

THE SCHOOL SURVEY: FINDING STANDARDS OF CURRENT PRACTICE WITH WHICH TO MEASURE ONE'S OWN SCHOOLS

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The superintendent of schools in a certain city found that his schools were unable to attract the quality of teachers that he wished to employ. He found also that the city was unable to hold many of its best teachers. They were continually resigning and going to cities that placed a higher valuation upon their services. He was continually being compelled to accept inferior teachers, to expend an undue proportion of time in getting them into shape for efficient work, only to find that a large portion of those that became efficient moved on to other cities, leaving the poorer quality of teachers for his service. The harder he worked to bring his teachers up to high standards of teaching ability, the sooner were they ready to leave him, and the sooner had he to begin the work over again with another batch of inferior material. The city could not hope to have effective teaching so long as this was the situation.

He asked the board to raise the general schedule of salaries. They replied that they raised many teachers' salaries every year; that they seemed to be always raising teachers' salaries. If they were unable to hold the teachers, this was simply due to the migratory nature of the teaching profession. In the nature of the case, teachers move about from city to city, and it is looked upon as being best for all concerned. In their opinions teachers' salaries were as high in their city as in other cities of their class. Moreover here was teacher A in their city receiving a full two hundred dollars more than teacher B over in their neighbor city

¹ The writer is indebted to Mr. E. G. Walker and Mr. E. C. Stopher for most of the computations, and to Mr. Harry Fultz for the graphical representation.

with whom one of them was acquainted; so if anything they were paying higher salaries than their neighbors.

Now most school board members are honest, well-meaning men; but, like the rest of us, they find it impossible to think clearly and to judge rightly on any question without a proper supply of the facts that bear upon the situation in hand. Like everybody else, they cannot think until they have the raw materials of thought. Now it is the business of the superintendent to supply the board in generous measure with these raw materials of thought. He must supply something more than his mere opinions, however; it must be an array of incontestible objective evidence. Moreover, it must not be presented in crude undigested form. It must be so assembled and organized that the meaning lies clearly upon the surface. So variable are the educational conditions concerned in the discussion of any problem that it is usually necessary to have a rather large quantity of facts; yet the whole must be so presented that the full significance of all of it, and of every part of it, can be taken in at a glance, and used as the basis of thought, discussion, and ultimate judgment.

The purpose of this article is to show the kind of facts that a superintendent situated as the one mentioned above should gather, and ways in which he might organize them in order to show the board the relative position of their city.

For this purpose the superintendent needs facts from many cities of the class to which his city belongs. Since conditions in different states vary, and teachers easily travel across state lines, the examples should be drawn from many states. The group of states must not be too dissimilar, however, in educational conditions. A superintendent in a northern city in the Middle West, for example, would best not include the states of the South. He possibly should not include cities west of the Rockies, owing to the greatly different economic conditions in those regions. For his purposes cities in the northern states east of the Rockies would constitute a reasonably homogeneous group.

In doing the work, one must at every stage keep in mind all the *purposes*. One of the purposes is always the finding of norms of current practice, applicable to his city for the immediate purposes

of administration. Since educational standards in the South are of a different type from those of the North, salary conditions there also are of a different type, and salary practice in that region cannot be employed for finding the standards of practice for the northern states. In setting up norms of salary practice, the superintendent must consider only cities in that part of the country where the general educational standards are of relatively the same level with those of his own city.

Salary facts ready for the superintendent's use are presented in the recent National Education Association bulletin published by the United States Commissioner of Education entitled *The Tangible Rewards of Teaching*. This presents the salaries of all teachers in most cities of the country of 5,000 population and over. The facts are classified by cities, in each case giving the number of teachers receiving each grade of salary. It is an array of crude data classified only for the convenience of publication. It is not digested and organized for the superintendent's use. One cannot get from the bulletin norms of practice on the basis of which to judge one's city. The averages as given include cities in all parts of the country, and are not, therefore, applicable to any part of the country. The bulletin does, however, provide the city superintendent with an invaluable mass of hitherto inaccessible data. He must, however, organize the portion of it that can be of service for his particular school system into the finished product that can be used as an instrument of thought and judgment. Our purpose here is to show how to organize such data. We shall assume that each superintendent has a copy of the bulletin, and shall not therefore reproduce here any of the crude data.

Let us suppose that it is the superintendent of the city of Reading, Pennsylvania, who is making the study, and that his purpose is to convince his school board that the salaries paid in his city are below standards of ordinary current practice; that they are below what responsible men in most cities consider a proper level. School board members do not like to see their city lagging behind the usual practice of cities of their class. What such board members usually need is information. The finished statistical product giving this information, which the superintendent might

well prepare from the National Education Association report, is shown in the following tables and charts.

TABLE I

MEAN SALARIES OF ELEMENTARY SCHOOL TEACHERS IN 34 CITIES HAVING A POPULATION OF 50,000 TO 100,000

	City	Median Salary	Upper Quartile	Lower Quartile	Quartile Range	Relative Range
1	Hoboken, N.J.	\$1,104	\$1,200	\$792	\$408	37 per cent
2	Bayonne, N.J.	910	950	720	230	25
3	Youngstown, Ohio ...	800	900	700	200	25
4	Des Moines, Iowa	800	850	700	150	19
5	Springfield, Ill.	800	800	650	150	19
6	Fort Wayne, Ind.	776	800	720	80	10
7	Duluth, Minn.	750	800	650	150	20
8	Springfield, Mass.	750	800	725	75	10
9	Somerville, Mass.	750	750	750	0	0
10	New Bedford, Mass. ...	750	750	700	50	7
11	Lawrence, Mass.	750	750	750	0	0
12	Evansville, Ind.	750	750	600	150	20
13	Passaic, N.J.	750	850	700	150	20
14	Lynn, Mass.	700	700	700	0	0
15	Holyoke, Mass.	700	700	700	0	0
16	Canton, Ohio.	700	750	425	325	46
17	Utica, N.Y.	700	700	675	25	4
18	Waterbury, Conn.	700	800	600	200	29
19	Kansas City, Kan.	684	793	540	253	37
20	Pawtucket, R.I.	684	722	532	200	29
21	Terre Haute, Ind.	680	680	660	20	3
22	Trenton, N.J.	680	840	520	320	47
23	Wichita, Kan.	675	675	585	90	13
24	Elizabeth, N.J.	675	750	595	245	36
25	East St. Louis, Ill.	650	700	550	150	23
26	St. Joseph, Mo.	607	720	513	207	34
27	Schenectady, N.Y.	600	675	500	175	29
28	Saginaw, Mich.	600	600	450	150	25
29	Wilkes-Barre, Pa.	600	700	550	150	25
30	Harrisburg, Pa.	570	641	499	142	25
31	Manchester, N.H.	550	650	450	200	36
32	South Bend, Ind.	540	702	414	288	53
33	Altoona, Pa.	540	585	495	90	17
34	Reading, Pa.	510	550	510	40	8

By reference to Table I and Chart I it is particularly easy for the school board in Reading to see at a glance the relative levels of salaries paid in each of the several cities, and to see the exceptionally low position of their city.

The quarter of cities doing the best by their teachers are paying mean annual salaries of more than \$750. The quarter of cities doing second best by their teachers are paying median salaries ranging from \$700 to \$750. The quarter of cities that stands

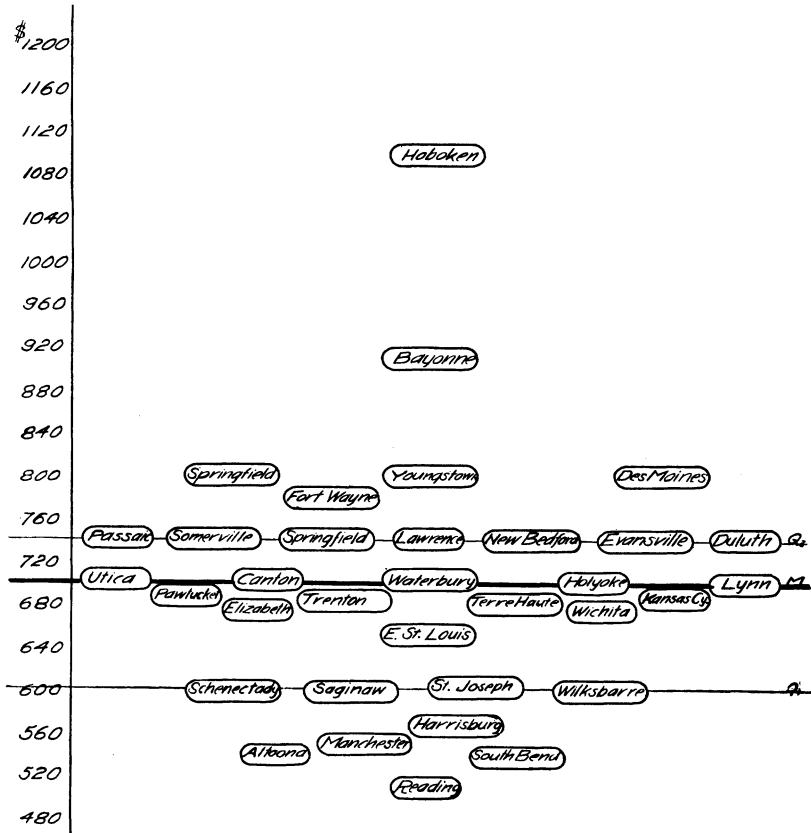


CHART I.—Showing the relative position of 34 cities of 50,000 to 100,000 population in the matter of mean annual salary paid elementary teachers. Data from U.S. Bureau of Education bulletin, *The Tangible Rewards of Teaching*, 1914.

third from the top are each paying a mean annual salary somewhere between \$600 and \$700. The quarter of cities paying the lowest salaries are paying less than \$600. Of these the city of Reading stands at the very bottom. The school board does not exist that is not convinced by such an array of facts. They can be made to

see clearly the exceptional nature of their judgment as to what constitutes a proper salary schedule. They may plead excuse; but they cannot deny.

What should be taken as the standard of practice for cities of this class? The general standard of practice may very well be represented by the median, the measure of the city which stands in the middle of the list—the city which has an equal number of cities above it and an equal number below it. There being an even number of cities in our list, there is no single middle city, but rather two middle cities, Waterbury and Utica, each with an average salary schedule of \$700. Seven hundred dollars may be taken as a measure of the general average practice of this entire group of cities. With this measure one can see at a glance whether his city stands in the more progressive half of cities or in the less progressive; whether near the general average of practice, or whether far removed from it above or below.

If one should like to use the progressive half of the cities as the basis for finding a standard of current practice, then he might take the median of the upper half of the cities. This is called the quartile, since it is the measure of that city which stands one quarter of the distance from the top. Taking only the highest half of the cities, the quartile is the measure of that city that stands at the middle of that half, with an equal number above and below it in that particular half. In this case the ninth city from the top, Somerville, Massachusetts, is at the middle of the upper half. The average salary paid in Somerville is \$750. This we may regard as a standard of current practice in the most progressive half of the cities. It is represented in the chart by the upper horizontal line, and marked Q_3 . It is called the third quartile.

If, however, a city finds itself very low in the scale, as for example Manchester, and wishes to employ for its immediate purposes a standard of current practice derived from that half of the cities that are most backward in their salary schedules, then one should take the lower quartile, which is the measure of the city that stands just at the middle of the lowest half. In this case it is St. Joseph, Missouri, with an average salary schedule of \$607. This lower quartile is shown by the lower horizontal line, and is marked Q_1 . It is called the first quartile.

If the superintendents of Reading, Altoona, South Bend, Manchester, Harrisburg, Wilkes-Barre, Saginaw, etc., should have such a chart as this, put up in neat, attractive form, hung on the wall in the school board rooms, so that, meeting after meeting, their incontestible relative situation is permitted to sink deeper and deeper into the board's consciousness, then—the human mind is so made—they might in time be impelled toward an effort at least to lift their city into the class a quarter next higher. It may well be an aid in developing a proper feeling of discontent with the inferior relative position of their city.

Likewise if the superintendents of East St. Louis, Elizabeth, Wichita, Trenton, Terre Haute, Kansas City, Kansas, etc., will prepare such a chart in attractive, effective form and hang it on the walls of their board rooms, their boards may also be impelled in time to exert themselves and get their city over the dead line of mediocrity represented by the median. They may well be impelled to get out of an inferior class into a class that is above the average, since they are so very near the line of crossing anyway.

As cities of the lowest quarter climb into the second quarter, and the cities of the second quarter climb above the line of mediocrity into the third quarter, the standards themselves will be carried upward, since they are determined by current practice. Some that are now in the third quarter may thus be passed and dropped down into the second. Thus the process may in time begin to stimulate some of them.

The superintendents in the cities of Hoboken, Bayonne, Youngstown, Des Moines, and Springfield, Illinois, will not need to use the data upon their school boards. It may be that the less their school boards know about their position on the scale of current practice the better it will be for the schools. These superintendents, however, need to draw up the same array of facts; but they will use them in another manner. They will, if their teachers are suffering from a proper measure of divine discontent, find them, as usual, dissatisfied with the salary situation in their cities, and clamoring for increases of pay. While the teachers' claims may be justified on the basis of certain kinds of facts, it will be a developer of patience and moderation in their demands to show them how high above current practice their city already

stands. The teachers can be convinced that if injustice is being done their profession on the side of remuneration, to them at least less injustice than usual is being done.

In a previous paragraph we referred to Table I and Chart I as being finished statistical products ready for the consumption of those for whom prepared. They are not quite complete, however. While showing the average position of each city upon the scale, they do not show the range of salaries over which the entire schedule is distributed. This range may be too narrow or too wide. If too narrow, injustice is being done the teachers, in that the poorer teachers are receiving altogether too nearly the same remuneration as the better teachers. Not enough reward for effort is given the better class of teachers; not enough stimulation to effort is given the poorer class of teachers. On the other hand the range of distribution may be entirely too wide. The city may be altogether too generous to a portion of the teachers who are particularly favored, and it may be altogether too parsimonious with another portion of the teaching body at the bottom of the schedule. Injustice may thus be done in just the reverse manner.

Now how can we compare the ranges of the salary schedules in different cities? The most convenient way and perhaps the best way is to take the quartile range for each city, and to compare these quartile ranges. By quartile range we mean the difference between the lower quartile and the upper quartile. We can illustrate the mode of calculation by taking the data of St. Joseph, Missouri. Salaries received in St. Joseph as shown by the bulletin are as follows:

12 teachers at	\$810
45 teachers at	765
18 teachers at	720
10 teachers at	693
19 teachers at	675
16 teachers at	657
15 teachers at	630
9 teachers at	603
7 teachers at	585
9 teachers at	567
11 teachers at	540
15 teachers at	513
29 teachers at	495
19 teachers at	450

The number of teachers in St. Joseph is 234. The teacher who stands one-quarter of the distance from the lower end of the scale is the 59th in the series. The salary of this teacher is \$513. This is the lower quartile for St. Joseph. The teacher who stands one-quarter of the distance from the highest salary paid is the 59th in the series from the top. The salary of this teacher is \$720. This is the upper quartile for St. Joseph. The quartile range therefore for the city is from \$513 to \$720—or \$293. This is the difference between the mean salary of the upper half of the teachers and mean salary of the lower half of the teachers.

The upper and lower quartiles and the median for each of the cities above considered are shown in columns 2 and 3 in Table I. The facts of columns 1, 2, 3, and 4 of Table I are all shown in graphic form in Chart II. This chart shows exactly the same facts as Chart I, but in addition it shows graphically the quartile range of salaries in each of the several cities. The cities are designated by numbers because of the exigencies of space. The numbers used are those which correspond to the names of the cities in Table I. (In general it is necessary to use numbers or an abbreviation to represent the name of the city in this form of chart in order to bring the whole within a reasonable space.)

Table I and Chart II show that the quartile range of teaching salaries in Holyoke is zero, and that in Hoboken it reaches the large sum of \$408. In Duluth the range seems to be about midway between the two extremes. It is clear that in Holyoke and in Hoboken the standards of current practice are not being followed. If the moderate range of the majority of cities represents the range that is most just and most stimulating to the teachers, then either the two cities referred to have an exceptional range in the qualifications and merits of the teaching body, or some injustice is being done one or another of the classes of their teachers. It is clear that Holyoke and Hoboken, as well as others similarly situated at the ends of the scale, should make an examination into the workings of their salary schedules to see whether adjustment may not be desirable.

Now it is a bit difficult to read directly from Table I or Chart II the standing as regards current practice of the majority of these

cities. Really, however, each city should be able to see its standing as to quartile range, as clearly as it can see its standing in the matter of average position as shown in Chart I. This can best

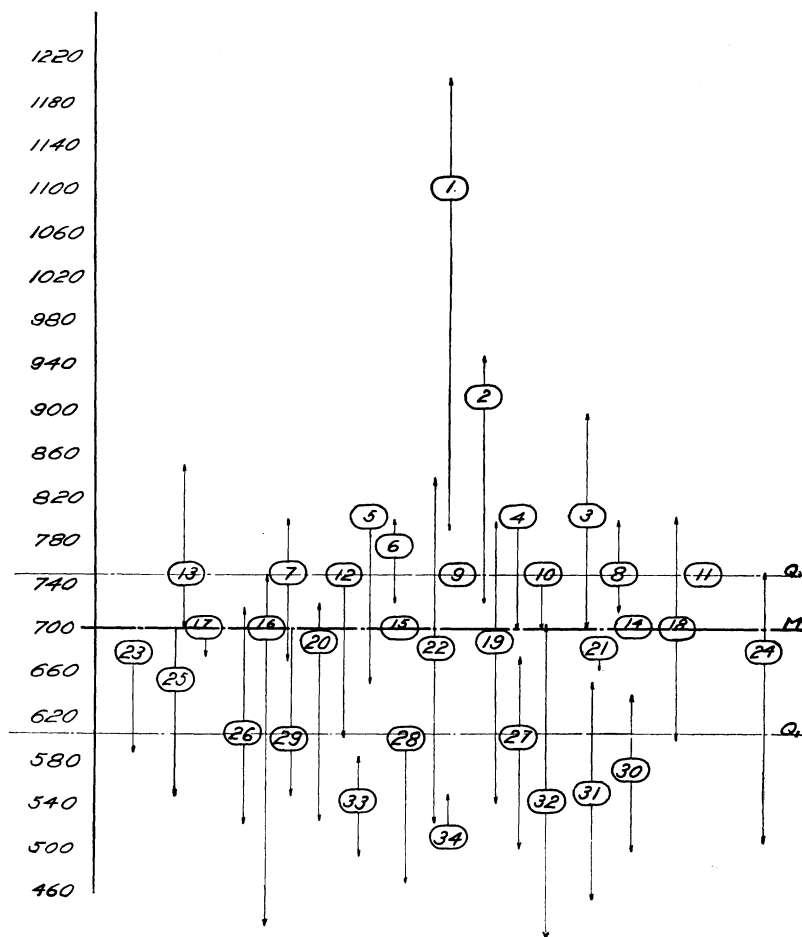


CHART II.—Showing the quartile range of elementary teachers' salaries for the 34 cities. Inclosed numbers refer to names of cities, Table I. The tips of the downward lines indicate the lower quartiles for the cities; the tips of the upward lines, the upper quartiles.

be shown by a chart built on exactly the same pattern as Chart I, using the data in the fourth column of figures in Table I, which

shows the quartile range. The quartile ranges in order of rank are shown in Table II, from which each chart might be made.

TABLE II
SHOWING ABSOLUTE QUARTILE RANGE FOR EACH OF THE 34 CITIES

Hoboken.....	\$408	Canton.....	\$325
Trenton.....	320	South Bend.....	288
Kansas City, Kan.....	253	Elizabeth.....	245
Bayonne.....	230	St. Joseph.....	207
Manchester..... \$200			
Pawtucket.....	\$200	Waterbury.....	\$200
Youngstown.....	200	Schenectady.....	175
Wilkes-Barre.....	150	Saginaw.....	150
East St. Louis.....	150		
Passaic.....	\$150	Evansville.....	\$150
Duluth.....	\$150	Springfield, Ill.....	\$150
Des Moines.....	150	Harrisburg.....	142
Altoona.....	90	Wichita.....	90
Fort Wayne.....	80		
Springfield, Mass..... \$75			
New Bedford.....	\$50	Reading.....	\$40
Utica.....	25	Terre Haute.....	20
Lynn.....	0	Somerville.....	0
Lawrence.....	0	Holyoke.....	0

Table II shows a median salary range to be \$150. The lower quartile of the salary ranges is \$75, and the upper quartile is \$200.

The "zone of safety" for range in salary schedules is perhaps represented by the zone between the two quartiles; that is to say, probably the salary range of a city should not be over \$200, nor under \$75. This means that such cities as Evansville, Duluth, Saginaw, Schenectady, Fort Wayne, etc., are playing safe when judged by the norms of current practice. It means that in the cities of Hoboken, South Bend, Canton, Trenton, etc., the quartile salary range is entirely too wide, if the general current practice is correct. It means further that in the cities of Holyoke, Somerville, Lynn, Utica, etc., the quartile range of the salary schedule is entirely too narrow. It needs to be widened, so as to do proper justice to meritorious teachers and properly to penalize those who are not sufficiently exerting themselves.

It is possible that the figures of Table II are sufficiently accurate for practical purposes. There is, however, an element of error that in doing very careful work should be taken into account and corrected.

It is altogether probable that in a city like Hoboken, where the general salary schedule is relatively high, the absolute quartile range should rightly be considerably wider than the corresponding quartile range of a city like Reading, where the general salary schedule is less than half as high. The figures therefore in Table II ought to be in some way related to the median level of practice in each city so as to take this difference into account. The simplest mode of procedure is to represent the quartile range of a city as a percentage of the median of that city. These percentages are shown in the last column of Table I. Their relative order is shown in Table III, and graphically in Chart III.

TABLE III

SHOWING THE RELATIVE QUARTILE RANGE OF ELEMENTARY TEACHERS' SALARIES
IN THE 34 CITIES

South Bend.....	\$53	Trenton.....	\$47
Canton.....	46	Kansas City, Kan.....	37
Hoboken.....	37	Elizabeth.....	36
Manchester.....	36	St. Joseph.....	34
Schenectady..... \$29			
Pawtucket.....	\$29	Waterbury.....	\$29
Harrisburg.....	25	Bayonne.....	25
Youngstown.....	25	Wilkes-Barre.....	25
Saginaw.....	25		
East St. Louis.....	\$23	Passaic.....	\$20
Evansville.....	\$20	Duluth.....	\$20
Springfield, Ill.....	19	Des Moines.....	19
Altoona.....	17	Wichita.....	13
Fort Wayne.....	10		
Springfield, Mass..... \$10			
Reading.....	\$8	New Bedford.....	\$7
Utica.....	4	Terre Haute.....	3
Lynn.....	0	Lawrence.....	0
Somerville.....	0	Holyoke.....	0

When the absolute quartile range is thus transformed into relative quartile range, the order of the cities is very considerably

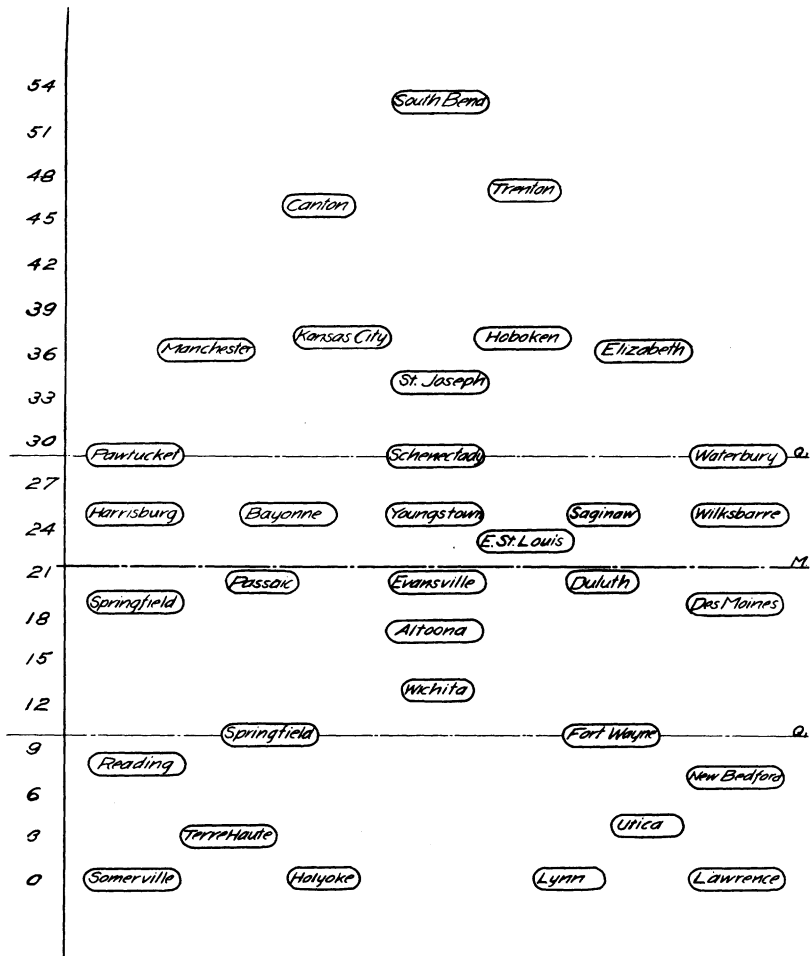


CHART III.—Shows graphically the relative quartile range of elementary teachers' salaries in the 34 cities.

changed. The cities within the "zone of safety" as judged by current practice are those in which the quartile ranges of salaries lie somewhere between 10 and 29 per cent of the medians. The

names of these cities are shown on Chart III lying between the lines that designate the lower and upper quartiles. The cities lying outside of these lines, whether above or below, clearly have something to explain to themselves. Exceptional conditions may justify them in their exceptional position. They should be fully informed of such exceptional conditions, however, before being satisfied with their positions.