	29	22	3	25	86.0
1959	29	21	3	24	82.8
TOTAL	204	97	7	104	50.8

*Includes students presently enrolled in graduate school. See Tables XXIV, page 54, and XXV, page 55.

TABLE XIII

NUMBER OF MATH-SCIENCE GRADUATES WHO HAVE GRADUATED FROM COLLEGE*

Class	Number Entering	Number Graduated			Per Cent
		Boys	Girls	Total	
1950	11	10	0	10	91.0
1951	15	7	1	8	53.4
1952	18	8	3	11	61.2
1953	15	6	0	6	40.0
1954	16	8	1	9	56.3
1955	22	7**	2	9	40.9
1956	22	4	1	5	22.8
1957	27	1**	1***	2	----
1958	29****				
1959	29****				

*Bachelors degrees only.
**Includes one two-year certificate.
***Includes one Registered Nurse.
****Students have not had sufficient time to complete a college degree.

TABLE XIV

INITIAL MAJOR ENROLLMENTS

Majors	Graduating Class '50	'51	'52	'53	'54	'55	'56	'57	'58	'59	Total
Engineering	7	8	7	8	8	10	13	16	9	7	94
Liberal Arts	1			1	2	1	2	3	2	3	15
Chemistry				1			2	1	3	4	11
Business Administration			4		1	2	2		1	1	11
Pre-Medical		2	2	1	1				1	1	8
Pre-Dental		2		1	1		1			1	6
Nursing			2					1	1	2	6
Geology	1					2	1		1		5
Education	1						1		1	1	4
Forestry						2		1		1	4
Pre-Pharmacy	1					1	1		1		4
Mathematics					1	1			2		3
Physics					1				1	1	3
Philosophy	1						1				2
General Studies									1	1	2
Music									1	1	2
Medical Technology						1				1	2
Home Economics			1								1
History, Political Science								1			1
Agronomy			1								1
Journalism					1						1
Optometry					1						1
Farm Management							1				1
English Literature									1		1
Agriculture									1		1
Pre-Law									1		1
Language									1		1
Hotel and Restaurant Management										1	1
Agriculture Education										1	1
Biology	1										1

Changes in major. Ten girls and fifty-two boys who started college made changes in their majors sometime during their college career. A total of 195 majors are indicated in Table XIV, page 33, so sixty-two changes would be 31.8 per cent; therefore, 68.2 per cent of those indicating a major remained in that field during college. The girls changed from six different majors to six others, the most common change being to the field of education. The most common reason for the change was listed as dissatisfaction in one form or another with the original course. One change was made so that the girl could support her husband while he finished college; another liked the challenge and advancement of the new field. Two girls did not list any reason for making the change.

The field of engineering suffered the highest mortality rate among the boys, with twenty-six dropping out and only four changing into the field. Twelve of those changing went into other science related fields. The field that attracted the most was mathematics with five persons going into the field; chemistry attracted two. Pre-medical students and chemistry students made five and four changes, respectively. The rest of the changes were accounted for in eleven other fields, as shown in Table XV, page 35. The field that gained the most students was Business Administration, which attracted ten; education attracted six. As with the girls, the most common reason given was dislike of the course. Four specified that they flunked out of the original course and fifteen gave no reasons for making the changes. One boy was talked into making the change into engineering by his father, while another was talked out of the pre-dental course by a dentist.

TABLE XV

SUMMARY OF CHANGES IN MAJORS
AND REASONS FOR CHANGE

Major Changed From	Major Changed To	Reasons for Change
	GIRLS	
Liberal Arts	Chemistry	No reason given
	Secretarial study	Put husband through college
Medical Technology	Sociology	Dislike of Mathematics
	Secondary Education	Lost interest
Nursing	Botany & Bacteriology	Challenge and better advancement
	Commerce	Unhappy with nursing
Chemistry	Secondary Education	Couldn't pass math-science courses
	German	No preparation for Chemistry
Engineering	Elementary Education	No reason given
Mathematics	Education	Dislike of Mathematics
	BOYS	
Engineering	Chemistry	No reason given
		Failed Engineering Mathematics
	Education	Became inspired to teach
		Broader course choice
		No reason given by two
	Mathematics	Hated Engineering
		Desire to learn more Mathematics
		Dislike of Chemical Engineering
		Dislike of Engineering
		Best grades and counseling service
	Business Administration	Flunked Physics
		Goals fitted better
		Aid in selecting a career

TABLE XV (continued)

Major Changed From	Major Changed To	Reasons for Change
Engineering (continued)	Business Administration	Didn't like Engineering Felt more qualified
	Industrial Arts	Lack of background No reason given
	Industrial Design	Not enough Mathematics
	Psychology	No reason given
	Aircraft Maintenance	No reason given
	Drafting	No reason given
	Film & Television	Opportunity for artistic creativity
	Geology	Dislike of Engineering
	Veterinary Medicine	Self employment
	Physics & Mathematics	No reason given
Chemistry	Pre-Medical	Variety and contact with people
	Mathematics	Improvement in the school department
	Business Administration	Improper study habits for Chemistry
	Chemical Engineering	Preferred application
Pre-Medical	Medical Technology	Preferred laboratory work
	Chemistry	Liked it better
	Music & Psychology	No reason given

TABLE XV (continued)

Major Changed From	Major Changed To	Reasons for Change
Pre-Medical (continued)	Music	Interest
	Business Administration	Lack of preparation
Pre-Dental	Liberal Arts	More suited to work
	Engineering & TV	Talked out by a dentist
Pre-Pharmacy	Education	No reason given
Liberal Arts	Business Administration	Going back to ranch
	Electrical Engineering	No reason given
	Accounting	No reason given
	Business Administration	No reason given
Business Administration	Liberal Arts	Well-rounded education Armed Service changed mind
Geology	Civil Engineering	Disillusioned with geology and experience in C. E.
	Business Administration	No reason given
Music	Economics & Political Science	More opportunity
Forestry	Education	No reason given
History & Political Science	Philosophy	More meaningful

TABLE XV (continued)

Major Changed From	Major Changed To	Reasons for Change
Physics	Finance	No reason given
	Archeology	Flunked Mathematics
General Studies	Engineering	Father

Students not enrolling in science related fields. If reference is made to Table XIV, page 33, it will be noted that there are approximately thirty students who enrolled in non-science fields during their first year in college. The greatest number of these, fifteen, enrolled in the liberal arts field and eleven enrolled in Business Administration. The reasons given for not following the sciences in most cases were that the individual had always planned on going into that particular field, or that it was his chief interest.

It will be pointed out in a later section of this paper that many of these students were in the math-science curriculum in high school because "it offered the greatest challenge," "it provided the best preparation for college," "it was the thing to do," "my parents wanted me to," and many similar reasons. It is felt that this is not a situation to become concerned over as attitudes and interests of high school students change rapidly, especially during late high school and early college years. Due to the fact that there were relatively few students involved in this situation, and that the information can be surmised from Table XIV, it was deemed unnecessary to include a separate table for this information.

Changes in colleges. Frequently students will find after they have started college that their interests and other factors have changed. Such was the case with thirty-eight boys and one girl in the group surveyed. Table XVI, page 40, shows that the greatest number of changes were out of Montana State College, with eighteen leaving. At the same time there were seven who transferred into the college from other schools. Seven of those transferring out of Montana State College went to Montana

TABLE XVI

REASONS FOR CHANGING COLLEGES

School Changed From	School Changed To	Reasons for Change
Montana State College	Montana State University	Conditions and classes more to liking
		Changed major
		Changed major
		Curriculum not offered
		To get degree in desired major
		Bozeman and MSC were depressive
		Changed major
	Carroll College	No reason given
	Gonzaga University	Closer to home
	Eastern Montana College	Finances
	University of California--Berkeley	Family moved to California
	University of Alabama (night school)	In service
	Pacific University	Enter School of Optometry
	Northrup Technical Institute	Dissatisfied
	Pacific University	To make fresh start
	Northern Montana College	Desired curriculum
	U. S. Naval Academy	Appointment
	St. Louis University	Husband entered Medical School

TABLE XVI (continued)

School Changed From	School Changed To	Reasons for Change
Montana State University	University of Southern California	Greater educational and professional opportunities
	Randolph-Macon	Change vocational interest
	University of Southern California	To get dental education
	University of Minnesota	
Washington State College	Montana State College	Tuition problems
Colorado College		Finances and changed curriculum
Pacific Lutheran College		Didn't have desired major
Denver University		Finances
Denver University		Finances
California Institute of Technology		Grades and personal problems
Clark College		Closer to home
Valparaiso	Montana State University	Closer to home
St. Olaf		Better school, finances, hypocrisy and lack of freedom
University of Washington	Montana State University, Maryland, and Minnesota	Finances and personal tastes
Washington State College	The Principia	To attend church school

TABLE XVI (continued)

School Changed From	School Changed To	Reasons for Change
Seattle University	School of Mines	Finances
	Montana State College	Major change
	Washington University	Admitted to Medical School
Pacific Lutheran College	Concordia	Better department
Gonzaga	Loyola, University of Southern California	Moved to area
Oregon State College	Washington State College	Football injury--lost financial grant--parents residents of Washington
Montana School of Mines	Texas Western	Army interruption
	International Correspondence School	No reason given
	University of Washington--Extension	Finances
	Montana State University	Changed to Education
	University of Washington	Lacked interest in Engineering
	Montana State University	

State University and the rest went to eleven different schools. A great variety of reasons were given for making the changes. Most common reason given was a change in major, listed by thirteen; seven indicated that financial difficulties were responsible for the change.

Graduates entering college later than the fall following graduation. It has already been indicated in Table VIII, page 25, that twenty-three of the graduates waited for a period of time before entering a college. Eleven of the graduates waited one year, four waited two years, four waited three years, two each waited four and five years, and one waited six years before starting. The only trend that seemed to be indicated was that thirteen of the total group of twenty-three who entered later than the fall of graduation, graduated since 1955. It might be that the economic conditions made it necessary for some of the students to wait. It is not felt that there are sufficient data, nor that they are particularly significant, to justify a tabulation of this information. However, the reasons for waiting to enroll in college are interesting. Table XVII, page 44, shows that the most common reason given is a military obligation in one form or another, with finances being the second most common reason.

College degrees received by graduates. The classes of 1957, 1958, and 1959 will not have had sufficient time to complete the prescribed work to qualify for any degrees at the writing of this paper; therefore, they will not be considered under this section. Twenty-three of the respondents indicated that they had received Bachelor of Arts degrees in fifteen different fields, as shown in Table XVIII, page 45. While the Registered Nurse course does not result in a Bachelor's

TABLE XVII

REASONS FOR NOT ENTERING COLLEGE THE FALL FOLLOWING HIGH SCHOOL GRADUATION

Reasons	Number
Armed Forces enlistment	6
Six months reserve program	3
Finances	7
Ill health	1
To gain maturity	1
Marriage	1
To be F. F. A. state officer	1
To run farm for parents	1
No reason given	2
Undecided as to desires	1
Worked two years (the only girl)	1

TABLE XVIII

BACHELOR OF ARTS DEGREES RECEIVED

Majors	1950	1951	1952	1953	1954	1955	1956	1957	Total
Pre-Medical		1	1		2				4*
Philosophy	1					1	1		3
Education	1					1			2
Business Administration			2						2
Chemistry					1				1
Liberal Arts	1								1
Architecture		1							1
Mathematics				1					1
English					1				1
Industrial Arts	1								1
Finance					1				1
Economics		1							1
Journalism					1				1
Economics and Political Science						1			1
Registered Nurse			1					1	2**
TOTALS	4	3	4	1	6	3	1	1	23

*Two completed Pre-Medical course but not a degree and went direct to Medical School.
**Not a Bachelor's Degree, but completed nurses training course.

degree, they are included here for convenience. Also, two of the pre-medical students did not receive degrees at the conclusion of the pre-medical course of three years.

Bachelor of Science degrees have been earned by forty-five of the students. In Table XIX, page 47, it is shown that these degrees were in twenty-three different fields. Electrical Engineering and Business Administration were the most popular with six in each field. Chemistry and Mechanical Engineering were next in line.

The following is a summary of the Bachelors degrees earned by the students, followed by the number of each class who started college at some time:

	1950	1951	1952	1953	1954	1955	1956	Total
Bachelor of Arts	4	3	4	1	6	3	1	23
Bachelor of Science	6	5	9	6	6	8	5	45
TOTAL	10	8	13	7	12	11	6	68
Number Starting	11	15	18	15	16	22	22	119

No generalization can be made on the basis of these figures, as many of the students are still in school working to complete degrees. At this writing the figures indicate that 33.3 per cent of those in the classes of 1950 to 1956 who enrolled in college have completed a Bachelors degree. Many of those, as will be shown in a later section, have continued their work towards advanced degrees.

Students withdrawing from college. It would be completely unrealistic to assume that all students who entered college would graduate. In a study of the 1958 high school graduates, being conducted by

TABLE XIX

BACHELOR OF SCIENCE DEGREES RECEIVED

Majors	1950	1951	1952	1953	1954	1955	1956	1957	Total
Electrical Engineering		1	1		1	2	1		6
Business Administration			2		3	1			6
Mechanical Engineering		2		1	1				4
Chemistry	1		1	1	1				4
Pre-Medical and Pre-Dental	1	1		1					3
Civil Engineering	1		2						3
Chemical Engineering						1	1		2
Agronomy			1	1					2
Physics							1		1
General Studies							1		1
Agricultural Engineering						1			1
Mathematics						1			1
Ceramic Engineering						1			1
Naval Science						1			1
Education			1						1
Industrial Arts			1						1
General Science		1		1					2
Aeronautical Engineering	1								1
Industrial Engineering	1								1
Pharmacy	1								1
Petroleum Engineering				1					1
Film and Television Production							1		1
TOTALS	6	5	9	6	6	8	5		45

the Montana State Department of Public Instruction, it was found that 38.7 per cent of the 1958 graduates enrolled in college; in 1960 the figure had dropped to 20.5 per cent.[3] Of the 204 graduates of Flathead County High School who entered college at some time, forty-three, or 21.0 per cent, withdrew before graduation, as shown by Table XX, page 49. Fourteen different reasons for withdrawing from college were given by the students. Table XXI, page 50, indicates that the most common reason for dropping out was financial need, with failing grades, marriage, and military service being next most common. In several cases, double reasons were given; for example, financial need and marriage. The students who dropped out indicated that they were following seventeen different occupations at present. Table XXII, page 51, shows the wide spread of activities, with the fields of laborer, office worker, the Armed Forces, and housewife being most common.

Students who have graduated from college. Girls who graduated from college and who have not continued their education at the post-graduate level were engaged in six different fields of endeavor. The boys, as indicated by Table XXIII, page 52, were in sixteen different fields. The seventeen that are in the Armed Forces are fulfilling their obligations as the result of the R. O. T. C. program, either Army or Navy, and are in the fields in which they majored in college for the most part--the greatest number of them being in the various technical and engineering fields. Sixteen other boys were in the various fields of engineering in civilian areas.

[3]Guidance and Counseling Service, A 1960 Supplement to a Report on the Activities of the 1958 Montana High School Graduates Enrolling in College, Autumn 1958, State Department of Public Instruction, Helena, Montana, 1961.

TABLE XX

NUMBER OF MATH-SCIENCE GRADUATES WHO
WITHDREW FROM COLLEGE

Class	Number Entering	Number That Withdrew			Per Cent
		Boys	Girls	Total	
1950	11	1	1	2	18.2
1951	15	3	0	3	20.0
1952	18	1	0	1	5.5
1953	15	7	0	7	46.6
1954	16	1	0	1	6.3
1955	22	3	0	3	13.6
1956	22	5	1	6	27.2
1957	27	6	0	6	22.2
1958	29	5	2	7	23.1
1959	29	6	1	7	23.1
TOTAL	204	38	5	43	21.0

TABLE XXI

REASONS FOR WITHDRAWING FROM COLLEGE

	Graduating Class									
Reasons	'50	'51	'52	'53	'54	'55	'56	'57	'58	'59
Financial need		3		2	1	2	2	3	1	3
Dislike of school		1	1							
Ill health				1						1
Failing grades								1	2	2
To teach	1									
Husband graduated							1			
To work									1	
Marriage				1					2	1
Undecided goals				1					1	
Military service				1		1	1			
No need for courses							1			
Need for rural teachers								1		
Family illness							1			
Parents didn't want him to attend college								1		

(Five students indicated double reasons for withdrawing)

TABLE XXII

PRESENT STATUS OF STUDENTS WHO WITHDREW FROM COLLEGE

Occupations	Graduating Class '50	'51	'52	'53	'54	'55	'56	'57	'58	'59
Housewife	1						1		1	
Nurses Aid										1
"Putting hubby through"									1	
Electronic parts distributor	1									
Production planning engineer		1								
Medical Technician		1								
Surveyor		1								
Office work			1	1				1		1
Procedure investi- gator--Boeing				1						
Air Force physicist NASA				1						
Field engineer for construction				1						
Armed Forces				1		1	1	1		
Electronic technician					1					
Ranching and farming							1	1		
Laborer						2		1		2
Teaching								1		
Business machine servicing									1	

TABLE XXIII

PRESENT STATUS OF THOSE GRADUATING FROM COLLEGE AND NOT TAKING GRADUATE WORK

Occupation	Number
	GIRLS
Housewife	3
Research assistant--Department of Bacteriology, Montana State University	1
Junior High teacher	1
Chemist--Institute of Medical Education and Research	1
Surgical nurse	1
Not stated	1
	BOYS
Armed Forces (most as pilots, or in Engineering and other technical fields)	17
Dentists	3
Medical Doctors	3
Architect	1
Chemist	1
Pharmacist	1
Company superintendent	1
Division superintendent	1
Minister	1
Grain company	1
Insurance	1
Math teacher	1
Traffic management	1
Free-lance photographer	1
Salesman	1
Engineering	
Mechanical	4
Electrical (3 in research)	4
Aeronautical	2
Civil	2
Industrial	1
Chemical	1
Petroleum	1
Not stated	1

Graduate work. Of the two hundred four graduates who started in college work, sixty-eight have completed a Bachelor's program, as has been indicated on page 46. Of these sixty-eight, thirty-four have at least started work on an advanced degree. Table XXIV, page 54, indicates that of the thirty-four starting advanced work ten have completed the work. Of the group starting the degrees there are four that have completed a Master's degree and are now working on the Ph. D. degree. Table XXV, page 55, shows the breakdown on the degrees that are involved in the various graduate programs. One of the Doctor of Medicine degrees is of particular interest as the young man is also planning on completing a degree in theology and becoming a medical missionary. Table XXVI, page 56, lists the twenty-one different schools at which the advanced degrees are being undertaken.

Financial assistance in attending college. Scholarships, grants-in-aid, fellowships, and assistantships have been awarded to one hundred six of the math-science graduates. Six girls and fifty boys received one award, while seven girls and forty-three boys received two or more awards. The assistance ranged from fifteen dollars to fully paid four year college educations, and in some cases a considerable amount of graduate work is included. Table XXVII, page 57, lists the colleges and other sources of the scholarships. Unless otherwise indicated, the amounts are a single lump-sum payment. By somewhat arbitrarily projecting those scholarship grants that are indicated for particular periods of time, and assigning reasonable values to those that are indicated as "tuition," the 106 students received aid in the amount of approximately $215,600.

TABLE XXIV

NUMBER OF GRADUATES STARTING OR COMPLETING
ADVANCED DEGREES

Class	Number Starting	Number Completing
1950	3	2
1951*	4	3
1952	6	1
1953	2	2
1954*	6	1
1955*	6	1
1956*	6**	0
1957	1	0
TOTAL	34	10

*One Ph. D. started in each class.
**The only girl to start an advanced degree.

TABLE XXV

ADVANCED DEGREES BEING QUALIFIED FOR AND MAJORS

Degree	Major	Number
Master of Science	Electrical Engineering	3
	Chemistry	1
	Agronomy	1
	Education	1
	Meterology	1
	Biochemistry	1
	Business Administration	1
	Undeclared	2
Master of Arts	Theology	1
	Education	2
	History	1
Master of Education	Education	1
Doctor of Philosophy	Psychology	1
	Economics	1
	International Relations	1
	Industrial Economics	1
Doctor of Medicine	---- (one to be a missionary)	5
Doctor of Dental Surgery	----	2
Doctor of Veterinary Medicine	----	1
Bachelor of Letters and Laws	Law	1
Uncertain	----	1

TABLE XXVI

COLLEGES IN WHICH ADVANCED WORK HAS BEEN DONE

Colleges	Number Enrolled
Montana State University	3
Montana State College	3
University of Washington	3
University of Oregon	3*
St. Louis University	1
Oregon State College	1
Johns Hopkins Biblical Seminary	1
Northwestern Medical School	2
Utah State University	1
Seattle University	1
Portland State College	1
University of North Dakota	1
University of Minnesota	1
Luther Theological Seminary	1
Pacific Lutheran College	1
George Washington University	1*
University of Omaha	1
Iowa State College	1
Duke University	1*
Massachusetts Institute of Technology	1*
Oklahoma State University	1

*Institutions at which Ph. D. degrees are being worked for.

TABLE XXVII

FINANCIAL ASSISTANCE RECEIVED

Source	Amount
Gonzaga University	Tuition, room and board
Carroll College	Tuition; tuition; $150; $100
Dartmouth College	$2000 per year
Montana State College	
Sherrick Nursing	$100
Research Assistant*	$300 per month
Agriculture Engineer**	$100
Department of Earth Science	$600 per year
Alumni Association	$300; $120
Montana State University	
Endowment Fund	$220; $550
Music Department	$200; $240; $900
Assistantship*	$1500
Journalism School	$100
Colorado College	$450
Montana School of Mines*	$1500 per year
University of Oregon	
Graduate assistant*	$1500 per year for two years
St. Olaf College	$250; $200; $150
Randolph-Macon College	$395
University of Denver	One-half tuition; one-half tuition
California Institute of Technology (freshman year)	$600
Massachusetts Institute of Technology	
Staff*	Tuition
Teaching assistant*	$1500
Freshman competitive	$1300; $900
Utah State University	
Research*	$125
Graduate assistant*	$3000
University of North Dakota	
Teaching assistant*	$1800 per year for two years
Graduate fellowship*	$1200
National Merit Scholarship (to California Institute of Technology)	$1500 per year for four years
Gallatin County Conservation Department	$25
Lutheran Educational Aid Fund	$200
Cobb Foundation	$500
St. Matthew Parish	$150

TABLE XXVII (continued)

Source	Amount
Evangel College	$25 per semester for four years
Ralph Goldwater Foundation	$500
Lambda Chi Alpha Fraternity*	$600
Northwestern Special Need Scholarship*	$750
U. S. Government Research*	$200
Anna Dunlap Foundation	Tuition
National Research Grants*	$300 per month for two years
Newhouse Foundation	$200
Kellogg Research	$1000
Ryman Graduate Fellowship*	$1500
Montana Truckers Association	$150
Mayo Foundation*	?
Phi Beta Kappa	$50
N. D. E. A. Loan	$1000; $200
Fleishman Foundation	$100
Consolidated Freightways	$500
National Science Foundation*	$2200; $400
Montana Science Fair	Tuition
Phi Kappa Phi	$100
U. S. Health Service Fellowship*	$2750
American Smelting and Refining Company	$500
Estate	$2500
Miscellaneous loans	$1600
Western Electric Company*	$450
Department of the Navy	Tuition
Knights Templar Loan	$500
Scottish Rite Foundation	$5400
O'Farrell Parish	$110
General Motors car design contest	$300
Montana Science Talent Search	$100
Montana High School Honor Scholarships	$3740 plus four indicating merely "tuition." (Received by 30 individuals.)
Montana Advance Honor Scholarships	$1540 plus two indicating "tuition." (Received by 10 persons.)
Montana Elk's Contests in Leadership and Scholarship	$3245 plus three unknown amounts. (Received by 25 persons.)
Sears Roebuck Scholarships	$2050 (Received by 6 persons.)

TABLE XXVII (continued)

Source	Amount
Bureau of Vocational Rehabilitation	Tuition for four individuals
Grants-in-Aid for Athletics (to Montana State University)	Tuition plus $60 per month for four years
	$1200 for one year
(to Montana State College)	Tuition plus $50 per month for two years
	$1200 for one year
(to Oregon State College)	Tuition plus $2700 (for three years)
	Tuition plus $75 per month for one year
(to Seattle Pacific University)	$4000 (for four years)
U. S. Government (G. I. Bill, Korean War)	Expenses plus subsistence (Received by 8 persons.)
Naval R. O. T. C.	Expenses plus stipend (Received by 6 persons.)
U. S. Naval Academy	Full expense
U. S. Army Academy	Full expense
U. S. Air Force Institute	Full expense
PL634 War Orphan Act	$110 per month for four years

*Indicates assistance on the graduate level.

(Each item listed in the "Amount" column above indicates an individual award.)

<u>School expenses</u>. Financing a college education is not an easy matter. It has already been shown that the group of students under consideration received substantial amounts of scholarship help from numerous sources. However, only about half of the group received this help and many of those did not receive sufficient help for their full expenses. Table XXVIII, page 61, presents a summary of the relative amounts of school expenses earned by the students. Seventy per cent earned some part of their expenses, with 52.3 per cent of the students earning at least one-half of their school expenses. The largest group earning their own expenses were those that stated they earned at least 90 per cent of their way. Thirty-seven, or 18.1 per cent, were in this bracket.

Thirty-seven different kinds or classes of jobs were engaged in to earn college expenses. The largest group, as shown in Table XXIX, page 62, indicated "summer jobs" as their source of income--a rather all-inclusive classification. Many of those who indicated earnings under the heading, "Government Agency," were students in the engineering fields who were working as engineering aids on survey work and similar projects. There seems to be no limit to the ends to which students will go to earn money for school--even to "scalping" tickets.

<u>Status of those not entering college following high school</u>. The seventeen who indicated they had not entered college following their graduation from high school were following nine different fields of endeavor during their first year after high school. The largest number of these persons, nine, were in the Armed Forces. Two were home-makers, and one each was clerking, working for the telephone company, employed

TABLE XXVIII

PER CENT OF SCHOOL EXPENSES EARNED

Per Cent Range	Number	Per Cent
90 - 100	37	18.1
80 - 89	8	3.9
70 - 79	25	12.2
60 - 69	17	8.3
50 - 59	20	9.8
40 - 49	10	4.9
30 - 39	11	5.4
20 - 29	12	5.9
10 - 19	2	1.0
None	62	30.4

TABLE XXIX

WAYS OF EARNING SCHOOL EXPENSES

Type of Job	Number
Summer	41
Government Agency (Forest Service Park Service, State Highway, etc.)	21
Food Service (Hasher, waitress, cook, dishwasher, etc.)	18
Woods work	17
Construction work	14
Part time school jobs	12
Odd jobs	11
Farm and ranch work	11
Common labor	10
Clerking (office, store, typist)	9
Student assistantship (examination grading, laboratory work)	8
Laboratory technician	8
Service stations and garages	6
Electronic technicians	4
Dance band	3
Drafting	2
Youth and church work	2
Bartender	2
Cherry warehouse	2
Baby sitting	1
Tutor	1
Nurse's aid	1
Resident assistant	1
Radio and T. V. entertainer	1
Scalping tickets	1
Personal business ventures	1
Printer	1
Hotel and restaurant management	1
Radio announcer	1
First aid man	1
Greens keeper	1
Inspector at Boeing	1
Paper Mill	1
Teaching assistant	1
Plumber's apprentice	1
Free-lance photographer	1
Resort work	1

by the U. S. Bureau of Reclamation, working for a bottling company, ranching, and working as a laborer. All of those in the Armed Forces had received advanced training in specialized service schools, while none of the others indicated any further education of a formal nature.

Reasons for enrolling in math-science curriculum. Twenty-eight different reasons were listed by the respondents in answer to the question "How and why were you influenced to take mathematics and science while in Flathead County High School?" Thirty-six students indicated that college preparation was their prime reason. General interest and parental influence were listed next with twenty-three each. Table XXX, page 64, summarizes the reasons listed by the respondents.

High school guidance. In response to the question, "Do you feel you were properly guided and directed in high school as to the courses you took?", one hundred nineteen students answered "yes," and forty-two said "no." An explanation of their answers was requested, but very few of the students made any comments. Those who did reply were quite favorable with respect to the preparation they had received for college work. The definite registration outline which the school had was commended, along with the personal interest of some of the teachers. Only three commented unfavorably in rather ambiguous terms.

Another question asked was, "Of what value was the Guidance Department to you while in attendance at Flathead County High School?" During the early years covered by this study the school had made a very meagre effort in the field of guidance, and the department had been built rather slowly and carefully over the years. This, perhaps, explains why there were twenty students who indicated lack of knowledge of the

TABLE XXX

REASONS FOR ENROLLING IN THE MATH-SCIENCE CURRICULUM IN HIGH SCHOOL

Reasons	Number
College preparation	36
General interest	23
Parents	23
Liked the fields	20
Desire to be an engineer	13
Basic interest	10
Teacher influence	9
Greatest challenge	9
Interest and influence of Junior High School	7
Personal choice	6
Enjoyed subjects most	5
Best foundation-"If undecided take math-science"	5
Aptitude tests	5
Guidance staff	4
Needed for nursing	3
Math required in most fields	3
Possible future need	3
Not sure of college-took hardest course	3
Changing times	3
Basic background	2
No reason	2
Planned on forestry	1
Course of least resistance	1
Started high school in Norway where everyone takes it	1
To make career of mathematics	1
To be a dentist	1
Most important field	1
It was the thing to do	1

existence of the guidance department, and forty who said they had made no use of the department. Twenty-eight said they had made "little use" of the department. Approximately one-third of the last two categories were in the school in recent years, during which time the department had been quite active, but still had made little or no use of it. Sixteen indicated that the department had aided materially in their deciding on a college career, ten said they were aided by scholarship information, and eight felt that they had been helped by the testing program. Three each were helped by the Career Day program, as well as in the area of personal and emotional problems.

Testing of math-science abilities. There was some misinterpretation of the question, "Were your mathematics and/or science abilities given a good testing while attending Flathead County High School?" Consequently some of the comments from the graduates could not be used in this report. However, there were a considerable number of replies that could be used, and a sampling of the replies is given in Table XXXI, page 66. Roughly, every second reply made was tabulated. Thirteen of the comments listed could be classed as favorable, while twenty of them are unfavorable.

It should be pointed out that in the two years since the last class of the students being polled graduated, and during the senior year of the class of 1959, the school embarked upon a strenuous program of upgrading many of the fields of study offered by the school. This is true not only in the mathematics and science fields, but in English and the languages. The writer feels that if many of the students making the comments listed were to return to the school, as many of them have

TABLE XXXI

"WERE YOUR MATHEMATICS AND/OR SCIENCE ABILITIES GIVEN A GOOD TESTING WHILE ATTENDING FLATHEAD COUNTY HIGH SCHOOL?"

Summary of Comments
+Each course added to previous knowledge.
+Good competition--students were in courses because they wanted to be.
-Didn't take enough advanced courses--no challenge.
-Too easy--never really had to work to achieve high standard.
-Courses not hard enough.
+Had little trouble with college work.
-Could have covered more material.
-Felt surface was barely scratched--not motivating students.
+Courses complete--I did not take advantage of them.
-Not properly geared for smooth entry into college studies.
-Need more testing for retention of knowledge.
-Math needs to be on a higher level.
+Work was sufficient; [subject deleted] was exception--"instructor was incompetent."
+Just did enough math to get by--own fault.
-Too few serious students.
-Slowed down by poorer students.
-Could have moved much faster.
-Fourteen to eighteen-year olds do not know what is ahead. High school should crowd students all they can.
-Math not taught with enough force--many bull sessions.
-Wasted much time being held back by other students.
+Most courses hard enough.
+Courses well prepared for college.
+Demanding of abilities.
-Students should be made to think for themselves--more, and work harder on homework.
-Didn't learn how to study.
-Instructors seldom taxed ability--often too easy. Two instructors improperly prepared.
+Program well set up. Was fifth in navy electronics class.
+High school provided with preparation to meet competition at Dartmouth.
+Math-Science is the only study discipline at FCHS.
+Courses produced adequate challenge.
-I should have flunked out.
-Too many students per class for individual work.
-Could make top grades without working--only competition in course of select groups.

+Favorable comments
-Unfavorable comments

as visitors, they would find changes that would be more in keeping with what they feel things should have been at the time they were in high school. Further indications of this upgrading will be made in the following section concerning the subject ratings made by the graduates.

Subject evaluation. As has been indicated in the introduction of this paper, one of the purposes of the study was to obtain the graduates' evaluations of the subjects in which they were enrolled while in high school, and to determine what additions they might recommend. All of the subjects that have been offered by Flathead County High School were listed on the questionnaire (see Appendix B, page 90) with instructions to rate the subject taken as being of "no value," "little value," "valuable," or "highly valuable." The respondents were then to indicate the subjects which they did not take but felt they should have. The subjects were also to be rated from the standpoint of either vocational or college preparation.

Only seventeen, or 7.7 per cent, of the 221 graduates reporting had not attended college at any time. These rated their subjects only as to their vocational value. In comparing these ratings with the ratings of those who had entered college, it was noticed that there was no marked difference in the ratings. Therefore, in listing and analyzing the ratings of the graduates all ratings were considered together. They are detailed in Table XXXII, page 68. Not all students rated every subject, even those subjects that are required of all graduates.

Algebra 1 and 2, Advanced Algebra, and Chemistry were rated the three most valuable math-science subjects; Plane Geometry, Trigonometry, and Physics were the next three most valuable. In the non-science area

TABLE XXXII

GRADUATES RATINGS OF SUBJECTS TAKEN

(PERCENTAGES LESS THAN FIVE HAVE BEEN OMITTED)

SUBJECT	NUMBER RATING	NO VALUE No.	%	LITTLE VALUE No.	%	VALUABLE No.	%	HIGHLY VALUABLE No.	%	SHOULD HAVE TAKEN No.	%
ALGEBRA 1 AND 2	212	0	-	7	-	67	32	138	65	0	-
PLANE GEOMETRY	211	0	-	15	7	83	39	113	54	1	-
ADVANCED ALGEBRA	200	1	-	18	9	50	25	123	61	8	-
SOLID GEOMETRY	185	5	-	12	6	62	33	81	44	25	14
TRIGONOMETRY	179	1	-	7	-	31	17	102	57	38	21
COLLEGE ALGEBRA	142	0	-	3	-	11	8	48	34	65* 15	46* 11
EARTH SCIENCE	87	1	-	12	14	33	38	9	10	32	37
BIOLOGY	210	9	-	41	19	107	51	53	25	(REQUIRED)	
PHYSICS	212	3	-	15	7	73	34	117	55	4	-
CHEMISTRY	207	3	-	4	-	67	32	130	63	3	-
ADVANCED BIOLOGY	59	5	8	1	-	8	14	16	27	29	49
SOCIAL STUDIES	183	31	17	73	40	66	37	13	7	(REQUIRED)	
WORLD HISTORY	133	10	8	35	26	60	45	11	8	17	13
AMERICAN HISTORY	196	10	5	63	32	99	50	24	12	(REQUIRED)	
AMERICAN GOVERNMENT	201	11	5	36	18	113	56	41	20	(REQUIRED)	
PSYCHOLOGY	114	8	7	28	24	37	32	17	15	24	21
LATIN	104	13	12	29	28	29	28	19	18	14	13
FRENCH	23	1	-	2	9	2	9	0	-	18	78
SPANISH	55	6	10	14	25	14	25	4	7	17	31
GERMAN	58	0	-	0	-	0	-	0	-	58	100**
ENGLISH	191	4	-	15	8	60	31	112	59	(REQUIRED)	
JOURNALISM	63	7	11	16	25	21	33	9	14	18	29
SPEECH	169	11	7	19	11	64	38	57	34	18	11
ADVANCED SPEECH	53	2	-	4	7	8	15	22	42	18	34
TYPING 1 AND 2	163	1	-	8	5	55	34	86	53	33	20
BOOKKEEPING 1 AND 2	23	2	9	2	9	3	13	4	17	12	52

TABLE XXXII (CONTINUED)

SUBJECT	NUMBER RATING	NO VALUE No.	NO VALUE %	LITTLE VALUE No.	LITTLE VALUE %	VALUABLE No.	VALUABLE %	HIGHLY VALUABLE No.	HIGHLY VALUABLE %	SHOULD HAVE TAKEN No.	SHOULD HAVE TAKEN %
BUSINESS LAW	33	1	-	3	9	4	12	0	-	25	76
HOME ECONOMICS	10	2	20	2	20	3	30	1	10	2	20
VOCATIONAL-AGRICULTURE	20	0	-	4	20	6	30	5	25	5	25
INSTRUMENTAL MUSIC	59	7	12	16	27	25	42	6	10	5	9
VOCAL MUSIC	45	6	13	10	22	20	44	7	16	2	-
PHYSICAL EDUCATION	172	23	13	54	31	71	41	24	14	(REQUIRED)	
WOOD SHOP	68	19	28	29	43	15	22	5	7	0	-
METAL SHOP	34	8	23	11	32	10	29	5	15	0	-
DRAFTING	87	7	8	12	14	19	22	24	28	25	29

*PREVIOUS TO 1957 WHEN COURSE WAS STARTED.
**COURSE NOT OFFERED UNTIL 59-60 SCHOOL YEAR.

English and Typing were listed as being the most valuable. Subjects rated as of little or no value included Biology, in the science area, and Social Studies and Latin in the non-science area. It will be noted that other subjects are not rated especially high, but this should not be taken as an indication of the competency of the subjects or departments. The ratings are skewed somewhat due to the specifications outlined in the questionnaire for rating. Many of the respondents remarked that a specific subject was most enjoyable to them and they had benefited from having taken it, but they could not rate it differently due to the stated limitations.

Notation was made in Column 5 of the questionnaire of subjects which the students felt they should have taken. They were then asked to make note of their reasons for such feelings. There were almost as many reasons given as there were marks, though they all fell into four principal categories: (a) the subject was not offered at the time or it could not be worked into the student's schedule, (b) personal enjoyment, (c) found in college that the additional background would have prepared them better for college, (d) general usefulness. Among the subjects most often listed were German, Business Law, Bookkeeping, and (before it was put into the curriculum) College Algebra. Most of those listing German were those in Chemistry and Pre-Medical courses where much of the literature is in German.

Nineteen different subjects were suggested by the graduates for addition to the high school curriculum. Higher Mathematics, advanced courses in Chemistry and Physics, Russian, and more English composition were the four most strongly recommended, as shown by Table XXXIII, page

72. At this point it should be emphasized that effective in the school year 1956-1957 the Kalispell school system undertook an accelerated program of mathematics instruction. In that year Algebra 1 and 2 were offered to a group of eighth grade students. This group of students was the first group to have the opportunity to take advanced mathematics courses. As seniors in the 1960-1961 school year, seven of the original twenty-five students were enrolled in what the school labeled "Math 13." This is the advanced math and calculus that the graduates have so urgently recommended. Also, starting in the 1959-1960 school year, the English Department has been undergoing a program of rearrangement, with more emphasis being placed upon the writing of compositions by the college-bound students. An analysis of the effect of these two programs will have to await some other follow-up study.

The chemistry and physics courses allow for very limited advanced work on an individual basis by a few qualified students. Russian has not yet come under the consideration of the school, but Economics, German, and Business Law have been offered on a limited basis for a number of years.

Graduates' personal comments. The final part of the questionnaire asked for the students to make any comments regarding "your feelings concerning the over-all accomplishments of FCHS in providing for your high school education." Virtually all of the students made comments of a very general nature, the majority of which were quite favorable toward the school's efforts in providing for their secondary education. There were, of course, a certain number of students who expressed a "sour grapes" attitude, but, for the most part, this was merely a

TABLE XXXIII

SUBJECTS THAT GRADUATES RECOMMEND ADDING TO CURRICULUM

Subject	Number Recommending
Calculus and Advanced Mathematics	26
Advanced Chemistry and Physics	16
Russian	12
English Composition	12
Current Events	5
Electronics	5
Economics	4
English Literature	3
Philosophy and Religion	3
Analytic Geometry	2
How to Study	2
Music Appreciation	2
Russian History	2
German	2
More foreign language	1
Business Law	1
World Government	1
About Communism	1
Sociology	1

continuation of the student's attitude in high school (as the writer remembers the individuals involved).

Probably the best way to analyze this portion of the questionnaire is to let the graduates speak for themselves by quoting selected comments.

> FCHS faculty and administration make long, hard strides in the right direction as far as counseling and subject matter offerings are concerned. Help is always available to everyone, not just a few. It is a good atmosphere for learning. Faculty members are always willing to do "extras" for students.

> I think FCHS provided me with an excellent education with the way classes were set up. I do think I would have enjoyed taking another class each day, with shorter periods and more homework. I took [subject deleted], but I must say we students always felt we knew more than our teacher, because [name deleted] could never explain anything, all [name deleted] did was look up answers in the answer book.

> I feel FCHS offered a good program...but since the "Sputnick crisis" shifted the emphasis in education toward science, the school should be encouraged (if not forced) to put forth more effort through more individual assignments. So few of us ever realized our capabilities because they were never fully tested and utilized at the high school level.

> I think what is offered is excellent. However, it is geared to the average student and those that enroll in the math-science course are usually above average and it is no challenge to their abilities to achieve the standards set up. My experience is that if you don't have to study to learn a subject you don't remember it as long.

> Greater emphasis is necessary on Guidance. Greater concentration on preparation for college, in other words, set the stage for the challenge of more demanding courses. Stress the necessity for independent thought rather than asking for easily memorized solutions and verbatim words on page 61.

> As I recall the school was one of the better in Montana. I would like to see a more rigid and thorough system put into use which would motivate the students more and maybe even cause them to have to take work home evenings and week-ends.

> I feel that, having talked to many other graduates from high schools across the U. S., and now attending university with them, that FCHS, considering the geographical locale and the size of the

urban population, can compare with the above average high schools in the U. S.

The school rates higher than any I have seen--certainly higher than the private schools in the southwest.

FCHS graduates generally rank in the upper one-third of their college classes.

The number one way to improve [is to get younger teachers] and to pay a high enough wage.

Since I did not continue on in science or math, what I say here will not lend as readily to your specific purposes. I would say this thought--I enjoyed all of my courses in science and mathematics and felt I got the most out of the courses in which I was strongly encouraged to work hard, e. g., chemistry and physics. I feel that anything such as the Science Fair which appeals to your imagination and helps you to escape the narrow confines of classes and books is especially valuable. This sort of thing gives life to otherwise dead subjects and relates them to our human situation.

When I entered the Navy I found that I was qualified as far as educational requirements for any program the Navy has. I graduated ranked number one of a class of seventy-one from Aviation Electronics Technician Class A school and never ranked below number four in any of the service schools....I do not mean to leave the impression that the social science courses were not valuable to me. I believe the instruction I received at Flathead was excellent and that the courses I took were well balanced. I believe that I was adequately prepared for any further education I wished to persue.

I sincerely favor our democratic system of education here in America, which attempts to educate the whole populace instead of an intellectual elite, as is the case in some European countries. But I think it is a mistake not to direct that education according to the needs and abilities of the individual. The gifted students should be challenged more than they are now; their talents developed at a more rapid pace. In this technological age math and science should be part of everyone's education, but not to the exclusion of the other fields. At least in one area the student should be challenged to dig deep, to use his abilities to the utmost, that he might realize that survey courses are only introductions after which the real work begins. And above all, there needs to be more discipline throughout the educational system. Students come to college with no conception of how to study. If they had experienced more discipline earlier, they might more easily discipline themselves.

I have always had a high regard for FCHS, but due only to the fact that I was in the science-math field where, I felt, the quality of teaching was excellent. However, three things could have been

improved--(1) guidance, (2) the absence of homework my last two years, (3) elimination of the athletic minded instructors...who relegated the courses they taught to a very minor position and consequently were detrimental to high standards.

Place much more emphasis on theme writing.

I was not ill-prepared except in how to study.

Student attitude can make or break any school. It is indeed a shame that such a large per cent [of students] fail to recognize what the high school is offering until it is a little late. FCHS prepared me to learn and I'm still learning.

After seeing other high schools and their products, it is inconceivable that any enterprising student of FCHS could graduate and be grossly unprepared for most college work--providing, of course, they are capable of accomplishing college-level education.

...I feel that the educational background I received in high school was less than adequate preparation for college. The emphasis was not on knowledge, but on grades and test scores....

I am an advocate of the return to the quest for knowledge in our educational system, to the training of the mind to inquire, to evaluate, and to function as a rational unit. Those who have the ability and the desire to achieve should be separated from those who are in school merely to occupy their time until they can go out and get a job....The time spent on home room meetings, service clubs, high school sororities and fraternities and other social organizations, band, chorus, cheerleading, and athletics should be curtailed in some cases and completely eliminated in others, to be used toward more rewarding pursuits.

...An exhaustive set of ability and aptitude tests should be given <u>every</u> high school student....I wasted a lot of time and money--moreover, I took up valuable space in an overcrowded school system when it could have been prevented....Also, not enough equipment is supplied for the teaching of math-science courses. Your lab would be more suited to a medieval alchemist. You have too many football suits and trombones and too little of the type of equipment found in modern labs and lecture rooms.

My high school education is a good one, especially in math-science. I have never had occasion to regret taking the courses that I did.

I hope you are now using grouping. The best high school preparation is not good enough for college.

The important thing when you get into higher education is not how much of the book you covered in high school but how <u>well</u> you learned the material you covered and the principles of math and science

which you will be using in college. Most students do not know how to study--teach them how.

In my math classes at FCHS I received average grades but in taking nation-wide Navy tests I have scored 78 out of 80 and am considered to be above average in math.

FCHS provided an excellent high school education. Basing my opinion on observations of several hundred engineering students who represent a reasonably extensive cross-section of the U. S. high schools, I have concluded that the Butte high schools are the only institutes which compare with FCHS in regard to excellence of academic preparation. Concerning improvement of the science-math curriculum, I can only encourage you to continue to attract sincere, devoted teachers.

I was planning to criticize the English courses which I took at FCHS, but I really don't feel that I know enough about English to do so. I do know that it was necessary to dispel from my mind and try to forget about 70 per cent of the English grammar which my high school teachers had taught me. Admittedly, our language is complex, but there must be a more consistent and systematic way to teach it.

FCHS is outstanding in both faculty and curriculum offered. Perhaps academic achievement should be stressed and rewarded more openly and generously and emphasized more within the student body.

The continuance of our way of life necessitates advancements (and hence studies) in math and science. And with this the student <u>must</u> know the meaning of his math and science--he must know where it fits in the totality of life. He should participate <u>fully</u> in his non-scientific life. After all, it is the politician and the social scientist who determine how the findings of the mathematician, physicist, etc., is going to be used. I feel that the math-science student at FCHS does not get a proper introduction to the "living" part of his life to be.

I felt that my background in math-science was better than others with whom I have attended school.

In high school, science students should not be pushed along a narrow dimly lit trail when there are expansive super-highways of knowledge to flit along. High school should be a place where one gets a very broad education. Getting wrapped up in one phase of science while so young can blindfold one to other aspects of education and even to other aspects of science.

Considering the fact that FCHS is a public school, I think that my high school preparation was above average, for that part of the country, and considerably so, especially since the majority of the school's

effort must be toward educating people not going on to college.

I feel it is important for a student to decide as early as possible as to the course of study he plans to follow and then follow it closely. Therefore, early guidance is essential, especially individual, personal help. A student can get so much more out of school if he has a goal in mind.

I did not remain in this field. I have never wished that I had. The FCHS people that I knew at MSU seemed to be well prepared to do college work. I have never been deficient in math or science as far as my limited use of it is concerned. The background is certainly advantageous in every day life. I feel that FCHS did provide me with worthwhile educational skills in all the areas that I explored.

I think that in the junior and senior years I could have been pushed harder, made to work more. In this way I would have been more prepared to work in the first year of college. The texts could be changed upward towards college level. If the students could be made to realize the importance of bettering high school study habits it would be a help.

Having gone to an out of state college, I can compare my high school education with many other schools, both much larger and smaller. I feel I was better prepared for college in all aspects, except math, than any graduate from any Washington high school. I believe the entire school system from the first through the twelfth grades far excells the Seattle school system. For one thing the discipline is much better and we are taught to respect our instructors. As for math, I understand College Algebra is now taught at FCHS. Most of my fellow engineering students have had one semester of College Algebra plus one semester of beginning Calculus when they enter college. Any course in the Humanities or History is helpful as in engineering we have little chance to take this type of course.

I feel that FCHS possibly emphasizes the math-science fields too much. However, I feel that I personally gained from this over-emphasis, because I changed to a Liberal Arts curriculum in college and this tended to give me the broad background that is necessary for Law School.

There were some courses I felt that were of much value and some that I thought were a 100% waste of time. In the latter I mainly include health, freshman social studies, and book type driver training courses. Part of the success of <u>any</u> course is dependent upon the teacher or instructor. There are insturctors I personally feel that are no benefit to FCHS and could easily be replaced by younger men with more interest and ambition. This observation is <u>not</u> based on personal prejudice, but is an opinion that I am sure many of my classmates will agree upon. It is these men who detract from the enthusiasm and devotion shown by other instructors in the school. I can see the same thing at [college deleted] but to a much lesser degree due to their exceptionally high standards.

I would like to see the physics course changed to include more mechanics which would give a firmer foundation for college physics.

In many science courses, it would be nice if FCHS could offer accelerated programs in math and science as has been done in many, many high schools.

CHAPTER VI

SUMMARY AND RECOMMENDATIONS

Re-statement of the problem. The purpose of this study was to survey the graduates of Flathead County High School who had been enrolled in the math-science curriculum of the school during the years 1950 through 1959 in order to analyze critically the school's function and success in fulfilling that function. The opinions and feelings of graduates relative to their preparation can be one of the most important sources of information for making such an evaluation. It was also a purpose of this study to determine what the graduates have been doing in the way of furthering their education, what they are now doing, and to check both of these in relation to their high school preparation.

Procedure. This study is based upon the returns of a questionnaire sent to two hundred forty-six students who graduated from Flathead County High School during the years 1950 through 1959. A copy of the questionnaire may be found in Appendix B, page 90. There had been two hundred sixty-two graduates during this period; however, the addresses of fifteen could not be located and one was deceased. The group contacted constituted 94 per cent of the eligible graduates; the questionnaire return was 89.8 per cent of the group contacted.

Outline of findings. The graduates were evenly divided between living within Montana and outside of Montana.

Forty-two per cent of the boys and 63 per cent of the girls were married. This is 45 per cent of the entire group.

One hundred eighty-one, or 82 per cent, of the graduates entered college the fall following their high school graduation and an additional twenty-three entered at a later time. The over-all college entrance rate for this group of graduates was 92 per cent.

The graduates enrolled in thirty-six different colleges as freshmen. Sixty-eight of these have graduated and thirty-four have been engaged in graduate programs, four at the Ph. D. level.

Sixty-five per cent of the graduates enrolled in mathematics and science-related courses in college.

A relatively minor number of the students changed majors and/or colleges after starting.

Bachelor of Arts degrees were received by twenty-three of the graduates and Bachelor of Science degrees were received by forty-five.

Twenty-one per cent of the students who started college indicated that they had dropped out without graduating.

One hundred six of the math-science graduates received help from one or more scholarships during their college careers. A projection of the amounts listed indicates a total financial support for the ten year period of $215,600.

Over half of the graduates earned 50 per cent or more of their college expenses; 18.1 per cent earned over ninety per cent of their college costs.

College entrance requirements were listed as the prime reason for enrolling in the high school math-science course of study.

A majority of the students felt they were properly guided in their high school years; however, many indicated they had made little

or no use, in a formal sense, of the guidance department. Many of the students were in high school and graduated prior to the time of full development of the guidance facilities.

The three most valuable math-science courses rated by the graduates were Algebra 1 and 2, Advanced Algebra, and Chemistry. In the non-science area English and Typing were rated highest.

The four most frequently mentioned subjects for addition to the school curriculum were: Advanced Mathematics (including Calculus), more advanced sciences, Russian, and more English Composition.

The graduates seemed to feel reasonably well pleased with the preparation provided by the school, but there were numerous constructive criticisms made of various phases of the program.

Recommendations. 1. In the accumulation and analysis of the data from the graduates, it has been noted that there are suggestions that have already been incorporated in the program of the school. The particular areas mentioned most frequently by the graduates were the inclusion of additional mathematics in the form of Calculus, and placing more emphasis upon English Composition. Since the last of the classes included in this study graduated, both of these programs have been strongly emphasized and it is recommended that they be continued and further reinforced for the college-bound high school students.

2. There should be a continued strengthening of the guidance program to the point where the guidance personnel-student ratio meets the standards set by the Montana State Department of Public Instruction.

3. More effort should be made on the part of all staff members in acquainting the students with the services of the guidance department,

particularly at the freshman level.

4. An increasing effort should be made to inform the "better" students that the guidance services can be of great value to them. Too often the guidance service is thought of as only for those who are having scholastic difficulties.

5. There should be a greater opportunity for the able science and mathematics student to do more individual work at an advanced level. There should also be a greater effort to identify this student earlier and to encourage his efforts.

6. More adequate facilities should be provided by the school for the science departments, with an emphasis on modernization.

7. There should be a greater effort to give proper recognition to scholastic achievement, both within the school and in the community. More emphasis should be given by news media to the successes of the graduates of the high school. This will necessitate the school making a greater effort to become aware of what the graduates are doing and getting the information to the proper outlets.

8. A follow-up of all graduates should be made during the first year after graduation and again after five years. The survey being reported may not be the ultimate answer, but it should be of some value as a guide in establishing a continuing program.

In conclusion the writer would like to quote a portion of a letter that was returned by one of the graduates along with his questionnaire. It seems to sum up quite well the American educational scene.

> As you mentioned, our American educational system has been the subject of considerable criticism and study. Much of this is no doubt well founded. However, it is my opinion that we need to keep

an even keel in this storm of criticism and carefully consider any changes which are made. We do not want to make scientific robots of our graduates just so that we can superficially compete with some foreign powers in a science, space, or what-have-you race. If we can turn out graduates from our high schools who have a good background in the sciences, who have had an opportunity to specialize in some field, and who have a desire to work for the joy of working with an ambition to improve conditions for themselves and their fellow men, who feel that life is worth living and worth living abundantly, then I feel that we will have graduates who will contribute to man's advancement with no need to take a second place to anyone.

It is a basic premise of our nation that man is more than a "tool" or puppet. It is my feeling that we are in danger of stunting the development of the individual if we adopt the programs proposed by some in education. In order to insure that each student is having an opportunity to develop as an individual we need to maintain a maximum of student-teacher contact.

BIBLIOGRAPHY

BIBLIOGRAPHY

A. PERIODICAL ARTICLES

Crawford, Jane E. "A Survey of High School Graduates of 1942," School Review, 53:44-49, January, 1945.

Norman, Ralph D. "A Review of Some Problems Related to the Mail Questionnaire Technique," Educational and Psychological Measurement, Summer, 1948.

B. PAMPHLETS

Michigan Study of the Secondary School Curriculum, State Board of Education. Follow-up of Secondary School Students. Lansing, Michigan: 1943.

Montana State Department of Public Instruction. A 1960 Supplement to a Report on the Activities of the 1958 Montana High School Graduates Enrolling in College, Autumn, 1958. Helena, Montana: 1961.

C. UNPUBLISHED MATERIALS

Buchholz, Fred. "A Follow-up of the Graduates of Antelope High School, 1944-53." Unpublished Professional Paper, Montana State University, Missoula, 1955.

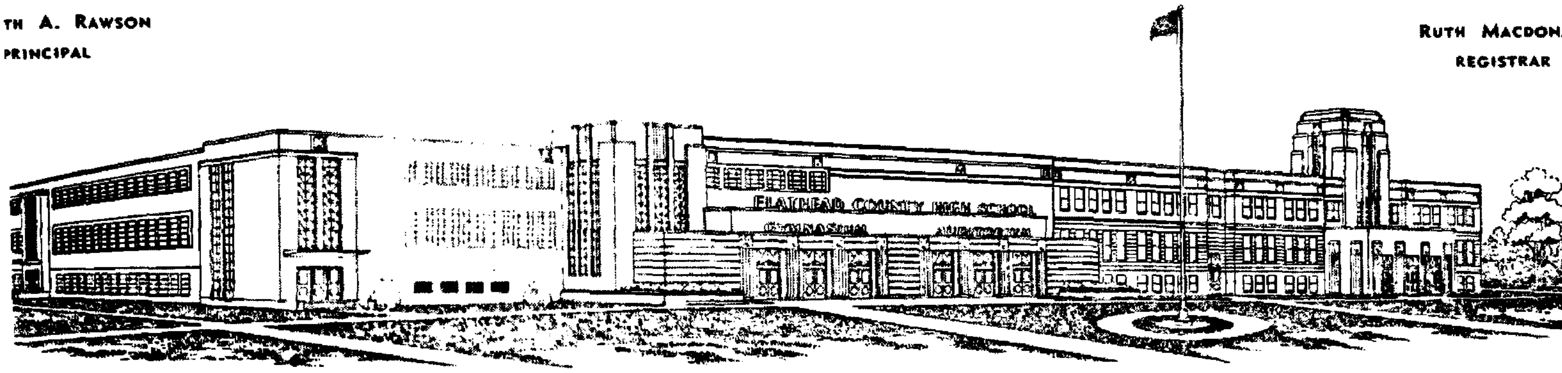
Fitchen, Stuart. "A Follow-up Study of the Ronan High School Graduates from 1942-51." Unpublished Professional Paper, Montana State University, 1953

Hokanson, Ray. "A Follow-up Study of the Graduates of Libby, Montana, High School for the Years 1946-50." Unpublished Professional Paper, Montana State University, 1952.

APPENDIX A

TH A. RAWSON
PRINCIPAL

RUTH MACDONA
REGISTRAR



KALISPELL, MONTANA December 26, 1960

Dear Flathead Graduate,

In recent years the American education system has been the subject of conciderable criticism and study. Claims have been made that the products of our high schools have not been properly trained in a number of fields, science and mathematics in particular. Your high school has been no exception. In an effort to analyze our efforts in recent years, I am conducting a survey of the FCHS graduates for the years 1950-1959, concentrating on those that were enrolled in our "Math-Science" curriculum.

The administration and school board have long felt the need for such a study and have given whole-hearted endorsement and backing to this project. It is being undertaken as partial fulfillment of the requirements for a Master of Education Degree at Montana State University. Information obtained as a result of the study will be furnished to the departments involved and to the Guidance Department. It is hoped that the material obtained will aid in either showing the adequacy of the programs or in bringing about the needed changes and improvements to more nearly meet the needs of our graduates.

I would like to ask thirty to forty-five minutes of your time in completing the enclosed form. As a suggestion, you might look over the entire form before completing any of it. Please be as objective as possible in your interpretations of the questions and answer as completely as possible. Your answers will be kept in strict confidence.

A prompt return of the form in the enclosed envelope will be greatly appreciated.

Thank you for your cooperation and assistance in this undertaking.

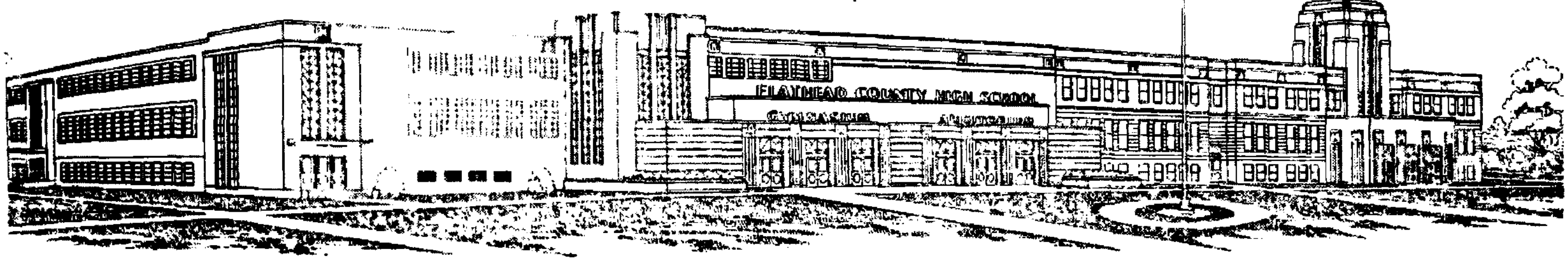
Sincerely yours,
Richard M. Nelson
Richard M. Nelson,
Science Instructor

I am anxious to see this study completed, so that we can use the findings in our future curriculum planning. Your cooperation is appreciated.

D. P. Langbell,
Superintendent

ETH A. RAWSON
PRINCIPAL

RUTH MACDON.
REGISTRAR



KALISPELL, MONTANA

June 10, 1961

Dear Flathead Graduate,

Quite sometime ago you received from me a questionnaire seeking information that I would like to obtain for a research project that I have undertaken. This project is in connection with my work for a Master of Education Degree at Montana State University. In checking my records recently, I find that your questionnaire has not yet reached me.

The value of any research project depends upon the receipt of as much information as possible. While the return to date has been most gratifying, I hope to be able to reach a point where the return of material will approach 100%. I would be most appreciative if you would do what you can to help me reach that goal.

I have enclosed a copy of my initial letter to you and another copy of the questionnaire. Please don't lay them aside, but help this project by filling out the form to the best of your ability and returning it in the enclosed envelope by return mail.

Time for completion of the project is getting short and I appreciate your prompt assistance in this matter.

Sincerely yours,

Richard M Nelson

Richard M. Nelson,
Science Instructor

July 10, 1961

Dear Flathead Graduate,

About a month ago you received from me a second copy of an information request, the original of which was sent to you the last of December, 1960. This request is in connection with work that I am doing at Montana State University. It is also endorsed by the FCHS School Board and will be used by them and the faculty in an appraisal of the school's function. The success and value of such a study depends upon the receipt of as near a 100% return as possible. Won't you please take a few moments and furnish the information we have asked for? At this point it is absolutely imparative that the forms be received by July 20 in order to be incorporated in the final analysis. Thank you for your assistance.

Richard M. Nelson

APPENDIX B

FLATHEAD COUNTY HIGH SCHOOL, KALISPELL, MONTANA
FOLLOW-UP SURVEY

I. GENERAL INFORMATION

A. Name ______________________________ B. Year Graduated ________
(If married, include maiden name)

C. Home address ______________________________

D. Present address ______________________________

E. Age _____ F. Marital status __________ G. Male _____ Female _____

II. COLLEGE ATTENDANCE (If you have not attended college at any time since graduation from Flathead County High School omit this section and sections III, IV, and V.)

A. If you enrolled in college the fall following your graduation place a CHECK in the appropriate space. If you enrolled later than the fall following graduation indicate the YEAR in which you enrolled.

1.	Montana State University	___	9.	Pacific Lutheran College	___
2.	Montana State College	___	10.	St. Olaf College	___
3.	Western Montana College	___	11.	Gonzaga University	___
4.	Eastern Montana College	___	12.	Washington State College	___
5.	Northern Montana College	___	13.	University of Washington	___
6.	Montana School of Mines	___	14.	Oregon State College	___
7.	Rocky Mtn. College	___	15.	Seattle University	___
8.	Carroll College	___	16.	______________	___

B. If you have indicated above that you entered college later than the fall following graduation, please indicate your reasons for waiting.

____

C. Are you still attending the college or university, as an undergraduate, that you started in? Yes ____ No ____. If you have graduated from the school checked in A, indicate the year. __________

D. If you are not now attending, or did not graduate from the college first enrolled in (as indicated in Item A), state the college(s) you have subsequently attended as an undergraduate.

School	(Year) Enrolled	Graduated
______________________________	________	________
______________________________	________	________

II. COLLEGE ATTENDANCE (continued)

E. Please indicate briefly your reasons for changing schools.

____

F. If you are presently enrolled in college, what is your status?

(circle one) Fr. Soph. Jr. Sr. Grad.

G. CHECK the major in which you first enrolled.

1.	Liberal Arts	___	7.	Forestry	___
2.	Engineering	___	8.	Home Economics	___
3.	Pre-medical	___	9.	Chemistry	___
4.	Pre-dental	___	10.	Mathematics	___
5.	Business Administration	___	11.	Pre-pharmacy	___
6.	Education	___	12.	____________________	___

H. If your major indicated above was not in a mathematics and/or science related field (engineering, pre-medical, nursing, etc.) please make a brief comment as to your reasons for selecting the major that you have indicated.

____

I. If you changed and did not follow the major listed in item G, to what major did you change and for what reasons?

____

J. If you have indicated in part C or D of this section that you have graduated from a college or university, what degree did you

receive and in what field? ________________________________

K. If you started college following graduation from FCHS, but did not graduate and are not now attending school, what are you now doing?

____

L. If you answered item K, above, what were the reasons for your withdrawing from school?

1.	Financial need	___	4.	Failing grades	___
2.	Dislike of school	___	5.	Disciplinary problems	___
3.	Ill health	___	6.	____________________	___

III. GRADUATE WORK

A. Have you taken graduate work of any kind? Yes ____ No _____

B. At what institution are you doing, or did you do, your work?

____

C. Is (or was) the work for an advanced degree? ______ Or for general extension of your knowledge? ______

D. <u>What degree</u> did you, or do you expect to, receive and in what field? ______________________________

E. <u>When</u> did you, or do you hope to, receive the degree? __________

F. If you have not yet received your advanced degree, what are your present plans for the period following receipt of the degree?

____

IV. SCHOLARSHIPS, FELLOWSHIPS, AND OTHER FINANCIAL ASSISTANCE.

A. If you have received, or are in line to receive, any financial assistance, please state the sources (Elk's, etc.), the type (Leadership, etc.), when you received it, and the approximate total value of each. Include any graduate fellowships. (Use an extra sheet if necessary.)

Sources	Types	Date	Amount

B. If you earned part of you school expenses, please indicate how, and approximately what percent of your expenses, to date, you have earned. Please indicate the types of jobs.

____

V. PRESENT STATUS (If you are still enrolled in college, either as an undergraduate or a graduate, omit this section.)

A. If you have terminated your college work, either through withdrawing or by graduation, list the major jobs you have held from graduation to the present. (Use an extra sheet if necessary.)

____

B. At the moment, do you intend to continue your present field? _____

If not, to what might you change and why? ______________________

____

VI. NON-COLLEGE ATTENDANCE (If you did not enroll in a college or university at any time after graduation from Flathead County High School, please complete the following section.)

A. What did you do the first year following graduation?

____

____

B. Have you at any time since graduation continued your education in ways other than college or university? Please indicate the kind of additional training received.

1. Business College ___ ____________________

2. Trade School ___ ____________________

3. Armed Forces School ___ ____________________

4. ________________ ___ ____________________

5. ________________ ___ ____________________

C. Are you still following, at the present, the activity listed in in Item A of this section? Yes ____ No ____.

D. If not, what is your present occupation and how long have you followed it? ________________________________

E. If you now feel that you were unwise in not attending college, indicate your reasons, if you care to.

____

VII. HIGH SCHOOL SUBJECTS

A. Listed on the following page are the subjects offered by Flathead County High School. In view of your experiences to date as outlined in the previous sections, and assuming that in most cases the cultural, citizenship, social and general values of the high school subjects can be considered as being "average", please evaluate those subjects that you took while in high school. If you did not attend college following graduation, evaluate on the basis of vocational preparation. If you did attend college please evaluate on the basis of college preparation. Please place a check in the appropriate column according to the rating scale indicated at the beginning of the table.

(Place a check in the appropriate column according to the following rating: 1 if the subject was of no value; 2 if the subject was of little value; 3 if the subject was valuable; and 4 if the subject was highly valuable. Check in column 5 those subjects which you did not take in high school, but feel now that you should have.

Basis for evaluation--Vocational____ College preparation____

SUBJECT	1	2	3	4	5	SUBJECT	1	2	3	4	5
1. Algebra 1-2						24. Advanced Speech					
2. Plane Geometry						25. Typing 1-2					
3. Advanced Algebra						26. Typing 3-4					
4. Solid Geometry						27. Bookkeeping 1-2					
5. Trigonometry						28. Bookkeeping 3-4					
6. College Algebra						29. Shorthand 1-2					
7. Earth Science						30. Shorthand 3-4					
8. Biology						31. Business Law					
9. Physics						32. Distributive Educ.					
10. Chemistry						33. Home Economics					
11. Advanced Biology						34. Vo-Ag					
12. Social Studies						35. Instrumental Music					
13. World History						36. Vocal Music					
14. American History						37. Physical Educ.					
15. American Gov't.						38. Art					
16. Psychology						39. Auto Mechanics					
17. Latin						40. Graphic Arts					
18. French						41. Wood Shop					
19. Spanish						42. Metal Shop					
20. German						43. Drafting					
21. English						44. General Math					
22. Journalism						45.					
23. Speech						46.					

B. Please indicate your reasons for checks made in column 5.

____

____

C. List any subjects that are not offered by Flathead County High School that you feel should be included in the curriculum.

____

VIII. GUIDANCE PROGRAM

A. How and why were you influenced to take mathematics and science while in Flathead County High School?

____

____

B. Do you feel you were properly guided and directed in high school a s to the courses you took? Yes ____ No ____

Please explain briefly your answer. ______________________

____

C. Of what value was the Guidance Department to you while in attendance at Flathead County High School?

____

____

D. Were your mathematics and/or science abilities given a good testing while attending Flathead County High School? Yes ____ No ____

Please explaih ______________________________

____

IX. PERSONAL COMMENTS

A. Remembering that (a) all of this information will be treated in a strictly confidential manner, and (b) that the purpose of this study is a critical analysis of the preparation of Flathead County High School graduates in the Mathematics and Science fields, and their subsequent activities, and (c) the information obtained will be used by the administration, guidance staff, and the faculty of the school in an effort to improve and alter the offerings of the school, please make a statement of your feelings regarding the overall accomplishments of FCHS in providing for your high school education. (Use an additional sheet if necessary.)

____

____

____

____

____

Thank you for your kind and generaous assistance in providing us with this information.

APPENDIX C

DATA TALLY CARD