

## SECTION E, SCIENCE EDUCATION

### Science Teaching and Science Teachers in Oklahoma Secondary Schools in the Mid-1960's

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#### I. THE PROSPECTIVE EXODUS OF TEACHERS AS INFLUENCED BY THE POLITICAL ISSUES OF MID-WINTER 1964-65

Implicit in the settlement of the salary issue before the Oklahoma legislature in January-February, 1965 was the question of continuation of instruction in science in September, 1965. The issues affected teachers of all subjects at all levels, but the history of the past decade had shown the science teacher supply to be one of the most critical segments of the employment market. The leadership of the Oklahoma Science Teachers Association deemed it important to probe the intentions of science teachers so that the association's activity could be better programmed. Accordingly, all science teachers were sent a questionnaire.

On 18 December 1964, the instrument was addressed to approximately 1500 science teachers in secondary schools. The leading question was: "Regarding your own personal plans, are you considering leaving Oklahoma at the end of this contract year? Yes..... No....."

Subsequent questions probed into steps taken leading to the current position. The factors influencing such a position were: personal data covering sex, age, minor dependents, academic preparation, relation of salary to the then current Oklahoma schedule, fraction of total family income that that salary represented, moonlighting, teaching experience, school-related (and paid) extra responsibilities, school size, personal teaching schedule with number of preparations and class sizes, rating of adequacy of instructional materials, satisfaction with opportunities for professional growth, and involvement in community affairs. Place for voluntary comment was provided. Two options for identification were provided, with the result that communication with approximately 95% of the respondents was simplified for follow-up study.

The group considering leaving the state were predominantly young males. They, because of family obligations, were forced to moonlight, being dependent on salary for total family income. Those considering leaving have been more recently trained with more emphasis on science subject matter. Twelve % of those considering leaving had only a Bachelor's degree before 1957 compared with 21% of those not considering leaving. The number of teachers salaried above state scale was approximately the same for both groups.

The number of teachers of biology, chemistry, and physics considering leaving was significantly greater.

The greatest problems of teacher replacement were predicted to be in senior high schools of smaller size, especially if the teacher's schedule required four or more class preparations per day. Since courses in senior high school require greater depth of study for teacher certification, replacements were expected to be in short supply.

*Factors that influenced decisions*—There could be no doubt that the salary schedule was the major factor influencing individuals considering leaving and received the most publicity. However, it became obvious that science teachers also consider nonfinancial factors in job satisfaction.

The survey instrument listed 14 factors that could conceivably have influenced the composite answer to the leading question. Respondents were asked to rank these factors in order. Factors mentioned more than two times by those considering leaving were: inadequacy of own salary (63% of those considering leaving), dissatisfaction with the election results of November 3, 1964 (57%), feeling that community was indifferent (35%), personal loss in confidence in the community (13%) and over-loaded class enrollments (18%).

The questionnaire permitted voluntary expression of supplementary reasons or opinions. Thirty-three of those not considering leaving (85%) exercised this option. One respondent said, "I happen to like my community and students," which was the only positive statement of satisfaction among all replies. From these responses, it is difficult to believe that those expecting to be in Oklahoma schools were completely satisfied with the situation at the time of response.

While only one in six had taken the usual step of finality (notifying the administrator), well over half had taken initial steps, such as consulting friends and/or deciding the matter within the family circle. A quarter or more had taken the first quiet, exploratory steps of putting personal records in shape for probing the market openings.

Four reasons given by individuals who do not feel themselves free agents in seeking relocation outside of Oklahoma are shown in Table I. The respondents planned to remain employed within the state in September 1965.

TABLE I. REASONS FOR STAYING IN THE STATE, DESPITE DESIRE TO LEAVE

Women tied to location because of husband's occupation	9
Individuals too old to relocate or having too much equity in OTRS	7
Individuals needing to stay to complete educational program for self or dependent	8
Individuals having fixed investments or lucrative sidelines too economically advantageous to sacrifice	12
Total Number	36
Percentage of "NOT" group	17%

*Women teachers in this sample*—Analysis made no complete and separate examination of the female component but a few features could be extracted. Ten women were considering leaving; 44 were not. Age distribution for all women was fairly proportional to the entire sample except in the "over 55" category. Forty-one % of the women were mainstay breadwinners dependent on their salary for 75% or more of the family income. An equal number contributed a second income less than half of the family total. In training, the women were comparable to the men in depth of study in the basic sciences. At least 9 (20%) volunteered comment that they could not consider leaving Oklahoma because of their husbands' interests, yet most of them expressed dissatisfaction with their salaries or working conditions.

*Geographical distribution*—Fig. 1 illustrates the number of those considering leaving, those not considering leaving and the percentage of those considering leaving distributed within the twelve OEA districts. The distribution distinguishes urban-rural and industrial-agricultural lines that appear in other studies of attitudes, habits, and positions.

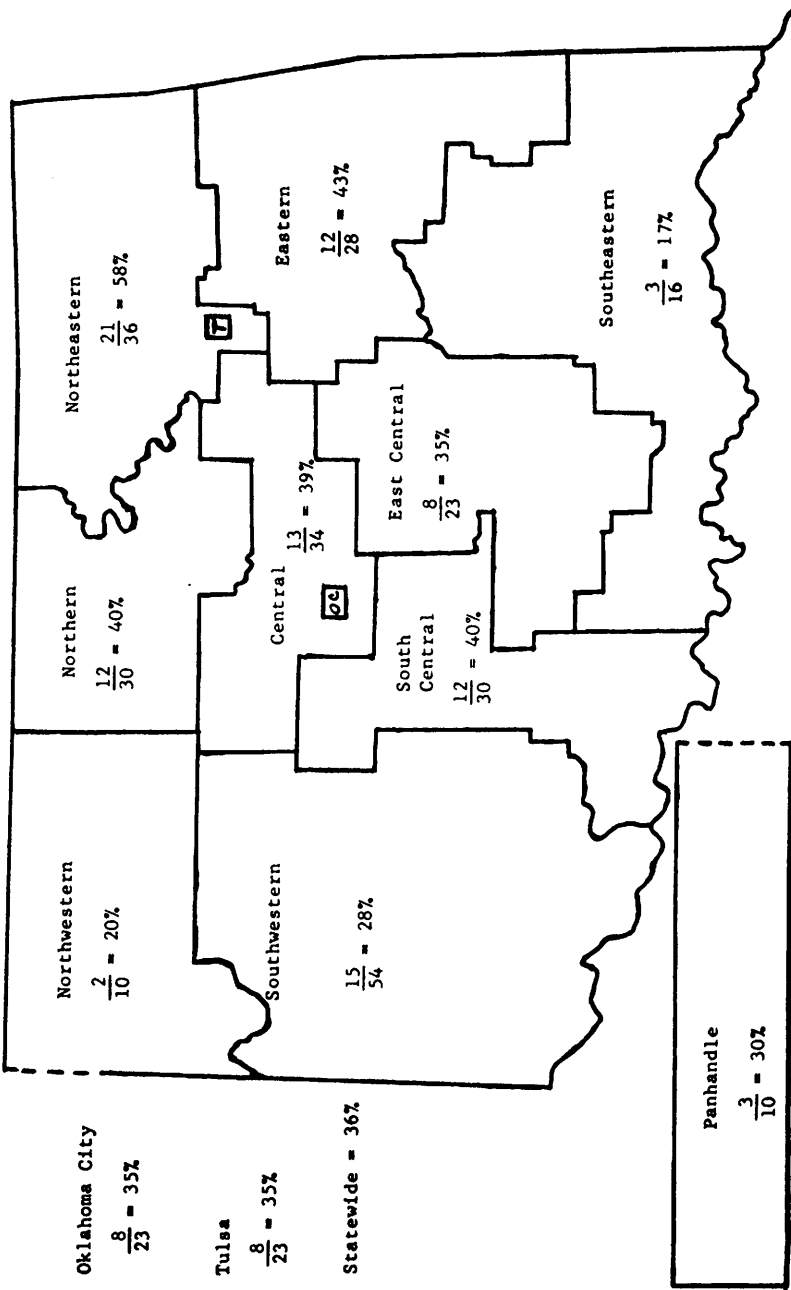


Fig. 1. The ratios of teachers considering leaving to respondents, by OEA districts.

Four peripheral and predominantly agrarian districts (each with over 70% not considering leaving) can be grouped for comparison of selected characteristics with the statewide totals. Individuals considering leaving from these districts are on the average slightly younger than the group average. Their training was equally recent and extensive. They fared more poorly in number receiving salaries above state scale and in probable opportunities to moonlight. A few more of them were leaving smaller-sized schools.

Disproportionately higher frequencies occur with individuals holding only a bachelor's degree attained before 1949, teaching in the very small schools and in the under-27 or over-55 age groups. Correspondingly, lower frequencies were reported from females, those receiving degrees since 1957, and those not currently seeking a higher degree.

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#### II. TEACHER TURNOVER AS REFLECTED IN PRELIMINARY PERSONNEL REPORTS

*Introduction*—In Part I, attention was called to a potential exodus of science teachers from the state as a consequence of political developments.

This part seeks to appraise the personnel distribution after schools opened in September 1965.

*Data source*—Were public records more accessible earlier in the year, this picture could be much better presented. As it is, only such primary data of an unofficial nature as could be collected from cooperative individuals were available. While the data are incomplete, their representativeness and limitations can be assessed sufficiently to warrant description of their validity and meaning. These sources have been used:

1. A revised (1964-65) mailing list of science teachers in Oklahoma public secondary schools.
2. A new list (property of OSTA) based on replies from school principals in September 1965.
3. A private communication from the OEA Research Director.
4. Requests cross-checked for withdrawal of deposits from OTRS.

Despite the insufficiencies of these sources, this report could be considered preliminary to a more exhaustive study based on more complete records of the official state agency.

*Analysis*—Basically, analysis is simply a process of cross-checking lists and counting numbers. Interpretation, with regard to limitations of the data, follows construction of tables.

The primary factor for subgroup comparison chosen was a sociological classification of communities modified to allow for school organization patterns:

**Metropolitan**—the school districts of Oklahoma City and Tulsa.

**Metro-suburban**—the several school districts in the area surrounding those two cities.

**Urban**—a group of 12 cities in the 20,000+ population class, including most cities with extensive industrial development and the seats of the two state universities.

Secondary trade centers—a group of 29 cities and towns in the 5,000-20,000 population class (1960 census).

Rural—the scattered smaller towns and communities.

The analysis has also separated the independently administered and/or housed junior high schools from the senior high schools.

Table II shows the gross characteristics of the sample.

TABLE II. GROSS SAMPLE CHARACTERISTICS

A. Senior High Schools

Grouping	Number of Schools	Number North Central	Total Teachers	Science Teachers
Metropolitan	21	20	1286	129
Metro-suburban	15	12	443	47
Urban	16	14	888	84
Secondary trade centers	29	26	835	89
Sub-total	81	72	3452	349
Rural	225	62	3241	535

B. Junior High Schools

Metropolitan	23	—	677	75
Metro-suburban	10	—	265	47
Urban	15	—	516	270
Secondary trade centers	15	—	270	35
Sub-total	63		1728	427
Rural (included with Senior High Schools)*				
Total (A&B)	144	72	5180	776
Total (A,B&R)	369	134	8421	1311

\*School districts in this rural category are usually too small to organize and administer separate junior high units.

Another way of expressing results would be the ratio of teachers who *did not* return to those who *did*. This factor averages 0.63 for the nonrural senior high school groupings, 0.56 for the nonrural junior high school groupings and 1.13 for the *rural* grouping.

It is known that 155 schools with 1504 teachers (all subjects) did not furnish the requested information. All but 12 were in the *rural* grouping. When factors calculated from the responses are used, this is estimated to include 230 teachers of science omitted from tabulation with an estimate of 20 in nonrural schools.

The contention is hard to deny that 50% of last years' science teachers returned to the same classroom this year. Nor can it be denied that proportionately more of these teachers in the urban and metropolitan systems returned.

Data on turnover rates of science teachers do not seem to exist, making it impossible to compare this range of 40-65% with other years. However, it may be considered, if not proven, that the rate is excessive and damaging to the stability and progress of an educational system. Nor is

Table III presents the essential data from cross-checking the two lists.

TABLE III. COMPARISON OF MAILING LISTS 1964-65 AND 1965-66

Grouping	Number of Names		1964-65 only	Ratio: Both Years Total 1965-66
	1964-65 1965-66	1965-66 only		
<b>A. Senior High Schools</b>				
Metropolitan	69	58	64	0.53
Metro-suburban	17	25	16	0.35
Urban	55	30	20	0.66
Secondary trade centers	49	36	20	0.55
Sub-total	190	149	120	avg 0.52
Rural	222	320	250	0.41
<b>B. Junior High Schools</b>				
Metropolitan	43	32	32	0.58
Metro-suburban	8	28	14	0.23
Urban	31	27	13	0.47
Secondary trade centers	13	19	5	0.37
Sub-total	95	106	64	avg 0.41
Rural (included with Senior High Schools)				
Total (A&B)	285	255	184	0.54
Total (A, B&R)	507	575	434	0.48

there existent any scale to gauge the effect on quality of personnel. There is good reason to question whether the replacements for the departees would have been secured at comparable competence and/or experience in Oklahoma's noncommanding position in the competitive market.

While the significance of the comparison is obscure, a check of a sample of 213 administrator positions shows a turnover rate of 29% for principals and 21% for superintendents.

Re-examination of the respondents of the earlier questionnaire located 215 (of 331). Results are given in Table IV.

TABLE IV. WHEREABOUTS OF RESPONDENTS OF PREVIOUS STUDY

Previous Group	Not Considering		Considering	
	Same School	Not in Same School	Same School	Not in Same School
1965-66				
Metropolitan	18	4	5	5
Metro-suburban	7	5	1	4
Urban	32	7	4	9
Secondary trade center	14	3	7	4
Subtotal	71	19	17	22
Rural	39	10	19	18

Approximately half of the individuals who felt disturbed enough in January to contemplate leaving Oklahoma actually returned to their respective schools. Yet almost 20% of the total subsample acted according to prediction of those emotions. Probably more foreboding is the almost equal number who were not then considering leaving the state yet did not return. The sum total of the two sub-samples indicates part of the price the state is paying for the agitation provoked by the handling of the educational issues.

Job hopping within the state undoubtedly occurred, in line with the custom of moving from school to school and from classroom to administration. Actual data on true out-of-state migration is difficult to obtain and organize.

Three efforts were made:

1. A follow-up short questionnaire addressed to 225 names on only the 1964-65 mailing list; mailed first-class to last year's address.
2. Extraction of science teachers from the study of out-migration of all teachers made by OEA Director of Research, Clark E. White, and
3. Cross-checking of lists of withdrawal requests of the OTRS.

Teachers leaving the state or the profession may withdraw their deposits from OTRS after October 1. On the first two monthly lists only 21 names could be identified. No effort was made to follow up on these individuals.

The OEA survey found 594 teachers reported by their last year's 479 schools to have taken teaching positions in other states. Of these, 66 were science teachers. Further scrutiny showed 37 of them in the rural grouping of this present study.

Eighteen respondents in the first probe threw little light on the problem. Eight protested the inaccuracies of the mailing lists although one was an elementary teacher and four were not teaching science this year. One man retired after more than 40 years of teaching and commented that his combined retirement and social security allowances (including his wife's) now exceeded last year's take-home earnings.

Two individuals had moved to other schools in Oklahoma, reporting greater job satisfaction and \$500 salary increase. Three had actually moved out of state (but none to California) to other teaching posts at \$1000 to \$2000 increase. Two of these were in elementary schools. The third was happy to abandon the grand-slam assignment in favor of four classes of chemistry and one of physics. One man took time out for an AYI. But the most pronounced case of self-betterment was the case of the teacher who took a Job Corps position in his home town at a \$2500 increase.

As an interesting instance of "doubling in brass" that can be expected in very small schools, the 1965-66 mailing list shows about 61 principals and 17 superintendents teaching some class, or classes, of science in the group of 225 rural schools.

In Part I (this paper) a geographical division of the people "considering leaving" was based on groupings of OEA districts. The grouping of Panhandle-Northwest-Southeast-Southwest districts showed data forecasting a substantially lower turnover in those predominantly rural areas. Comparing the same grouping with other non-metropolitan districts, the 1964-65 teachers who returned to the same schools in September 1965 were almost identical at 44-45% for all three clusters, significantly lower than the 55% figure of the two metropolitan systems.

## CONCLUSIONS

A very sizeable turnover of science teachers between 1964-65 and 1965-66 school years developed, 35-60% for different types of communities and significantly larger than 29-21% for principals and superintendents. Quasi-sociological characteristics of the communities appear to be the most significant differentiating factor. The analysis is based on privately accumulated data, admittedly incomplete but extensive enough to support the conclusions that turnover was great enough to cause adverse effects on science instruction in schools. Examination of existent public records, more complete and extensive, would yield a more definitive picture. However, this present study uncovers the need for further examination of quality factors associated with science instruction to see whether such is as effective as generally assumed. Part of the price that Oklahoma is now paying for its recent political wranglings consists of low qualifications of replacement personnel and of accentuation of improvisation practices for which the schools have been so often criticized. Since science is involved in public understanding and in the continued supply of future scientists, it would seem that resident scientists and industrialists dependent on the applications of science would be much more concerned with the situation.

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