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Continued Study of the Growth of Earth Science Offerings in Iowa Secondary Schools

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Abstract. Earth science has had a phenomenal growth or rebirth in the public schools of Iowa. There were 7 districts teaching earth science in 1960. Five years later there were 53 districts in which earth science was being taught. This is an increase in five years of 657.1%. In September of 1965 there were 82 districts offering the course. This was a 54.7% increase in one year. Included tables about earth science classes and teachers in Iowa public schools for the two years of 1964-1965 and 1965-1966 makes a comparison of the following: (1) undergraduate majors of teachers, (2) graduate majors of teachers, (3) grade level at which the course is taught, (4) size of classes, (5) total semester hours of teacher's college credit, (6) highest degree held by teacher, (7) tenure of teacher in present position, (8) total years experience of teachers, (9) salaries of teachers, (10) age of teachers, and (11) sex and marital status of teachers.

This is the second of a series of papers intended to study the growth of earth science in the public schools in the state of Iowa. The first paper was presented to the Science Teacher Section of the Iowa Academy of Science in the spring of 1965.[1]

A brief summary of the progress of earth science in the Iowa public schools will bring the reader up to date. Earth science was a common part of the high school curricula fifty years ago. Nationally it dropped from about 30% to 0.4% of the total school enrollment from 1900 to 1949.[2]

In 1960 earth science was offered in Iowa as a high school subject in seven districts. In 1965 fifty three districts had an earth science offering. This was 757% of the 1960 figure, or 657.1% increase. At present there are eighty two districts offering earth science in Iowa. This is a 54.7% increase for a one year period from 1964-1965 to the 1965-1966 school year.

In 1964-1965 there were 64 teachers teaching earth science in fifty six schools. In 1965-1966 there were 104 teachers teaching earth science in eighty nine schools. This is an increase of 62.5% in the number of earth science teachers and a 58.9% increase in the number of different schools offering earth science as a course to junior high and high school students in the state.

In 1964-1965 there were approximately 2831 students taking earth science. In 1965-1966 there were about 5447 students taking the course. This is a 92.4% increase in one year. With only a 62.5% increase in the number of teachers it would seem that the shortage of earth science teachers was upon us. The real shortage is in the number of qualified teachers.

In the present listing of teachers there is not one with a declared undergraduate or graduate major in earth science. Tables 1 and 2 shows the listed undergraduates and graduate majors as indicated by the data obtained from IPSEDS (Iowa Professional School Employee Data Sheet).

Table 1. Undergraduate Majors of Iowa Earth Science Teachers in Public Schools.

	1964-1965		1965-1966	
major	no.	%	no.	%
Biology	14	23.0	32	25.8
Physics	3	4.9	4	3.2
Chemistry	2	3.3	5	4.0
General Science	15	24.6	25	20.2
Physical Science	0	0	3	2.4
Physical Education	10	16.4	20	16.1
Vocational Fields	6	9.8	12	9.7
Other areas outside science	11	16.4	24	19.2

The 1965-1966 figures includes 20 double majors. Vocational subjects include: vocational agriculture, vocational homemaking, general agriculture, general homemaking, and industrial arts. General science includes: general science and those classified as all science. All other areas outside of science include: social science, elementary education, math, history, English, school administration, psychology, sociology, economics, art, philosophy, secondary education, junior high education, and music.

Table 2. Graduate Majors of Iowa Earth Science Teachers in Public Schools.

	1964-1965		1965-1966	
	no.	%	no.	%
Biology	3	11.1	7	31.8
Physics	1	3.7	2	9.1
Chemistry	2	7.4	1	4.5
General Science	9	33.3	2	9.1
Physical Science	1	3.7	0	0
Physical Education	3	11.1	3	13.6
Vocational Fields	0	0	0	0
School Administration	4	14.8	4	18.2
Guidance	1	3.7	0	0
Math	1	3.7	0	0
Secondary Education	2	7.4	3	13.6

General science includes the listing of all science. School administration includes: secondary school administration and general school administration. The 1965-1966 figures include three double majors.

It is quite clear that the present crop of earth science teachers are retreads and transferees. No data at present available to the writer gives a valid account of the qualifications of these teachers.

There is a great effort being made throughout the country to improve the qualifications of these teachers. Summer institutes and academic year programs sponsored by the National Science Foundation are the first line of defense. At best they are only a stop gap. Several institutions in the state offer a program of studies in the earth sciences, but unfortunately most of the small

colleges in the state that prepare the major portion of the state's teachers do not have such a program.

A prospective earth science teacher needs to have a background in several fields. He needs training in geology, astronomy, physical geography, meteorology, geophysics, and oceanography. Only a few institutions in the state offer a course in meteorology and none offer a course in oceanography, to the best of the writers knowledge.

It is held by authorities that at least a sixteen hour major in one of the fields and at least thirty two hours in the combined fields should be a minimum requirement for certification. Where in the state of Iowa could one get sixteen hours in any one field let alone thirty two hours in the combined fields? There are only two schools at present that have a program of studies that will allow them to prepare earth science teachers if these become the requirements. Where will the vast numbers of earth science teachers that will be needed going to come from? The small institutions in the state need to take a critical look at their science offerings.

The following tables from IPSEDS will serve as a ready reference for those seeking data on the regrowth of earth science in Iowa.

Table 3. Grade level at which Earth Science is taught in Iowa Public Schools.

	7	8	9	10	11	12	
%	10.7	21.9	50.0	6.2	6.2	4.7	1964-1965
no.	7	14	32	4	4	3	
%	3.6	25.0	57.1	5.9	3.6	4.8	1965-1966
no.	3	21	48	5	3	4	

Table 4. Size of Earth Science Classes in Iowa Public Schools.

	5-10	11-15	16-20	21-25	26-30	31-35	36 and over	
%	1.7	7.0	20.0	23.5	27.8	16.5	3.5	1964-1965
no.	2	8	23	27	32	19	4	
%	0.4	4.6	10.6	28.9	44.0	11.0	0.4	1965-1966
no.	1	10	23	63	96	24	1	

Table 5. Total semester hours college credit of Iowa Earth Science teachers in The Public Schools.

	130 or less	131-150	151-170	171-190	190- above	
%	5.1	42.4	18.6	13.5	20.3	1964-1965
no.	3	25	11	8	12	
%	6.8	37.9	20.4	9.7	25.2	1965-1966
no.	7	39	21	10	26	

Table 6. Degree held by Earth Science teachers in Iowa Public Schools.

	none	BA	MA	Spec.	Ph.D.	
%	3.1	84.4	12.5	0	0	1964-1965
no.	2	54	8	0	0	
%	7.8	74.0	18.2	0	0	1965-1966
no.	8	77	19	0	0	

Table 7. Tenure in present position of Earth Science teachers in Iowa Public Schools.

	1st yr.	1-3	4-7	8-12	13-14	15-19	20 and over	
%	24.1	46.8	19.4	0	4.8	0	4.8	1964-1965
no.	15	29	12	0	3	0	3	
%	20.8	39.6	23.8	6.9	1.0	3.0	4.9	1965-1966
no.	21	40	24	7	1	3	5	

Table 8. Total number of years teaching experience of Earth Science teachers in the Public School of Iowa.

	1st yr.	1-3	4-7	8-15	16-19	20 and over	
%	14.3	25.4	34.9	14.3	3.2	7.9	1964-1965
no.	9	16	22	9	2	5	
%	12.2	24.5	33.7	15.3	5.1	9.2	1965-1966
no.	12	24	33	15	5	9	

Table 9. Salaries of Earth Science teachers in Iowa Public Schools.

	below 4800	4800 5000	5100 5500	5600 6000	6100 6500	6600 7000	7100 8000	8100 9000	
%	1.6	13.1	29.5	16.4	23.0	6.5	8.2	1.6	1964-1965
no.	1	8	18	10	14	4	5	1	
%	1.0	12.6	25.2	11.7	23.3	8.7	11.7	5.8	1965-1966
no.	1	13	26	12	24	9	12	6	

Table 10. Age of Earth Science teachers in Iowa Public Schools.

	21-25	26-30	31-35	36-40	41-45	46 and over	
%	26.2	27.9	18.0	11.5	1.6	14.7	1964-1965
no.	16	17	11	7	1	9	
%	18.6	31.4	16.7	13.7	7.8	11.8	1965-1966
no.	19	32	17	14	8	12	

Table 11. Sex and maritial status of Earth Science teachers in Iowa Public Schools.

	married male	single male	married female	single female	divorced female	
%	79.0	11.3	4.8	4.8	0	1964-1965
no.	49	7	3	3	0	
%	72.1	11.5	14.4	1.0	1.0	1965-1966
no.	75	12	15	1	1	

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Biology Team Teaching at Wahlert[1]

Sister Bernice Ann Huberty, O.S.F.

Background

Our own program had its remote beginning in the spring of 1961 following the North Central meeting in Chicago. Informal discussions and questions with faculty members found us having had no direct experience with team teaching nor were we familiar with schools using it. We began reading and discussing the then new book: FOCUS ON CHANGE – GUIDE TO BETTER SCHOOLS. An outgrowth of our discussions and a desire to learn resulted in trips to the Chicago area to attend seminars and observe teaching-teams in action.

In early May the first formal faculty discussion proposed possible objectives that could be derived from this type of program. Some of the objectives included:

1. Student responsibility – to make the transition from the high school to the college-type of assignments less difficult and thereby prevent dropouts during the first year of college because of failure of students to adjust their study habits successfully; to aid the non-college bound student and the less academically gifted to benefit from the large-group instruction by the use of a greater variety of visual aids;

[1] Wahlert High School – Dubuque, Iowa