

AN OUTLINE OF A HALF-YEAR COURSE FOR SEVENTH
GRADE MATHEMATICS BASED ON A STUDY
OF HOME BUDGETING

A THESIS

SUBMITTED TO THE DEPARTMENT OF
MATHEMATICS AND THE GRADUATE COUNCIL OF THE KANSAS STATE
TEACHERS COLLEGE OF EMPORIA IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE

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CHAPTER I

INTRODUCTION

1. Purpose of the Study

This study was planned to meet the need for a new plan of presentation in the mathematics of the junior high school, recognizing the curriculum problem created by its transition function and purposing to afford mathematical experience for the child within his own immediate surroundings. The theory¹ has been advanced that in this period of self-finding the pupil will be best served if his activities are directed from the familiar elements of his own small social unit, gradually outward to a broader horizon. Consequently this course will seek to enlarge the mental area of the pupil by dealing directly with mathematics in home situations as discovered by the study. Also, at this period of education, a course so constructed will be expected, because of the directness of its application, to serve best its fundamental aim--citizenship efficiency.²

The unit of study here set forth is intended for a half year course (seventh grade) in junior high school mathematics and draws its associations from the home and its small community. However, this study is not intended to weaken the mathematical structure of these grades, nor yet to destroy the ends now being pursued. It is not a question of "mathematizing sociology" or "socializing mathematics" but rather one of attempting to achieve established ends by a direct practical route. It is intended that,

¹H. G. Lull, Secondary Education, 1932, p. 183.

²David Eugene Smith, "Mathematics in the Training for Citizenship," in The Third Yearbook of the National Council of Teachers of Mathematics, Selected Topics in the Teaching of Mathematics, 1928, p. 16.

through direct connection of mathematics with life in the home, the very pertinent relation of mathematics to everyday affairs will be accordingly vitalized. Too, no implication of transfer need be considered since the nature of the entire course will be completely direct.

The National Committee on Mathematical Requirements under the auspices of the Mathematical Association of America quotes a report of the Chicago Schools Principals Association concerning the aims of mathematics in grades seven to nine as follows:

"(1) To apply computational arithmetic to the most useful phases of business practice and social applications, (2) to study space forms and relationships arising in linear, surface, volume, and angular measurements, (3) to study and to represent quantitative data and relationships by means of simple graphs, (4) to express quantitative relationships in the language of the formula and the equation and to evaluate and solve the same, (5) to study positive literal numbers and the necessary forms and operations to evaluate simple formulas and to solve simple equations, and (6) to practice at times on the fundamentals of computation until a norm of proficiency is acquired."

The committee also proposes a study of the arithmetic of the home and familiarity with business applications during the junior high school period.

Bobbitt³ says, concerning mathematics in the curriculum:

"To see things with exactness one must, among other things, see them quantitatively.....This is shown by the simplest of matters of everyday life. Rightly to see one's income and expenditures one must see them in exact quantitative terms."

He criticizes the "looseness and inaccuracy" of community thinking and declares that "we wallow in a slough of economic and civic inefficiency because we cannot think accurately." He would transplant his curriculum from mathematics in the abstract to mathematics in the real life all about us.

²The National Committee on Mathematical Requirement, The Reorganization of Mathematics in Secondary Education, 1923, pp. 190-191.

³Franklin Bobbitt, How to Make a Curriculum, 1924, pp. 146 and 150.

Accordingly the problem herein set forth may be considered to have a dual purpose. First, it will aim, through the method of its content, to supply the general mathematical concepts essential to the early part of the junior high school period. There is no intention of disorganizing the general harmony of the work now being done in these years by any substitution that this study may offer. Second, in developing these mathematical understandings it is purposed that they shall involve, from their very nature, practical and real situations.

2. Related Studies

Since the present problem is an adaptation based chiefly on findings in the field of home budgeting, material has been drawn from various other studies for the purpose of comparison and contrast. Among the most recent and complete of these is Peixotto's⁴ investigation concerning standards of living among 96 families of university professors, associates, assistants, and instructors at the University of Southern California. The study was carried on by questionnaire and the results outlined comprehensively in a bound volume.

The report of The Committee on Costs of Medical Care,⁵ although more concentrated and probably less reliable in treatment, also affords valuable information relative to the American home. The committee has attempted to emphasize the status of public health service and expense today in relation to actual costs of sickness, which may or may not be a direct result of inadequate public health attention.

⁴Jessica B. Peixotto, Getting and Spending at the Professional Standard of Living, 1927, 307 pages.

⁵Final Report of the Committee on the Costs of Medical Care, Medical Care for the American People, 1932, 213 pages.

The Monthly Labor Review has made extensive, although less recent, contributions in the field in various studies appearing in issues from 1919 to 1922. Of these, the revision, a "Tentative Quantity and Cost Budget,"⁶ published in separate pamphlet, is most inclusive. In the study the department has attempted to ascertain, by studying a large number of families in Washington, D. C., and by investigating the actual needs of an average family, just what are the minimum essentials of food, clothing, housing, fuel, light and miscellanies (including recreation, amusement, entertainment, medical care, education, etc.) at which a worker's family may live on a level of "health and decency." For present purposes this report is hardly applicable since incomes and expenditures of the two periods, then and now, are without basis of comparison.

Ogburn⁷ discusses standards of living from the "subsistence level" at approximately \$1500 per year on through higher rates of income and standards of living. Andrews, however, points out the dangers in substituting "idealized budgets for fact budgets" or attempting to transfer budget facts from one community to another. More⁸ in her study attempts to select typical families among men in business, tradesmen, laborers, and others, and to describe just to what extent their standards of living are sufficiently high.

⁶Royal Meeker (ed.), Tentative Quantity and Cost Budget, U. S. Department of Labor, Bureau of Labor Statistics, 1919, 75 pages.

⁷W. F. Ogburn, "Standard of Living Factor in Wages," AMERICAN ECONOMIC REVIEW, March, 1923, page 118.

⁸Louise Boland More, Wage-Earner's Budgets, 1907, 280 pages.

The Ohio Agricultural Experiment Station has sponsored a number of investigations recently in connection with the incomes and expenses of Ohio farm families. In these investigations Brinton,⁹ Lively,¹⁰ McKay,¹¹ Moore,¹² and Wertz¹³ have attempted to discover the actual cash incomes and expenditures of farm families.

3. Subject Matter and Method of Procedure

The subject matter for this course has been established partly in accordance with the recommendations of Reeve,¹⁴ Buckingham,¹⁵ and Lull.¹⁶ Reeve advises keeping up a proper use of fundamental skills in the seventh grade by "giving such applications in the arithmetic of the home, of the store, of the bank, of thrift, and the like as the well educated citizen is likely to need." Buckingham names "making a living" as the "most pressing problem to which arithmetic may be applied" and states further that "this involves the whole question of getting a sufficient income, of spend-

⁹Grace Brinton, A Study of Certain Cash Expenditures of Ohio Farm Families, Bulletin 474, April, 1931, 51 pages.

¹⁰C. E. Lively, Family Living Expenditures on Ohio Farms, Bulletin 468, November, 1930, 36 pages.

¹¹Hughina McKay, Food Consumption of Farm Families, Bulletin 433, April, 1929, 34 pages.

¹²H. R. Moore, Taxation as Related to the Property and Income of Ohio Farmers, Bulletin 459, April, 1929, 75 pages.

¹³V. R. Wertz, Estimated Income from the Ohio Agricultural Industry, Bulletin 450, March, 1930, 57 pages.

¹⁴William David Reeve, "United States," The Fourth Yearbook of the National Council of Teachers of Mathematics, Significant Trends in the Teaching of Mathematics Throughout the World Since 1910, 1929, p. 166.

¹⁵B. R. Buckingham, "The Social Value of Arithmetic," in NATIONAL SOCIETY FOR THE STUDY OF EDUCATION, TWENTY-NINTH YEARBOOK, 1930, p. 40.

¹⁶H. G. Lull, op. cit., p. 204.

ing wisely within one's income, and of investing to provide for old age or disability." Lull believes that the applied mathematics of this period should emphasize "home budgeting efficiency." However, due to the fact that the study which follows cannot, within its limitations, offer a revised program for the entire three years of the junior high school, it has been necessary to build so as not to disturb the present program.

The material has been secured largely by means of a questionnaire issued to families with children attending Roosevelt High School, Kansas State Teachers College, Emporia, Kansas. The results of the questionnaire are tabulated completely in Table 1 of the second chapter. The questionnaire used is given in the appendix.

CHAPTER II

RESULTS OF QUESTIONNAIRE

The tables which follow present in a summarized form the results obtained from the questionnaire before mentioned. These results have been tabulated in groups, according to the column headings in Table 1, and averages calculated. Medians have not been employed because, for the purpose of the study, the average is more applicable and presumably offers greater reliability because of the small number of frequencies in each group.

Since the data secured was not, for the most part, based on actual accounts (To the question asking, "Are these figures based on actual accounts?" the majority answer was "partly"), average amounts have been given to the nearest dollar in all cases, and per cents to the nearest tenth.

Table 2 gives in condensed forms the data of Table 1 and makes possible comparisons with other studies in the field. Also, for purposes of application in Chapter III, it would seem advisable to consider the main problem under fewer heads.

Greer¹ treats household expenditures under the six general headings included in Table 2. In accordance with her plan (one most commonly used in budget making), the column entitled "Food" in Table 2 includes food and refrigeration costs from Table 1; "Clothing" includes only clothing expense; "Shelter" takes in rent for those not owning, and taxes, insurance, interest and payments on mortgage, and repairs for the owner (all

¹ Carlotta C. Greer, Foods and Homemaking, 1928, p. 198.

included under "Housing" in Table 1); "Savings" constitutes bonds, insurance, investment in real property, etc.; "Operating" refers to "Personal Supplies," "Housecleaning Supplies," "Lighting," "Heating and Cooking," "Telephone," and "Incidentals"; "Personal" or "Advancement" is composed of expenses for "Education" (fees, books, magazines and other reading material), "Profession" or "Vocation," "Recreation" including vacations and entertainment, "Church and Charity," "Gifts," and "Furnishings."

TABLE 1
 MEAN AMOUNTS SPENT FOR DETAILED ITEMS OF BUDGET
 BY FAMILIES WITH A GIVEN MEAN INCOME

Income	Mean	F	Food	Cloth- ing	Hous- ing	Light- ing	Heat. Cook.	Refrig- eration	Tel., Teleg.	Per- sonal	House Clean.	Fur- nish.	Recrea- tion	Maint. of Car	Edu- cation	Sav- ings	Church, Charity	Health	Exp. of Prof.	Gifts	Incid.	Total	Sur- plus	Defi- cit
			Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
600- 799	665	3	253 38.0	38 5.7	159 23.9	16 2.4	35 5.3	11 1.6	18 2.7	5 .8	8 1.2	18 2.8	9 1.3	54 8.1	17 2.5	5 .8	7 1.0	15 2.3		13 2.0	12 1.6	693 104.2		28 4.2
800- 999	923	5	336 36.4	58 6.3	203 22.0	24 2.6	43 4.6	16 1.7	21 2.3	9 1.0	13 1.4	24 2.6	20 2.1	56 6.1	28 3.0	9 1.0	8 .9	19 2.1		19 2.1	9 1.0	915 99.2	8 .8	
1000-1199	1057	8	356 33.5	71 6.6	200 18.9	22 2.1	43 4.1	21 2.0	19 1.8	15 1.4	11 1.1	22 2.1	28 2.7	43 4.1	35 3.3	61 5.8	14 1.3	33 3.1		33 3.1	14 1.4	1040 98.4	17 1.6	
1200-1399	1297	6	406 31.3	89 6.8	218 16.8	25 1.9	54 4.2	25 1.9	19 1.5	19 1.5	13 1.0	39 3.0	40 3.1	60 4.6	42 3.2	82 6.3	14 1.1	38 2.9	19 1.5	44 3.4	19 1.5	1265 97.5	32 2.5	
1400-1599	1601	11	442 29.3	133 8.7	218 14.4	28 1.8	67 4.4	33 2.1	23 1.5	19 1.2	17 1.1	42 2.8	54 3.6	77 5.1	44 2.9	117 7.8	30 2.0	51 3.4	17 1.1	39 2.6	30 2.0	1481 98.7	20 1.3	
1600-1799	1706	10	565 33.1	206 12.1	223 13.1	36 2.1	70 4.1	34 2.0	22 1.3	22 1.3	17 1.0	49 2.9	67 3.9	84 4.9	70 4.1	129 7.6	32 1.9	41 2.4	17 1.0	51 3.0	27 1.5	1762 103.3		56 3.3
1800-1999	1894	6	622 32.8	232 12.2	253 13.3	36 1.9	81 4.3	40 2.1	26 1.4	23 1.2	17 .9	45 2.4	70 3.7	78 4.1	57 3.0	147 7.8	30 1.6	53 2.8	15 .8	40 2.1	19 1.0	1884 99.5	10 .5	
2000-2199	2109	3	669 31.7	283 13.4	297 14.1	44 2.1	93 4.4	40 1.9	23 1.1	23 1.1	15 .7	51 2.4	74 3.5	80 3.8	68 3.2	173 8.2	32 1.5	65 3.1	23 1.1	42 2.0	10 .5	2105 99.8	4 .2	
2200-2399	2226	2	738 33.2	322 14.4	304 13.6	49 2.2	102 4.6	38 1.7	22 1.0	24 1.1	13 .6	56 2.5	73 3.3	91 4.1	67 3.0	174 7.8	27 1.2	46 2.1	38 1.7	22 1.0	18 .8	2224 99.9	2 .1	
2400-2599	2504	1	754 30.1	343 13.7	371 14.8	50 2.0	120 4.8	47 1.9	25 1.0	22 .9	10 .4	58 2.3	100 4.0	105 4.2	53 2.1	215 8.6	28 1.1	50 2.0	40 1.6	38 1.5	25 1.0	2454 98.0	50 2.0	
2600-2799	2721	1	768 28.2	417 15.3	370 13.6	57 2.1	109 4.0	49 1.8	30 1.1	27 1.0	8 .3	60 2.2	84 3.1	103 3.8	30 1.1	294 10.8	30 1.1	49 1.8	46 1.7	38 1.4	16 .6	2585 95.0	136 5.0	
2800-2999	2897	2	687 23.7	467 16.1	532 14.9	64 2.2	110 3.8	49 1.7	29 1.0	26 .9	12 .4	69 2.4	116 4.0	104 3.6	52 1.8	351 12.1	35 1.2	58 2.0	46 1.6	38 1.3	14 .5	2759 95.2	138 4.8	
3000-3199	3050	3	735 24.1	523 17.1	495 16.2	61 2.0	110 3.6	43 1.4	24 .8	21 .7	33 1.1	76 2.5	131 4.3	88 2.9	70 2.3	375 12.3	33 1.1	46 1.5	55 1.8	46 1.5	15 .5	2980 97.7	70 2.3	
Mean	1636		505 30.9	187 11.4	250 15.3	34 2.1	69 4.2	31 1.9	22 1.3	19 1.2	15 1.9	42 2.6	57 3.5	74 4.5	48 2.9	130 7.9	24 1.5	42 2.6	18 1.1	37 2.3	19 1.2	1623 99.2	13 .8	

The table is read thus: Families with yearly incomes between \$600 and \$799 have a mean annual income of \$665, are three in number, spend on an average \$253 (38% of their average income) per year for food, \$38 (5.7% of average income) for clothing, and so on from left to right across the table. The same families spend on an average \$693 (104.2% of average income) per year, leaving an average deficit of \$28 (4.2% of average income). Across the bottom: The average annual income of all families reporting is \$1636; the average yearly expense for food is \$505 (30.9% of average income); and so on.

TABLE 2

MEAN AMOUNTS SPENT FOR CONDENSED ITEMS OF BUDGET
BY FAMILIES WITH A GIVEN MEAN INCOME.

Income Range	F.	Average Income	Food	Clothing	Shelter	Savings	Operat.	Advance.	Total	Surplus	Deficit
			Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
			264	38	159	5	94	133	693		28
600- 799	3	665	39.6	5.7	23.9	.8	14.2	20.0	104.2		4.2
			352	58	203	9	119	174	915	8	
800- 999	5	923	38.1	6.3	22.0	1.0	12.9	18.9	99.2	.8	
			377	71	200	61	124	208	1040	17	
1000-1199	8	1057	35.5	6.6	18.9	5.8	11.9	19.7	98.4	1.6	
			431	89	218	82	149	296	1265	32	
1200-1399	6	1297	33.2	6.8	16.8	6.3	11.6	22.8	97.5	2.5	
			475	133	218	117	184	354	1481	20	
1400-1599	11	1501	31.4	8.7	14.4	7.8	12.0	23.5	98.7	1.3	
			599	206	233	129	184	411	1762		56
1600-1799	10	1706	35.1	12.1	13.1	7.6	11.3	28.1	103.3		3.3
			662	232	253	147	202	388	1884	10	
1800-1999	6	1894	34.9	12.2	13.3	7.8	10.7	21.5	99.5	.5	
			709	283	297	173	208	435	2105	4	
2000-2199	3	2109	33.8	13.4	14.1	8.2	9.9	20.6	99.8	.2	
			776	322	304	174	228	420	2244	2	
2200-2399	2	2226	34.9	14.4	13.6	7.8	10.3	18.9	99.9	.1	
			801	343	371	215	252	474	2454	50	
2400-2599	1	2504	32.0	13.7	14.8	8.6	10.1	18.8	98.0	2.0	
			817	417	370	294	247	440	2585	136	
2600-2799	2	2721	30.0	15.3	13.6	10.8	9.1	16.2	95.0	5.0	
			733	467	432	351	255	518	2759	138	
2800-2999	2	2897	25.4	16.1	14.9	12.1	8.8	17.9	95.2	4.7	
			778	523	495	375	264	545	2980	70	
3000-3199	3	3050	25.5	17.1	16.2	12.3	8.7	17.9	99.2	2.3	
			536	187	250	130	178	342	1623	13	
Mean		1636	32.8	11.4	15.3	7.9	11.9	21.0	99.2	.8	

The table is read thus: See directions for Table 1. This table is condensed for purposes of comparison.

CHAPTER III

THE MATHEMATICS OF HOME BUDGETING

In this chapter the six items of a budget are taken up separately. Discussion and a variety of exercise work is given with each item. It is not intended that the exercise lists will be sufficient for drill purposes in any case but they should afford typical examples of processes involved. The instructor may extend work on any group to such a degree as he sees fit for mastery on the part of the pupil. Special emphasis should be laid upon the ratio concept here and generally upon accuracy of fundamentals. Further practice on bill and receipt forms will very likely seem advisable. Accuracy of solution and clearness of form should be demanded always.

1. Food

In Table 3 is given a food budget as recorded by the U. S. Department of Labor for a level of "health and decency" in a family of five (2 adults and 3 children, ages 2, 5, and 11--the equivalent of 3.35 adults and the average American family). The exercises which follow involve data of a similar nature, except, of course with variations to fit the present cost relations.

Exercises

1. Make out a table similar to Table 3 for a food budget based on present prices. The instructor with the class may establish prices on the various items or the class as individuals may secure this data.

TABLE 3

FOOD BUDGET FOR A FAMILY OF FIVE¹

Item.	Unit of purchase.	Weekly quantity.	Weekly cost.
Beef and veal, fresh	Pound	4.35	\$ 1.64
Beef, salt	"	.38	.14
Pork, fresh	"	.74	.38
Port, salt, including smoked ham and bacon	"	1.03	.53
Mutton	"	.60	.22
Poultry	"	.52	.24
Other meat, including sausage, dried beef, etc.	"	.66	.25
Fish and other sea food	"	1.31	.39
Eggs	Dozen	1.31	.79
Milk, sweet, and buttermilk	Quart	8.86	1.35
Cream	Pint	.06	.02
Milk, condensed	Pound	1.25	.25
Cheese	"	.38	.19
Tea	"	.19	.15
Coffee and substitutes	"	.78	.41
Butter and oleomargarine	"	1.87	1.18
Lard and compounds	"	1.10	.44
Sugar	"	3.13	.34
Molasses, including sirup and honey	"	.68	.12
Flour	"	7.50	.60
Corn meal	"	1.23	.07
Bread	"	9.66	1.01
Rice	"	.85	.14
Cereals	"	2.21	.33
Fruits, fresh	"	7.71	.70
Fruits, dried and canned	"	.70	.18
Potatoes	Peck	.95	.71
Other vegetables, fresh and dried	Pound	10.89	.88
Other vegetables, canned	"	.84	.24
Other food	"	1.83	.66
Weekly total			\$14.55
Yearly total			\$755.93
Refrigeration			18.00
TOTAL			773.93

¹Royal Meeker (ed.), op. cit., p. 11.

Example of class project:

Item	Unit of purchase	Weekly quantity	Cost per unit quantity	Weekly cost.
Beef and veal	Pound	4.35	.15	.65
Beef, salt	"	.38	.18	.07
-----	---	----	----	----
-----	---	----	----	----

2. Using the results you obtained from Exercise 1, find the percentage of total food cost for the condensed items. Following is an example based on Table 3:

Item	Unit of purchase	Weekly quantity	Weekly cost	Ratio	%
Meat and fish	Pound	9.59	3.74	3.79	26.48
Eggs				14.55	
Milk and cream					
Tea and coffee					
Cheese					
Butter and other fats					
Bread, cereal and other grain products					
Sugar, molasses and syrup					
Vegetables and fruits					
Other food					
Ice					
				TOTAL	100%

3. Rounding off per cents to the nearest whole per cent in Exercise 2, list the relation of condensed items to total food cost, as below:

meat and fish-----26%
eggs----- etc.

4. One writer² on the relation of diet to health says that equal amounts should be spent for milk, meat, and vegetables and fruit. For which items are the above per cents too large? Too small?

²H. C. Sherman and Lucy Gillett, Adequacy and Economy of Some City Diets, New York Association for Improving Conditions of Poor, p. 18.

5. Using Exercise 1 as a basis find the cost of food necessary for a family of 8.

6. In Table 1, Chapter I, you will note that families with an average income of \$665 spend \$253 a year for food. Compare by ratio this amount with the amount recommended in Exercise 1. Make like comparisons of amounts for each of the other income groups. Which groups spend less than necessary for food? Which more?

7. The Agricultural Experiment Station³ of Wooster, Ohio, found that 48 farm families used foods in these proportions:

Meat, cheese, and eggs-----	29%
Milk and cream-----	14%
Fruit and vegetables-----	23%
Cereals-----	10%
Sugar and fats-----	17%
Miscellaneous-----	7%

Make a circle graph illustrating these expenditures.

8. In a similar study⁴ of 67 farm families the food expense for families with a cash income of \$800-\$1000 was \$197. Compare in per cent this amount with the income of the corresponding group in Table 1 which is \$336.

9. All of these families spent on an average of 10.8% for food. The Roosevelt High School families reporting spend 28.8% for food. Compare

³Hughina McKay, Food Consumption of Farm Families, Bulletin 433, April, 1929, p. 17.

⁴Royal Meeker, op. cit., p. 10.

the two by per cents. How do you account for the farm families using such a small per cent of their cash income for food?

10. Benjamin Andrews⁵ reports that farmers produce approximately $2/5$ of their own food. In that case what would be the actual average value of food used by the families in Exercise 8?

11. Make a bar graph showing the amounts spent for food by the 13 income groups in Table 1.

12. Make a bar graph showing the per cents of total incomes spent for food in these groups.

13. In what ways are the graphs in Exercises 11 and 12 alike in shape? How are they different?

14. It is estimated that the thrifty housewife can save 7% on food costs by careful and wise buying. If your work in Exercise 1 is based on regular store prices, find how much might be saved in one year by economical buying.

15. Loss⁶ of food through spoilage, waste in preparation, and waste in garbage, ranges as high as 20%, according to one writer. If only 10% were wasted from the budget in Exercise 1, find the amount of yearly loss through waste.

16. Most families prefer to pay for their groceries at the end of each month and thus it is wise they keep all of the bills that come with

⁴Royal Meeker, op. cit., p. 10.

⁵Benjamin R. Andrews, Economics of the Household, 1927, p. 279.

⁶Ibid., p. 279.

separate orders as a check on the monthly bill. Here is a typical bill form:

JONES GROCERY STORE				
1513 Kansas Ave.		Phone 2198		
To <u>Mrs. John Brown</u>		Date <u>Jan.9, 1933.</u>		
Address <u>2104 Missouri St.</u>		By _____		
City		Account Forward <u>10.49</u>		
No.	Items			
2	Bread @ .10		20	
1	Bu. of apples	1	25	
3	Lbs. steak @ .18		54	
1	Lb. coffee		32	
	Chg. TOTAL	12	80	

Suppose that on May 27 the William Smiths', an average Roosevelt High School family, had an amount forward on their grocery bill of \$37.59. On that date Mrs. Smith purchased the following items to last the rest of the month:

4 lbs. steak @ .16	2 loaves bread @ .10
2 lbs. bacon @ .18	1 peck potatoes @ .30
2 lbs. fresh pork @ .18	3 heads lettuce @ .08
1 doz. eggs @ .12	3 lbs. carrots @ .05
1 $\frac{1}{2}$ lbs. cheese @ .20	4 lbs. cabbage @ .08
1 lb. coffee @ .32	7 lbs. apples @ .06

Make out her bill.

17. On June 1 the Smiths' would have to pay the above bill and should request a receipt similar to the form below. They should file this receipt for future reference, in case the Jones Grocery should wish to see it or, more especially, as a check on their budget.

Emporia, Kans. <u>June 1, 1933</u>	
Received from <u>John Lowe</u>	<u>\$ 23.00</u>
<u>no</u>	
<u>Twenty-three and 100 -----dollars.</u>	
For <u>Labor</u>	
<u>W. H. Ford</u>	

Make out the receipt to be given by the grocery.

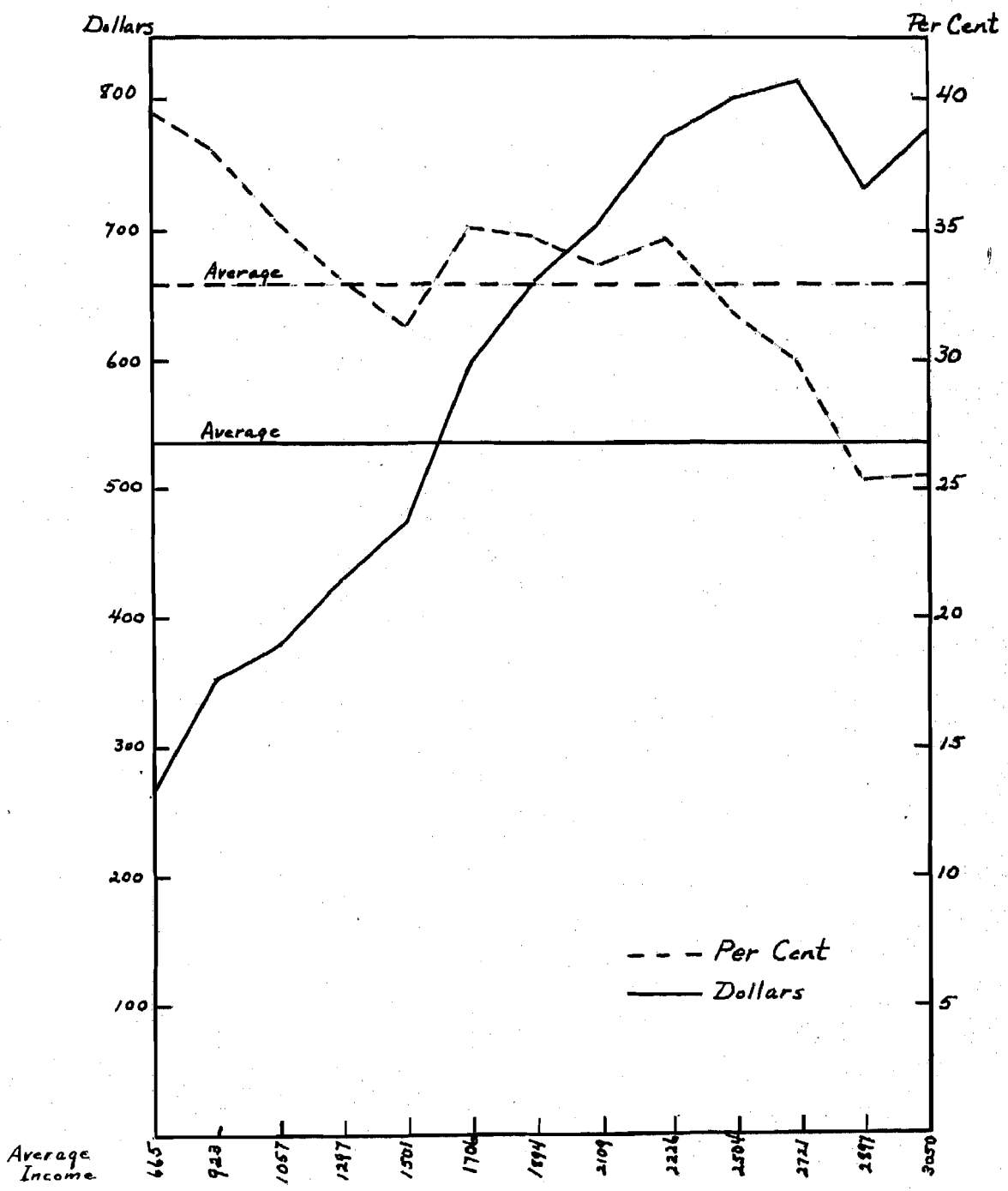
18. If Mr. Smith pays by check he should have his own check book. The check is also good evidence of payment for Mr. Smith, so it is always well that he keep his cancelled checks. The following is a common form:

FIRST NATIONAL BANK	
No. _____	Emporia, Kansas _____ 1933.
Pay to the order of _____	\$ _____
	_____ dollars.
For _____	_____

Make out the check that he would give the Jones Grocery.

19. According to Table 1 the average yearly income for Roosevelt High School families is approximately \$1636, or \$136.33 per month. Of this an average of 32.8% is spent for food. Show these items in the form of a simple cash book. Here is an example with other figures.

Date	Items	Receipts	Paid Out
Jan.1	Income	180.	
	Food		51.84
	Balance		<u>128.16</u>
		180	<u>180.00</u>



Graph Showing Amounts and Per Cents of Total Spent for Food

GRAPH I

2. Clothing

Since clothing expense is extremely variable, especially in times like the present (1933) when incomes have decreased enormously and people are forced to cut expenses to an extreme minimum, any survey of the item would be expected to indicate a drastically reduced account. Thus, it is found that families with an average income of \$665 report an expenditure of only \$38 per year for clothing. The amount, however, increases rapidly in succeeding income groups.

Exercises

1. Budget makers have placed the expenditure for clothing as high as 20% of total income. Compare by ratio this amount with the average reported for Roosevelt High School families, 11.4%. Do you think 20% too high? Is 11.4% too high or too low?

2. Find the amount set aside for clothing by a family with a yearly income of \$1650 if $12\frac{1}{2}\%$ is allowed. If $16\frac{2}{3}\%$ is allowed. What would be the per cent of income spent for clothing by this family if they used \$275?

3. Make out an itemized clothing account for your family, as nearly as you can, and see approximately what the cost is for a year's supply.

Items	No.	Price	Cost per year
For Father			
Hats-----	2	\$2.50	\$5.00
Suits-----			
Shirts-----			

Other items for Father (list separately as above on your account):

Underwear
 Pajamas
 Overcoat, raincoat, or topcoat
 Gloves
 Ties
 Handkerchiefs
 Suspenders, belts
 Overalls
 Other items

Items for Mother:

Hats
 Dresses
 Undergarments
 Shoes
 Stockings
 Gloves
 Handkerchiefs
 Other items

Items for Children:

(You may supply your own account here.)

Extra:

Cleaning and pressing
 Shoe repair
 Hired sewing, etc.

4. Make a circle graph showing the average amount spent for food, 30.9% according to Table 1, and the amount spent for clothing, 11.4%. What per cent of the average income is spent for all other items?

5. Compare by ratio the amount spent for clothing with the amount spent for food.

6. Lively⁷ has recently studied a large number of Ohio farm families and found that they spent (in 1928) only \$197 a year for clothing although their annual incomes average over \$3000. Remembering that clothing costs

⁷C. E. Lively, Family Living Expenditures on Ohio Farms, Ohio Agricultural Experiment Station, Wooster, Ohio, Nov., 1930, p. 12.

then were even higher than now, how do you account for the small amount? What per cent of total income was this?

7. Greer,⁸ an economics teacher, says that the average budget for clothing is approximately 15% of income. What amount would this be on an income of \$1500? \$2000? On the salary of your favorite movie actor? Of the president of the United States? Do you think the ratio would hold true for folks with extremely low or very high incomes?

8. In Exercise 3 you made out a clothing account for your family. What per cent of income does it represent? Do you think you have included too much, or too little?

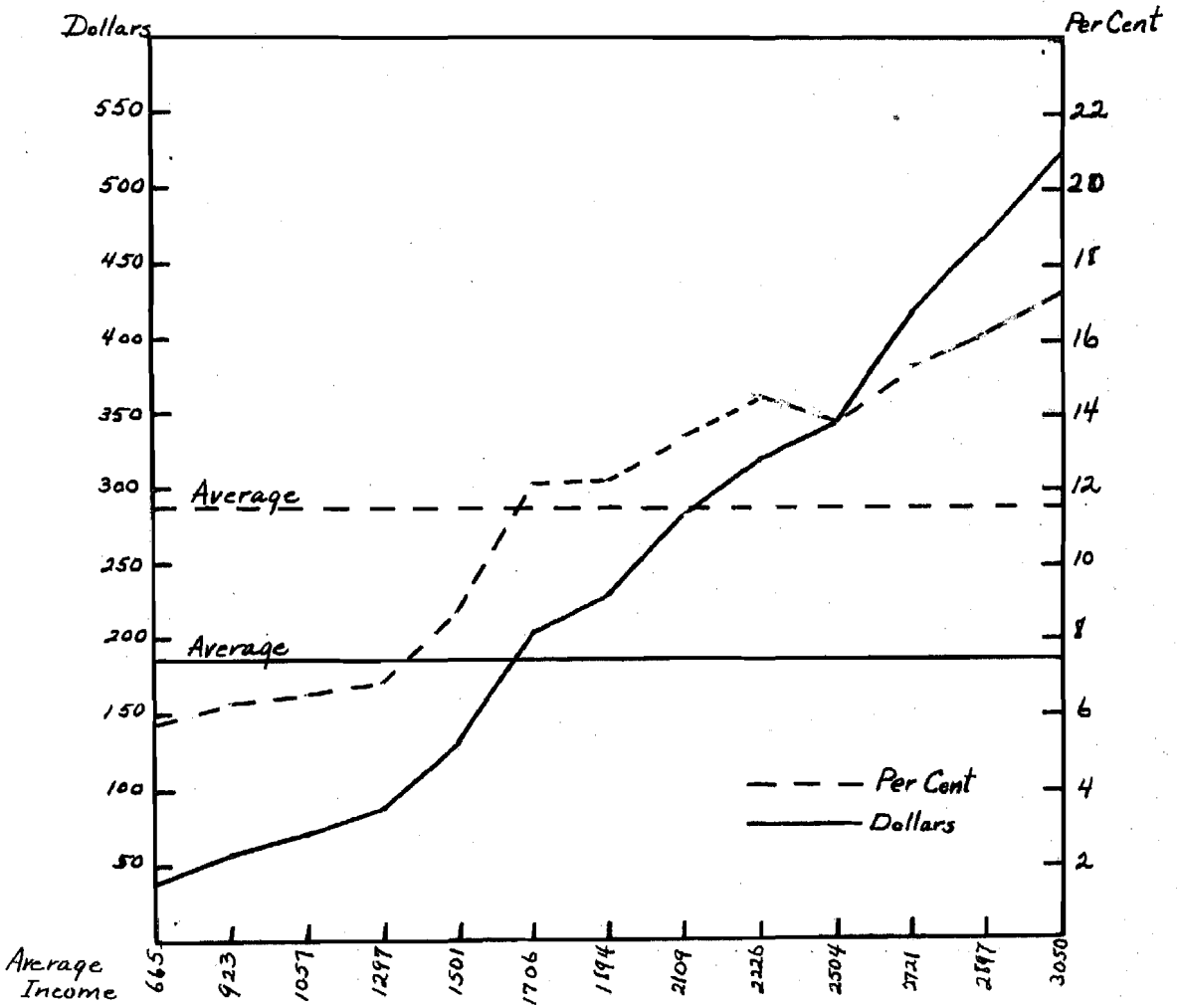
9. It is estimated that by careful buying one can save 8% on food and clothing purchases. How much might be saved on your account in Exercise 3 by economical purchasing?

10. Make out a bill similar to the form on page 16 which you might receive from your family clothing store, for these items: 1 house dress, \$2.15; 3 pairs of hose, \$0.70 each; 1 pair of low shoes, \$3.25; 2 dress shirts, \$1.45 each; 6 handkerchiefs, \$0.10 each.

11. Make a bar graph showing the amounts spent for clothing for each member of your family according to Exercise 3.

12. In Exercise 19 on "Foods" you started a simple cash book for the average Roosevelt High School family, listing receipts and amounts paid out. Now enter clothing expense, along with foods and find the monthly balance after food and clothing expenses are deducted.

⁸ Carlotta C. Greer, Foods and Home Making, 1928, p. 198.



Graph Showing Amounts and Per Cents of Total Spent for Clothing

GRAPH II

3. Shelter

Shelter for the home owner includes taxes, insurance, interests and payments on a mortgage, repairs, and general upkeep expense. Above all this is to be considered of course the investment made and the income it would yield if put on interest or into other type of property. For the renter, the chief item of expense is, of course, just rent--a certain amount every month; varying amounts through a period of years. When times are good and desirable locations scarce, rents go up correspondingly; likewise, if times are hard and the supply of available homes plentiful, rents decrease. From this angle it might seem that the renter has the advantage, since his payments do vary almost directly with the level of the times, while the owner contracts at a certain definite figure. However, the home is an investment and if the owner so desires he may take advantage of improved times and demands by turning his home at a profit.

Probably one of the biggest pitfalls in home buying is the new scheme of "pay like rent." Under this plan, which is similar in nature to any other installment buying arrangement, the buyer pays an initial down payment, (usually small) plus a financing charge which may be as high as 10% of the total purchase price, and then pays monthly amounts (like rent) over a period of years until the home is paid for. These monthly payments include interest on his debt. In the end the "pay like rent" home owner will have paid a high rate of interest on his investment besides having stood all expense of insurance, repairs, taxes, etc. Moreover, if he should happen to meet with financial reverses, the payments are liable to be more than he can raise. Experience during the past three years has

verified this statement in every field. Few people have made actual cash purchases for automobiles, furniture, electric refrigerators, or any such major items during recent times. A radio may be installed for a dollar down and a dollar a week; a new rug or a parlor suite, likewise.

The result of this type of selling is that some people buy more than they can afford. They buy more expensive homes, furnishings, automobiles, clothing, and all the rest, than their incomes will permit--just because the down payment looks small. In reality what they do pay includes an interest and handling charge amounting to from 15 to 50 per cent of actual cost for the item. The payment plan caught up with the American people more than two years ago. Many folks lost their jobs and began missing payments; as a result they had to return their property, mortgaged by payments, and lose all they had invested. Others, reduced in salary, found their installment payments more than equalling their incomes.

The whole trouble is an outgrowth of a weak budgeting scheme--or none at all. This type of consumer has failed utterly in putting his mathematics to work, and "high-pressure" salesmanship has done the rest. He has spent entirely out of proportion with his income. Instead of spending a fair amount of one year's salary for shelter, furnishings, automobiles, etc., he has inconsiderately spent a large amount out of two, three, four, or even ten years' wages. He has been a poor budget maker. The more thoughtful family will consider carefully, before buying a home or any item about the home, just what it will cost them and whether they can pay for it without overloading their budget.

However, in fairness to both sides of the question, it should be understood that installment buying does have its place in our present system of

trade. The system is a distinct privilege to those who buy wisely and do not abuse their credit. This type of purchaser will consider carefully just what he is paying for and what will be the rate of interest before he makes any deals. He will buy within his means, and profit by the method of buying.

Exercises

1. Shelter costs (for the owner) include taxes, insurance, payments and interest on mortgage, and repairs on the home. Taxes in Emporia are about 2.7% of property value per year. Find the amount of tax on a home valued at \$3000.

Find the cost of insurance on this home if the premium is \$4.50 per thousand.

Find the amount of interest on a mortgage against the home for \$1000 at 6% per annum.

If the owner pays \$50 a year for upkeep and repairs (papering, painting, etc.) and \$120 a year on his mortgage what will be his total expense for a year?

Item	Rate	Amount
Taxes	2.7%	-----
Insurance	\$4.50 per M	-----
Interest on mortgage	6%	-----
Payment on mortgage	---	-----
Repairs	---	-----
		Total

2. Paving tax might increase the expense in Exercise 1 by as much as 1%. How much would this cost on \$3000?

3. At what rate per month would a renter pay who spent the same amount for shelter as the owner in Exercise 1?

4. If the owner in Exercise 1 has an income of \$1600, what per cent is he paying for shelter? Is this too much? Could he afford to pay more?

5. Good business authorities advise that a family, in buying or building a home, should be able to pay 40% of the cost at the time. How much cash should a family have on hand to buy or build a \$10,000 home? A \$6,000 home? A \$3,000 home?

6. Amount⁹ of annual income is also very important in home owning. The family with an income of \$2500 per year probably should not pay over \$3750 for a home. Find the amount of the 40% down payment.

Find the amount of interest per year on the remainder at 6%.

Find the annual cost of insurance with rates according to Exercise 1; the amount of taxes.

Find the amount of the yearly payment on the mortgage if it was made out for a period of 10 years.

Allowing \$60 a year for repairs, find the total expense for a year on this priced home.

What per cent of total income would this be?

7. With a yearly income of \$1600, a family probably should not pay over \$2000 for a home. How much should they be able to pay in cash?

⁹"Cost of Building a Home," MAGAZINE OF WALL STREET, September 13, 1924. (Mimeographed form).

Answer the same questions as for Exercise 6. Allow only \$35 a year for repairs.

8. It is a general rule that the annual "carrying charges" on a home, which include all of the items mentioned in Exercise 6, will amount to about 10% of the cost. Find how much this would be for Exercises 6 and 7. Is 10% of cost enough?

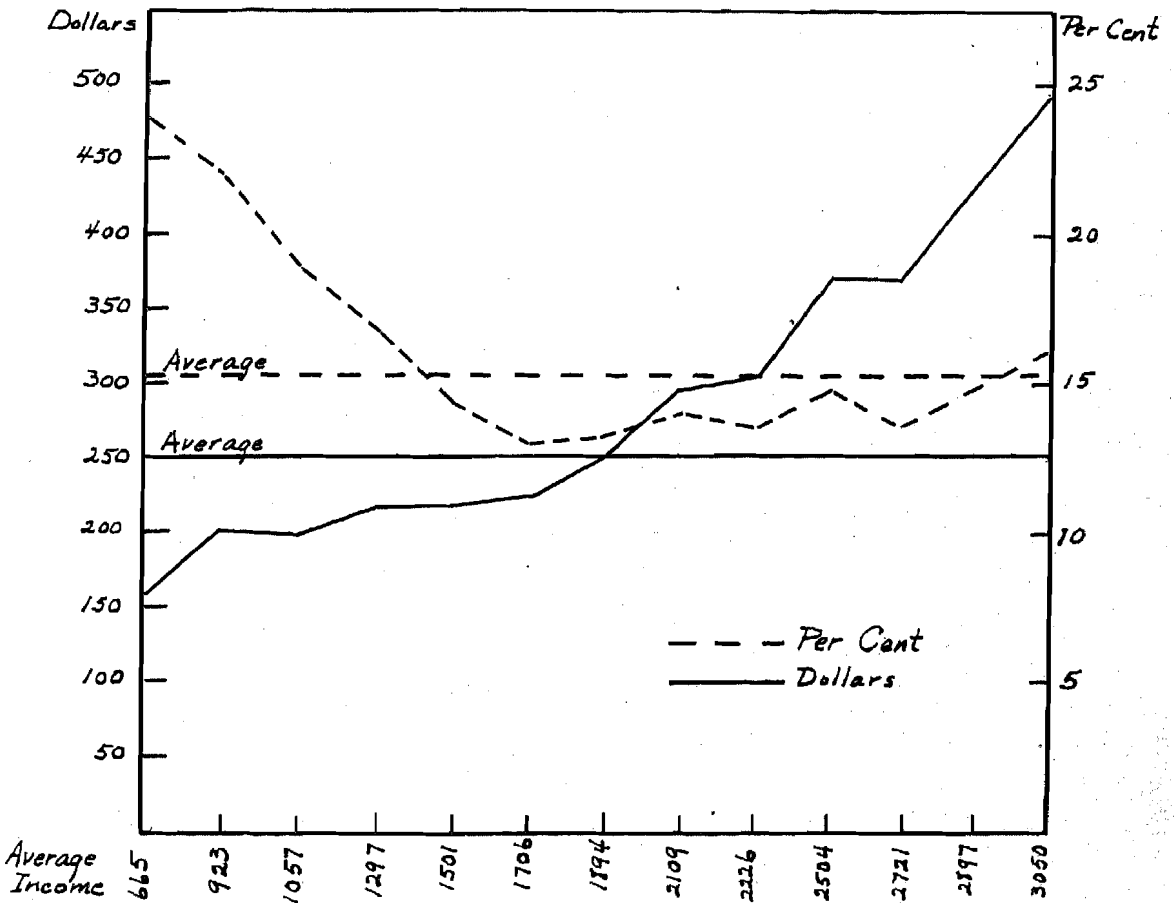
9. Remembering that the renter has no insurance, taxes (on a home), interest on a mortgage, or repairs to pay, find out the total cost of these items for Exercise 7.

10. At the present time, one can rent a good five or six-room home in Emporia for \$20 a month. Is this cheaper than owning?

11. If the owner of the home suggested in Exercise 10 has \$3000 invested, will he gain or lose? How much?

12. The average Roosevelt High School family has a yearly income of \$1636 and spends \$250 of this for shelter. If they spend this \$250 as "carrying charges" on a home (see Exercise 8) what priced home can they buy?

13. Using the simple cash book in which you entered monthly food and clothing expenses for the average Roosevelt High family, enter the monthly amount for shelter.



Graph Showing Amounts and Per Cents of Total Spent for Shelter

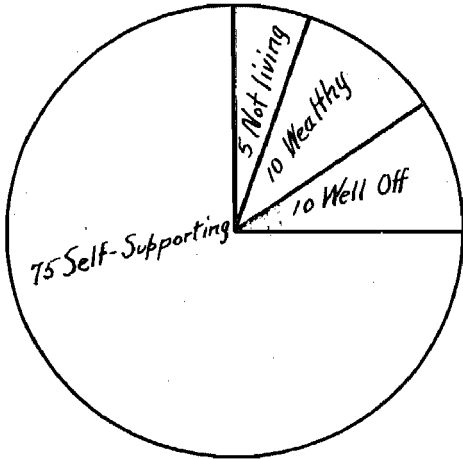
GRAPH III

4. Savings

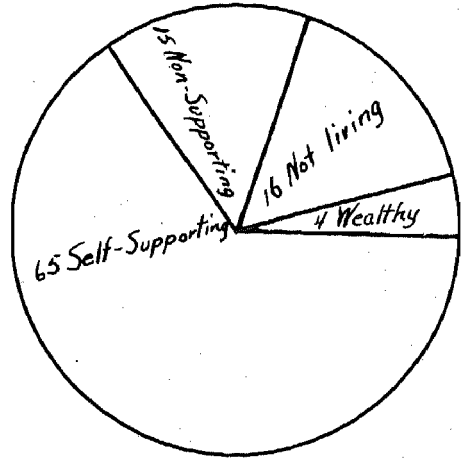
Of all the budget items, none is more important than savings; but seemingly it is one that people in general give very little attention. Everybody knows that he should save, and save a great deal. On the following page are some graphs which illustrate the fact very clearly. These figures show on the average what will have become of 100 men, 16 to 24 years of age, when they reach a certain age. At 35 years of age, for example, 75 will be self-supporting, 10 well off, 10 wealthy, and 5 not living. At 45 years of age, 65 will be self-supporting, only 4 wealthy, 15 non-supporting, and 16 not living. At 65 years of age we see that 54 of the 100 are non-supporting, 36 are not living, and only 10 are able to support themselves.

These figures in themselves should be sufficient to show the need for a definite savings budget in every family. Surely no young man of sound body and mind has any desire to become a burden of charity at any age, and yet these statistics show that 10 of every 12 are dependent at the age of 65. Of course, some of these people may have very good reasons for being without money, but most likely they are dependent on aid because they have not taken proper steps to save.

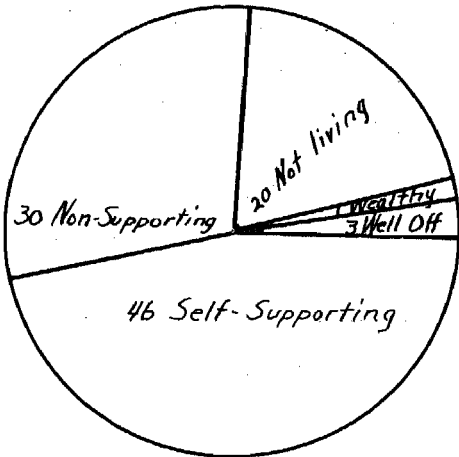
Among the most common types of investments now made for savings are real estate, life insurance, stocks and bonds, and savings accounts in banks and building and loan associations. Which of these is the safest and best it is hard to tell. Real estate is considered a good investment at any time, either as a purchase or a mortgage, provided the investor buys or lends wisely. Life insurance serves best to protect the family in case of the death or disability of one or both parents. The value of stocks or bonds depends largely on the type. Stocks of any kind are probably less



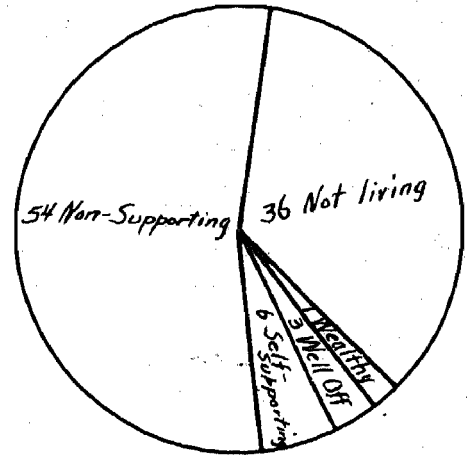
Age 35



Age 45



Age 55



Age 65

Graphs Showing Why People Should Save¹⁰

GRAPH IV

¹⁰ Roger W. Babson, Business Fundamentals, 1923, pp. 178-179

advisable as a means of savings than other types of investments mentioned. Government, state, city, and school bonds are nearly always a safe investment and pay a fair rate of interest. Savings accounts are good if kept with reliable banks or loan companies. A good plan for savings is, perhaps, to invest in several types of institutions. In order of importance to the person with average income these investments might include life insurance, savings accounts in banks, building loan associations, and postal savings, bonds, and finally, stocks. However, where the family has only a limited amount to place in savings each year, it will be necessary to invest in fewer fields. A life insurance program may even be planned that will provide for all the future needs of the family, either at a certain fixed time or upon the disability or death of the earner. Savings plans will accomplish a similar end if they are wisely followed.

Real Estate

Investments in real estate, either as a purchase or a loan, are considered among the very best of all savings. In fact our whole credit system is based, in one way or another, on real property. If one examines the reports of banks, insurance companies, and building and loan associations, he will find that a great per cent of their loans are mortgages on real property or bonds and notes secured by real property.

According to Babson,¹¹ the individual should consider at least three principles when he buys property or loans money on it. First he should consider security--whether or not the property is worth what he pays for it or loans on it. In lending money on a mortgage it is advisable to take only first mortgages and not to lend more than 50 to 60 per cent of actual value.

¹¹ Roger W. Babson, op. cit., pp. 185-188.

Second, he should consider marketability--the likelihood of his selling his property or mortgage, in case he needs the money, and getting face value for it. Third, he should consider yield--the amount of income or interest his investment will pay.

Also, the investor of savings must take into account the amount he has to invest. The man with only 50 or 100 dollars a year for this purpose can not buy a very large piece of property without borrowing money, and his borrowing will likely cost him more than he can afford to pay. This type of person probably should invest in other types of savings, at least until he has accumulated enough to pay perhaps 40 per cent on a purchase, or make a loan of some size on real estate. The man with a larger amount of savings per year well may consider real estate.

Exercises

1. The average Roosevelt High School family saves \$130 a year. This amount by itself is hardly enough for an investment in real estate. However, if this amount were invested in other savings each year for 5 years the family would have approximately $5\frac{1}{2}$ times as much savings. How much would this be.

If this amount were lent on a real estate mortgage at 6%, how much interest would it yield in 1 year?

2. If at the end of 5 years the savings suggested in Exercise 1 were invested in a home as a 40% down payment, how much could the family pay for the home?

TABLE 4

LIFE INSURANCE COSTS AND VALUES PER THOUSAND DOLLARS¹²(Participating)
Ordinary Life Insurance

Age	20	25	30	35	40	45	50	55	60
Annual Premium	\$ 19	\$ 21	\$ 24	\$ 28	\$ 33	\$ 40	\$ 48	\$ 61	\$ 78
Av. Yearly Dividend	6	6	7	8	9	10	11	13	16
Total Cost for 20 Yrs.	260	300	340	400	480	600	740	960	1240
Cash Value at 20 Yrs.	192	231	276	328	387	441	498	551	607

Twenty Payment Life

Annual Premium	29	32	35	38	43	49	56	67	82
Av. Yearly Dividend	8	9	10	10	11	12	13	15	16
Total Cost for 20 Yrs.	420	460	500	560	640	740	860	1040	1340
Cash Value at 20 Yrs.	460	505	555	610	667	723	777	825	869

Twenty Year Endowment

Annual Premium	48	49	50	52	53	57	62	70	83
Av. Yearly Dividend	12	12	12	13	13	14	14	15	16
Total Cost for 20 Yrs.	720	740	760	780	800	860	960	1100	1340
Cash Value at 20 Yrs.	Paid up Policy--\$1000								

(Non-participating)
Ordinary Life Insurance

Annual Premium	13	15	17	20	24	30	37	47	60
Total Cost for 20 Yrs.	260	300	340	400	480	600	740	940	1200
Cash Value at 20 Yrs.	As above for Ordinary Life (participating)								

Twenty Payment Life

Annual Premium	20	22	25	28	32	37	44	52	64
Total Cost for 20 Yrs.	400	440	500	560	640	740	880	1040	1280
Cash Value at 20 Yrs.	As above for Twenty Payment Life (participating)								

Twenty Year Endowment

Annual Premium	40	41	41	42	44	46	50	56	65
Total Cost for 20 Yrs.	800	820	820	840	880	920	1000	1120	1300
Cash Value at 20 Yrs.	As above for Twenty Year Endowment (participating)								

¹²The National Underwriter's Co. (Pub.), 1933 Little Gem Life Chart, pp. 315-319 and 521.

policy is not emphasized because it does not have the savings feature. For purposes of comparison the table gives values on each policy at the end of 20 years.

Exercises

1. Below is given a table¹³ of "Life Expectancy" for people of various ages. This has been compiled by life insurance companies over a large period of years. Read it thus: A man 20 years old may expect to live 42 years, etc.

Age	Expectancy	Age	Expectancy
20	42	45	25
25	39	50	21
30	35	55	17
35	32	60	14
40	28		

If a man of 20 takes out an Ordinary Life Policy (Participating) for \$1000, how much should he expect to pay in annual premiums? How much should he be returned in dividends? What then is the total cost of his insurance?

Answer the same questions for each of the other ages given above.

2. How much should a man of 20 expect to pay (total) for a \$1000 Ordinary Life Policy (non-participating)?

Answer the same question for the ages given in Exercise 1. Compare your results.

3. Why is the cash value of an Ordinary Life Policy at 20 years less than the amount paid in? Why is it more in the Twenty Payment Life?

4. If a man 35 years old buys a \$1000 Twenty Payment Life Policy, it will be worth \$555 to him in 20 years. However, he may leave the money

¹³ Ibid., p. 768.

with the insurance company and draw $3\frac{1}{2}\%$ interest on his money. Is this a good investment? (Remember that if the man dies or becomes totally disabled his beneficiary will receive \$1000).

5. Find the annual premium on a \$5000 Twenty Year Endowment policy (participating) for a man of 35. Find the total cost for 20 years. Does this seem to allow a fair rate of interest?

6. If a man 25 years old wishes to save \$6500 in 20 years through a non-participating endowment policy, what will be his premium per year? How much if he wishes to save \$7500? \$8500?

7. Probably not more than one-fourth of the family's savings should go into life insurance. How much should the average Roosevelt High School family invest in life insurance at this rate?

8. Considering the average age of Roosevelt High School parents to be 35 (this is the age on which life insurance companies base their calculations), how much would a \$2000 Ordinary Life policy cost per year? Is this too much insurance? Is it enough?

9. Allowing the average family a \$2000 Ordinary Life policy as in Exercise 8, make the entry in your simple cash book (the cost per month).

Building and Loan Associations

People are now investing savings to a considerable extent in Building and Loan associations. These associations are so organized that an investor may pay in small amounts by the week or month, or in a lump sum,

and draw interest (dividends) according to the earnings of the company. However, dividend rates usually average around 5 per cent.

Exercises

1. A family may buy a \$200 share in a building and loan association by paying \$1 a month for $11\frac{1}{2}$ years. How much will the share have cost? Does this seem like a good way to save?
2. What would be the cost per month of a \$500 share according to Exercise 1? Of a \$1000 share? Of a \$1500 share?
3. Find out what you can about saving through a building and loan association. Would this be a good way for members of your class to save a few cents a week?
4. Building and loan associations earn money by lending money, chiefly on real estate--first mortgages on farms, homes, and other property. Some of them draw interest rates as high as 10% on loans. Is this a high rate? Find the amount of interest on \$1000 for one year at 10%. Compare by ratio this amount with the interest paid by a $4\frac{1}{2}$ % government bond worth \$1000.
5. If the average Roosevelt High School family were building or buying a home for \$2500, they could borrow the money from a Building and Loan association and pay it back, with interest, at the rate of \$25 a month for 12 years. How much would they pay?
6. What do you think of building and loan associations as places to invest money? As places to borrow?

Postal Savings and Savings Banks

Postal Savings have become one of the most popular types of investments during the past few years. Loans or deposits with the government have always been considered fair investments. Postal Savings Certificates may be purchased in amounts from one dollar up to \$2500, and even amounts as low as one dime will be taken on deposit until the amount has grown to one dollar. These certificates pay 2% interest, but they may be exchanged in amounts from \$20 up for Postal Savings Bonds paying 2½% interest.

The savings bank has become especially popular with school children. Schools have sponsored the movement and in some of our larger cities nearly every child has a savings account to which he adds each week. Pupils are paid interest on their average deposits at approximately 4% per annum. Savings accounts may also be opened in almost any bank by the time deposit method. That is, a person places a certain amount of money on deposit for a given length of time--say one year. At the end of this year, or twice a year, he is paid interest on his deposit, usually about 4½%. If, however, he withdraws the money before the end of the year, he will receive no interest payment.

Exercises

1. The average boy or girl from 6 to 14 years of age might not have a great deal to put into a savings account in one year. But, how much would have to be saved each week in Postal Savings to make \$10 in a year? To make \$15? \$20? \$25? \$30?

How much interest would Postal Savings pay on each of the above amounts for one year?

2. How much interest would a savings bank pay on the amounts in Exercise 1? Place your results for these two exercises in a table and compare them by ratio.

3. If Postal Savings certificates were changed into Postal Savings Bonds they would pay $2\frac{1}{2}\%$ interest. How much would this be on the different amounts of Exercise 1? How would these amounts compare with savings bank payments? (Find out what you can about taxes on savings. Are they taxed at the same rate as real estate? Are Postal Savings taxable?)

4. Find the amount of interest on \$100 worth of Postal Savings Certificates for one year at 2% . How does this compare with the rate on stocks, bonds, or real estate mortgages? Would you advise Postal Savings as a good paying investment for amounts of \$100 or more?

5. Compare the interest paid on \$1000 worth of Postal Savings certificates with that paid on a $6\frac{1}{2}\%$ real estate mortgage.

6. Roosevelt High School families with an average income of \$665 per year report average savings of only \$5 a year. Some of these families save more than \$5; others save nothing at all. Do you think it might be possible for each of these families to deposit 25 cents a week with Postal Savings? How much would this amount to in one year? How much at 35 cents a week? At 45 cents a week?

Would Postal Savings be a service to these families? Could they save in small amounts through a savings bank?

7. Families with an average yearly income of \$923 report savings of only \$9 per year. Make out a weekly savings plan for them in Postal Savings of bank savings.

8. Make out a weekly savings plan for yourself whereby you might purchase Postal Savings certificates or build a savings account with a bank.

Stocks and Bonds

In buying stocks or bonds the investor should first pick some reliable person to advise him. In most cases his banker can give him good information and recommend to him the best type of stocks or bonds to buy. Of course it is always advisable for the small investor to buy something with a steady market value and sound security. Speculating is ruinous to the small investor who knows little or nothing of the game.

Besides the quality of the stock the purchaser should consider the rate of interest that it will pay, or the amount of dividend. In stocks the preferred type is frequently more desirable than the common stock since the preferred is paid its dividend first and the common is paid last. Future payments of dividends on common stock will depend on future business prospects. A good company may continue to do well in its business or it may gradually decline. Harness and buggy companies are a good example of businesses which were prosperous a few years back but which now are entirely out of date.

Bonds are of two main types, registered and coupon. The registered bond is recorded when sold and thus the ~~buyer~~ is protected from loss. The coupon bond is made payable to bearer and is not recorded. Bonds are usually made out as a note payable over varying periods of time ranging from one to 50 years. The value of the bond, like stocks, depends upon who issues it and what rate of interest it bears.

Exercises

1. Find the rate of dividend in per cent on a stock purchased at \$56.50 which paid \$3.39 the first year. Is this a good rate of interest?
2. Suppose the buyer of Exercise 1 needs his money at the end of the second year and his stock is selling for only \$45.20. Find his per cent of loss. Find his per cent of gain if he sells for \$62.15.
3. A block is 100 shares. Find the cost of 15 blocks of American Steel at \$31.25 a share.
4. Clip the "Stock Quotations" from the daily newspaper and figure costs of blocks of stock from various quotations.
5. From the library secure "Stock Quotations" from papers a year old. Compare the values, then and now. Pick out stocks which you think might be good ones.
6. United States Government bonds are considered among the best bond investments. The first Liberty issue pays $4\frac{1}{8}\%$ annually. Find the amount of interest per year on a \$100 bond.
7. Government bonds are non-taxable. Remembering that taxes in Emporia are 2.7%, find out what per cent income from real estate would equal the $4\frac{1}{8}\%$ income from a government bond.
8. Clip from the newspaper copies of "Foreign Bond Quotations" and compare these values with United States bond values.
9. Make similar comparisons on domestic bond values.

General Exercises on Savings

1. How much per week would a family have to put aside in order to save \$50 a year? \$75 a year? \$100 a year?

2. Make out a schedule of investments for the different amounts in Exercise 1, showing how you think a family might divide them.

Item of saving	Amount per year
Insurance (name kind of policy)	
Stocks or bonds	
Postal savings	
Deposits in savings bank	
Real estate or other	

3. Make out a schedule showing how a family with yearly savings of \$500 might invest it.

4. Some budget makers recommend that 10% of the total income should be saved. According to this ratio, what amount should be saved by a family with a yearly income of \$1000? \$1500? \$2000?

Others recommend 15% for savings. What amounts would 15% of the above incomes give for savings?

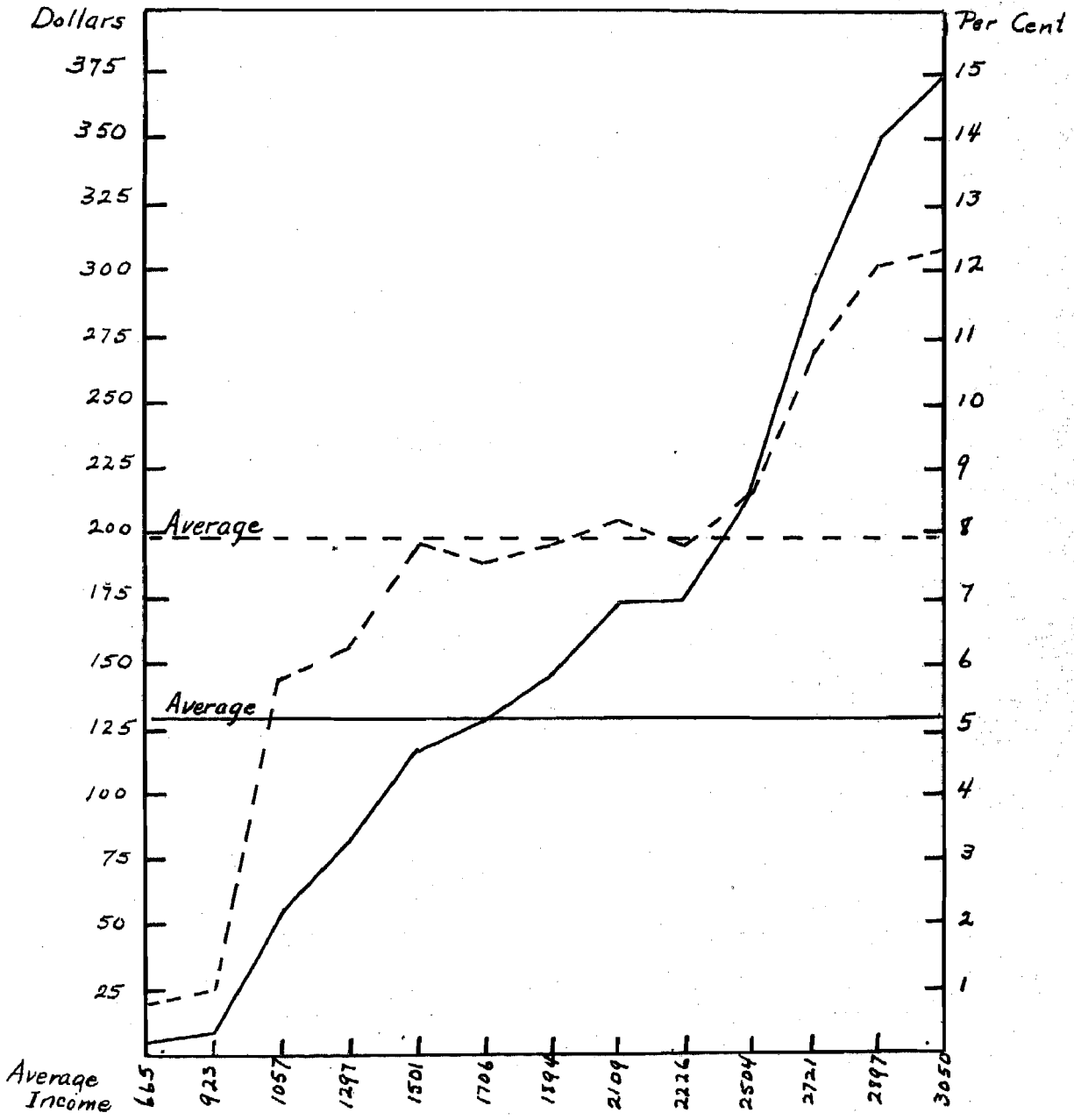
5. The average Roosevelt High School family earns \$1636 a year and saves \$130. What per cent of total income do they save?

6. Make out a schedule showing how this average family might invest the saving of \$130 per year. Compare your plan with those of the rest of the class. Decide which plan you like best.

How do you think this average family should proceed to save more than \$130 per year?

7. Enter the results of Exercise 4 in your simple cash book.

8. Make a bar graph showing the relation of the total amount saved by the average Roosevelt High School family to the amount spent for the other five items of budget.



Graph Showing Amounts and Per Cents of Total Spent for Savings

GRAPH V

5. Operating Expenses

Operating expenses include such items of budget as personal supplies, housecleaning supplies, lighting, heating, cooking, telephone and telegraph, and incidentals. Each item in itself does not amount to a great deal, but in total Operating Expenses make up almost 12 per cent of the average Roosevelt High School family budget. Thus it is very important that attention be given each of these items and that the possibility of reducing them be analyzed.

Exercises

1. Personal supplies include tooth brushes, combs and hair brushes, shoe polish, soap, mouth wash, tooth paste, etc. List in a table the amounts and costs of these items for a family of 5, according to your own estimates. Do you think \$19 per year is too much for this item?
2. The average family spends \$15 a year for housecleaning supplies-- soap, washing powders, etc. Do you think this is too much?
3. Lighting expense averages \$34 a year for Roosevelt High School families. Is this too much to pay for light? Make a bar graph showing the amounts spent for light in each of the different income groups. Would you say that light is a luxury in some of these groups?
4. The average Roosevelt High School family spends \$69 for heating and cooking. How many tons of coal would this purchase at \$7.50 a ton?
5. Get an estimate on your own home bill for heating and cooking.

List the items and expense in order:

Item	Cost
Coal (give no. of tons)	----
Gas (Give approximate bill for one year)	----
Oil or other fuel	----

6. Find the average of the bills in your class for heating and cooking. How does it compare with the average in Exercise 4?

7. Bring to class gas bills which you have paid and show how they have been worked out.

8. Following is a table of gas costs in Emporia per 100 cubic feet:

First 3000.....	\$1	per	M
Next 2000.....	.90	"	"
Next 5000.....	.75	"	"
Next 5000.....	.65	"	"
Over 20000.....	.55	"	"

Find the amount of a gas bill if the amount used were 5000 cubic feet.
10,000 cubic feet. 25,000 cubic feet.

What is the average amount of gas in cubic feet used by homes of your class?

9. Bring light bills to class for a single month and find the average light bill for your homes. How does your average compare with the average given in Exercise 3.

10. Following are the approximate rates per kilowatt-hour for electricity in Emporia. (Exact amounts depend upon the size of home.)

First 25 kilowatt-hours.....	7 cents each
Next 25 kilowatt-hours.....	6 cents each
Over 50 kilowatt-hours.....	3 cents each

Find the amount of an electricity bill for 35 kilowatt-hours . For 45 kilowatt-hours. For 65 kilowatt-hours.

11. Here is a list of the operating expenses for the average Roosevelt High School family:

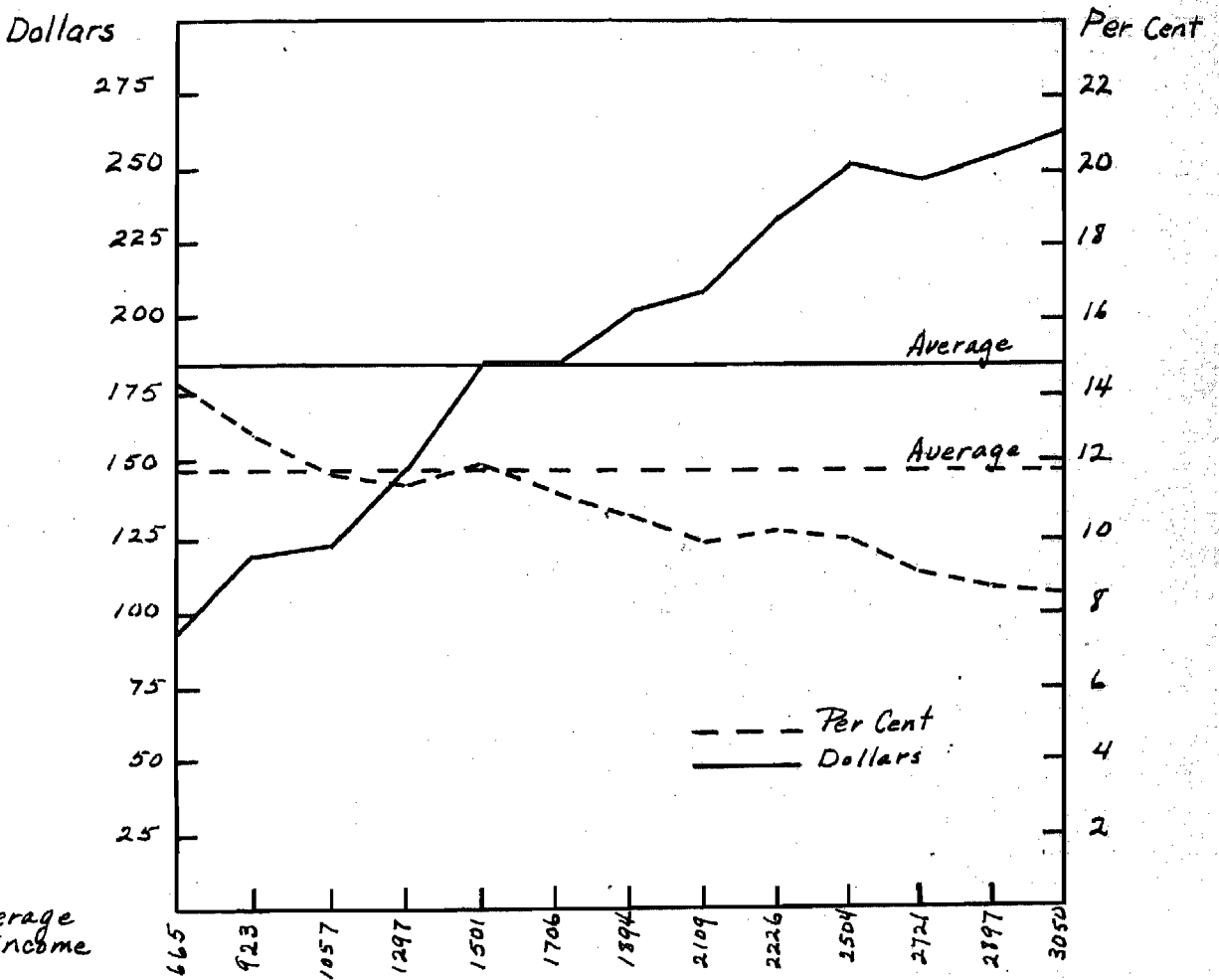
Lighting.....	\$34
Heating and cooking.....	69
Telephone and telegraph.....	22
Personal.....	19
Housecleaning supplies.....	15
Incidentals.....	19
Total	<u>178</u>

Find the total for operating expenses according to your own estimates.

Is your total more or less than this one? How much?

What items do you think are too high in the above table? Which are too low? How much do you think might be saved, if any, by the average family on operating expenses?

12. Enter the average monthly amount for operating expenses in your simple cash book.



Graph Showing Amounts and Per Cents of Total Spent for Operating

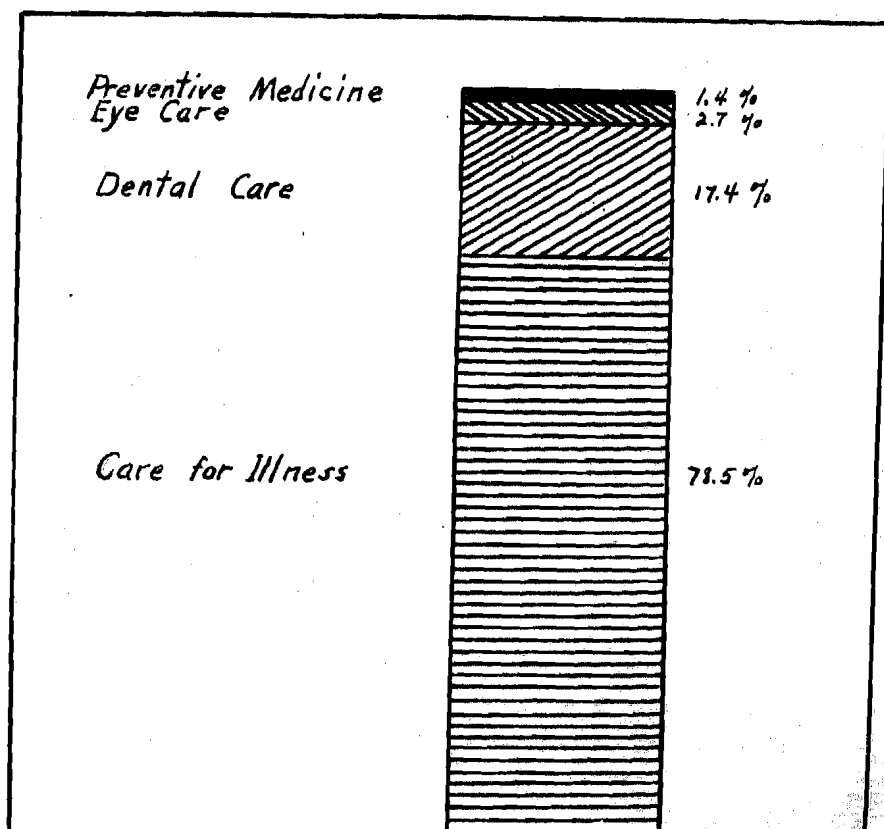
GRAPH VI

6. Advancement Expenses

The second largest amount on the average Roosevelt High School budget is Advancement Expense. Perhaps this is as it should be since advancement does include some very important items--educational expenditures, professional or vocational expenses, gifts, church and charity donations, maintenance of car, recreation, health, furnishings for the home--all of these are classed as advancement expense. Just how much people should spend on these items, it is difficult to say. Tables 1 and 2, page 8, give some idea of what families are spending on these items. Money spent for real advancement is always, or should be, money well spent. However, among the items included, certain ones may be found where savings might be made; in others greater liberality might be advisable.

Exercises

1. Educational expenses include the following items: tuition fees, school books, paper, pencils, pens, magazines, newspapers, books for the home library, and private lessons. List in a table the amount spent in your family during the year for these items.
2. Find the average amount spent for education by families represented in your class, using the results of Exercise 1.
3. Do you think the average family is spending enough for education? That is, for library books, magazines, newspapers, or private lessons?
4. Estimate the cost of gifts in your own home for a period of a year and find the average for the class.



Family Expenditures for the Prevention and
Care of Illness ¹⁴

GRAPH VII

¹⁴ Final Report of Medical Care, Med. Care for American People, 1932, p. 41.

5. According to Table 1, page 8, the average family spends as follows for items of advancement:

Education.....	\$ 48
Expenses of profession.....	18
Gifts.....	37
Church and charity.....	24
Furnishings.....	42
Maintenance of car.....	74
Recreation.....	57
Health.....	42
Total	<u>342</u>

What items do you think are placed too low? Which items are too high?

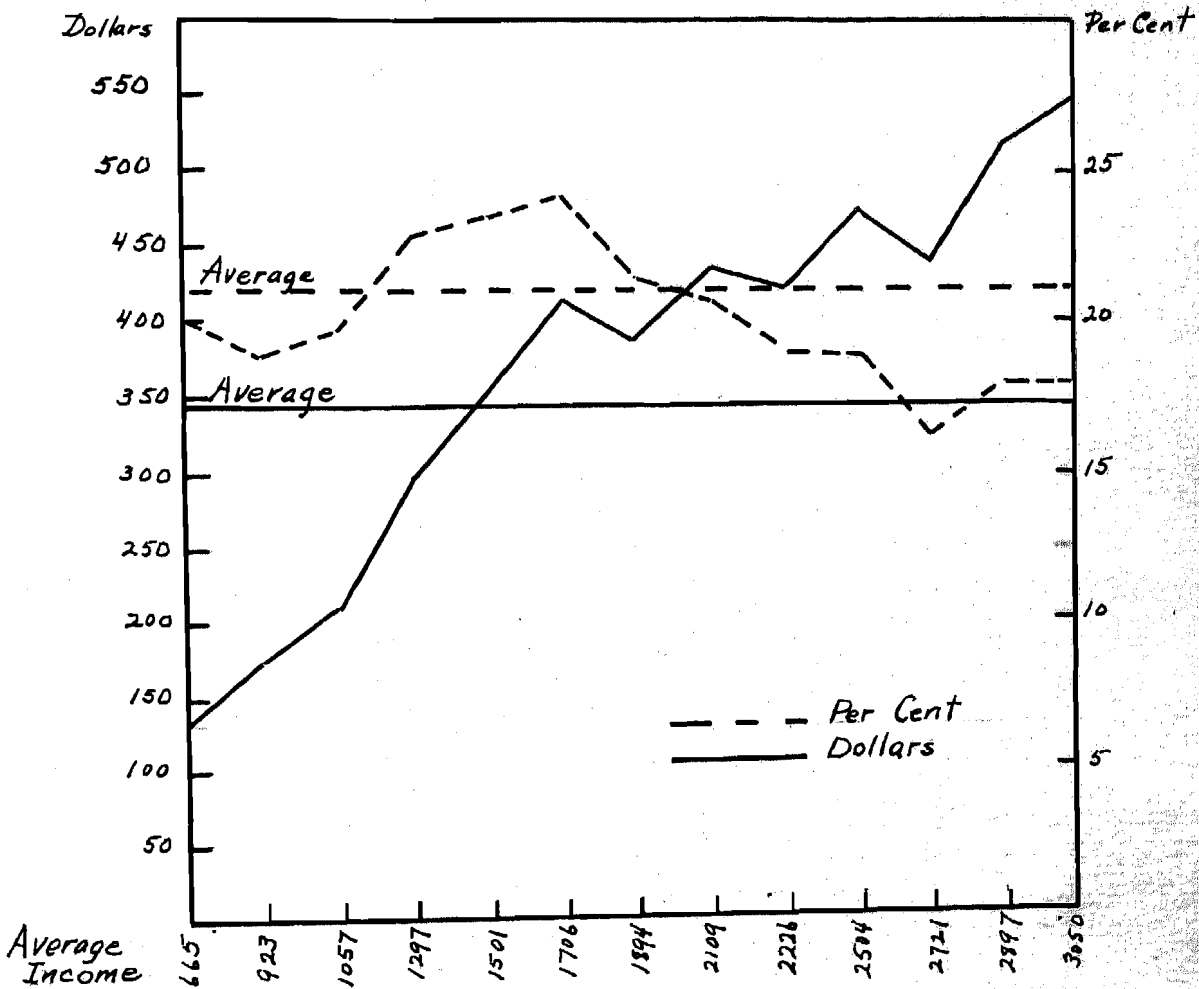
6. Families with incomes averaging \$665 spend only \$133 per year for advancement expenses, according to Table 1. The average family spends according to the results quoted above. Show these facts on a line graph.

7. Make a bar graph showing the amounts spent for health by the 13 income groups, according to Table 1. What does this graph show in relation to expenditures for health?

8. Make a graph like the one in Exercise 7 on amounts spent for education. Criticize it.

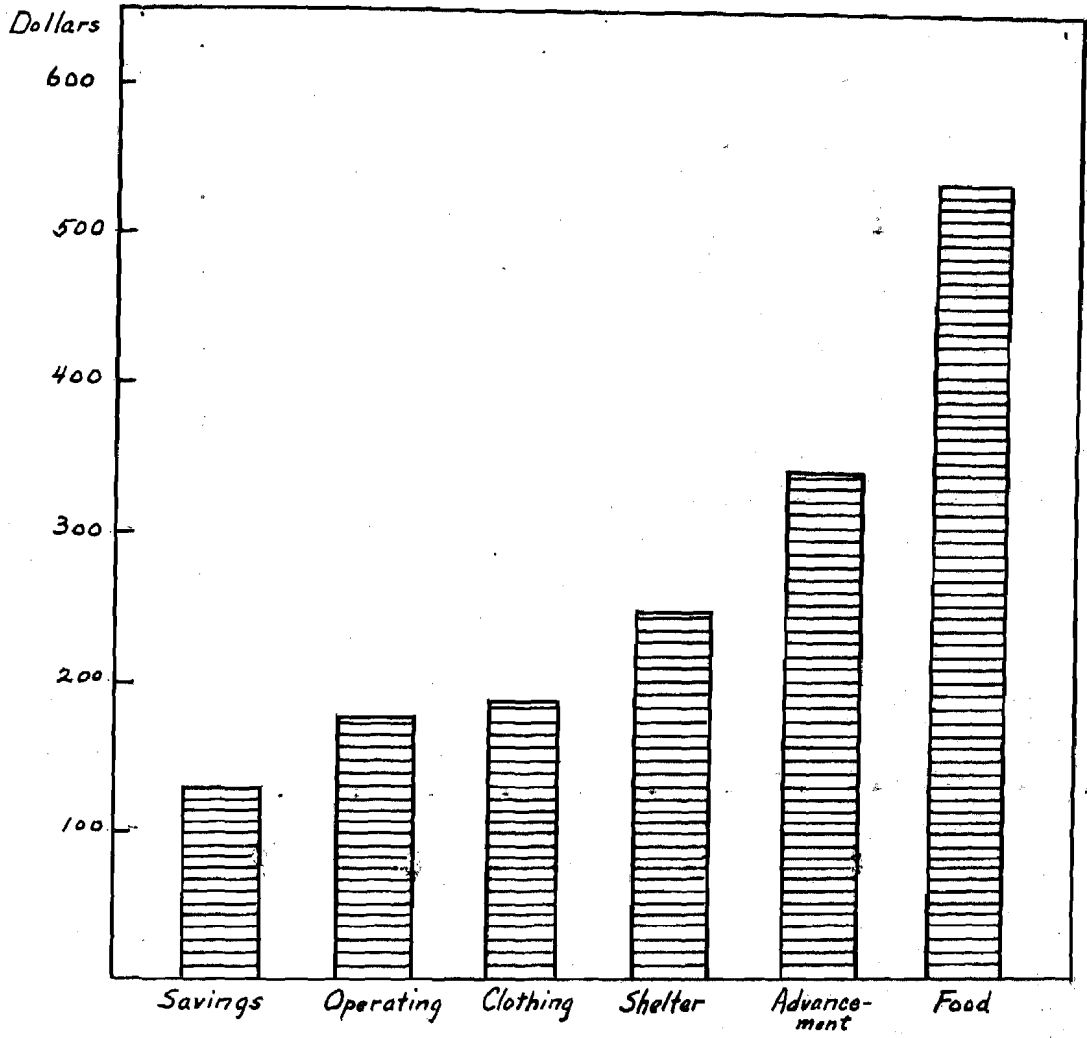
Make a similar graph on amounts spent for recreation.

9. How much does the average family spend per month for advancement? Enter the amount in your simple cash book. Balance the cash book. Do you have left a surplus or a deficit? How much?



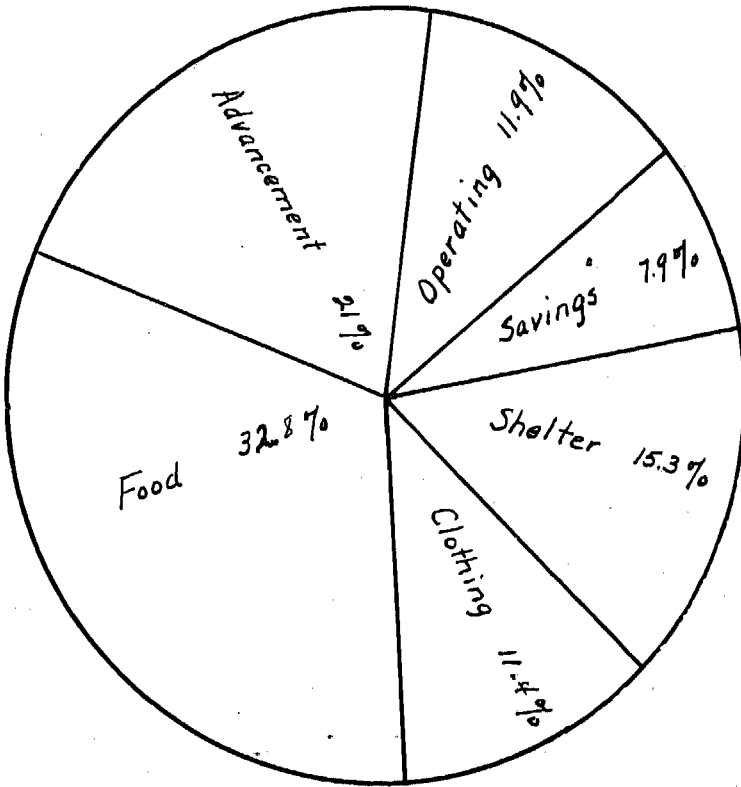
Graph Showing Amounts and Per Cents of Total Spent for Advancement

GRAPH VIII



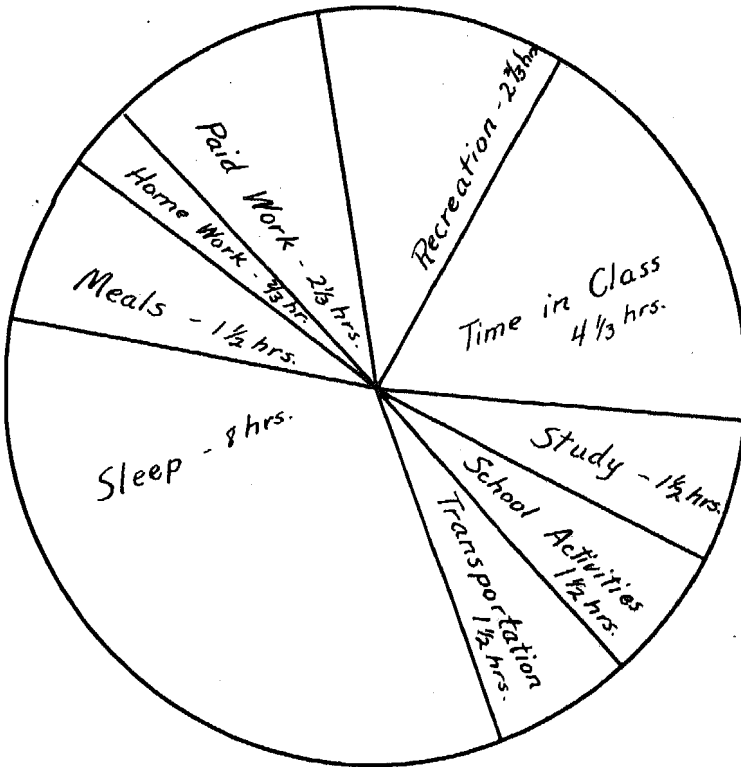
Bar Graph Showing Amounts Spent by Average Family for Items of Budget

GRAPH IX



Circle Graph Showing Per Cents of Income Spent by Average Family for Items of Budget

GRAPH X



Time Budget for a Student ^{15.}

GRAPH XI

^{15.} Greer, *op. cit.*, p.191

7. Suggested Topics

a. The Checking Account. It is considered the good business practice for any family to have a checking account in a good bank and to pay their bills by check. Banking is probably the safest way of keeping ready money and a check is always a good record of payment on bills. Everyone should know something of the nature of a checking account--how to make deposits with a bank (how to fill out a deposit slip), how to write a check in good form, how to endorse a check, how to read a monthly statement from a bank, how much bank charges are on small checking accounts, what federal tax is on checks, etc.

Thus, at the close of the teaching of home budgeting, a short study of the checking account should follow rather logically. The teaching might be carried on as a class project in which each member of the class is taken to represent an average Roosevelt High School family. Then he would have a certain amount of money to deposit with the bank at the beginning of the month. During the month he would write certain definite checks in payment for the items of his budget. At the end of the month he would make out his own bank statement, according to standard form, find his balance on hand in the bank, and compare it with the record of his simple cash book.

This project has been carried out twice during the past year in the 7A mathematics classes of Roosevelt Junior High School and has been found to stimulate a good deal of interest along with quite satisfactory results in comprehension of banking.

b. Three Cases of Percentage. If the instructor wishes he may emphasize the three cases of percentage quite logically in connection with the work here offered. Each one of the six divisions of a budget offers a mass

of opportunities for problems in finding the per cent of a number (case 1). Cases 2 and 3 are naturally illustrated in relations between the whole income and divisions of expenditure, one of these items being taken as unknown and the rate known. Emphasis should be given at the same time to the decimal meaning of per cent, and to the close relation of fractions and ratios. The following is a table given by Knight¹⁶ indicating types of decimals and per cents in which pupils may encounter difficulties.

- A: Decimals less than .01, as .005 of $N = .5\%$, or $\frac{1}{20}\%$ of N
 B: Decimals, even hundredths, as .07 of $N = 7\%$ of N .
 (Includes from .01 to .09)
 C: Decimals, with fractions, as .075 of $N = 7\frac{1}{2}\%$ of N .
 (Includes from .01 to .09)
 D: Decimals, even hundredths of two digits, as .24 of $N = 24\%$ of N .
 (Includes from .10 to .99)
 E: Decimals, of two digits with fractions, as .195 of $N = 19\frac{1}{2}\%$ of N .
 (Includes from .10 to .99)
 F: Decimals, of unity or over, as 1.25 of $N = 125\%$ of N .
 G: Decimals, written as even tenths, as .8 of $N = 80\%$ of N .

Knight reports that, according to investigations by Rice and by Edwards and Knight, types B, D, and F are most easily handled by pupils in grades 7 and 8. However, types C and E were done incorrectly by from 40% to 59% of the pupils tested, while type G was missed by even more. Thus types C, E, and G should be stressed in the study of percentage, that is, assuming that these types are to be used in problem material. From even a hasty survey of Tables 1 and 2 in the second chapter, one will see at once problems involving these types. Sufficient problem material and drill should be devised to establish these types with the class. Knight also offers an analysis of the unit skills and meanings in fractions which well

¹⁶ F. B. Knight, "Some Considerations of Method," in NATIONAL SOCIETY FOR THE STUDY OF EDUCATION, TWENTY-NINTH YEARBOOK, 1930, p. 156 and pp. 209-210.

might be correlated in this teaching of percentage types.

If the instructor desires, he may introduce the percentage formula in connection with the work here proposed.

c. Making out budgets for families of various levels will afford drill in fundamentals as well as strengthening the concept of the budget.

d. Graphing offers great opportunities for comparison by ratio, fractions, decimals, and per cents. The pupils should make graphs and interpret them until they have a good understanding of the topic. There is ample material in the study for line graphs, bar graphs, and circle graphs to supply all possible needs.

e. Business forms and devices should be given a great deal of additional attention. Pupils should be able to understand the essential parts of any business form or device included in the study, and to use it as suggested in the exercises.

f. Much drill in approximating answers is also recommended at this period. Number and value concepts can be developed in pupils of the junior high school age, provided sufficient training is given. Mental calculation with rounded numbers is good practice for the pupil and provides a good means of checking the probability of correctness in obtained results. Unreasonable answers to problems may be detected nearly always in this manner.

g. For excellence of recommendations as to subject matter and methods in this field, the Yearbooks of the National Council of Teachers of Mathematics and the Twenty-ninth Yearbook of the National Society for the Study of Education are extremely fertile.

CONCLUSIONS

While this study has proposed to set up a changed means of presentation for the work of a small sector of the junior high school period, it has not aimed to deviate intentionally from the established objectives of mathematics. It is believed that material presented does not depart from these ends. Smith and Reeve¹⁷ classify the abilities needed in arithmetic under five general heads. In summary these needs are:

- (1) The ability to perform the fundamental operations with whole numbers, fractions, and decimals, and to express ratios as fractions and decimals;
- (2) The ability to find per cents of numbers, to work discounts, to use fractional equivalents of per cents, and to understand the meaning of per cents from less than 1% to more than 100%;
- (3) The ability to use the common forms of denominate numbers;
- (4) The ability to make and interpret statistical tables and graphs, not too difficult in nature;
- (5) The ability to understand and employ such business forms and devices as the personal account book, the cash account for the home, yearly budgets, banking forms, bills from stores, and notes, to distinguish between stocks and bonds for investment, and to understand quotations.

All of these abilities have been taken into account in the development of the study. As previously stated, the study has not proposed to offer sufficient material for mastery in every case. Rather, it has aimed to outline the way. If it has done this, it has achieved its end.

The study has covered only a limited amount of ground. It has made proposals regarding the mathematics of home budgeting. The entire course, if put into practice, will not consume more than a semester of time during the seventh grade. For further study in the field, then, it might be sug-

¹⁷David Eugene Smith and William David Reeve, "Objectives in The Teaching of Junior High School Mathematics," in the Second Yearbook of the National Council of Teachers of Mathematics, Curriculum Problems in Teaching Mathematics, pp. 191-94.

gested that the work be carried into a further study of the applications of mathematics both in the home and in other institutions: the city, state and national governments, the vocations and professions. The carrying out of studies of this type, in time it may be hoped, will unify the work of the junior high school mathematics and produce a continuous whole in terms of the actual, or near-actual, experience of the pupils.

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APPENDIX

The following is a copy of the letter written by Dr. H. G. Lull and enclosed with questionnaires sent to the patrons of Roosevelt High School.

Dear Patrons:

Mr. Skeen, a graduate student doing work for his Master's degree in the Kansas State Teachers College, is writing his thesis on the subject of "The Mathematics of Home Budgeting." He desires to secure certain information through the pupils of the Roosevelt Junior-Senior High School. I have given him permission to do so with the understanding that all information will be entirely impersonal - no names will be mentioned either of pupils or parents in connection with his thesis. He is trying to work out a course of study for the High School which will be more practical from the standpoint of applied mathematics and also will require improved mathematical processes.

I shall appreciate anything you can do for Mr. Skeen in filling out his questionnaire. I believe the questionnaires will help the pupils as well as Mr. Skeen.

Thanking you very kindly in advance, I am

Very sincerely yours,

H. G. Lull
Head of the Department of
Education and Director of
Teacher Training

Questionnaire

(Note: Suggestions of form and content have been drawn partially from Peixotto's study before mentioned.)

I. Size of family _____
Age _____

A. Father _____
B. Mother _____

C. Children (list by number in order of age)

	Sex	Age		Sex	Age
1.	_____	_____	4.	_____	_____
2.	_____	_____	5.	_____	_____
3.	_____	_____	6.	_____	_____

II. Home: Dwelling _____ Apartment _____ Or _____

- A. Total of rooms in the home..... _____
- B. 1. Bath rooms..... _____
- 2. Bed rooms..... _____
- 3. Sleeping porches..... _____
- e. Other rooms..... _____
- B. Rented home (Yes, no)..... _____
- 1. Monthly rate..... _____
- 2. (Check items included in above fee)
- a. Light _____ d. Telephone _____
- b. Heat _____ e. Furnishings _____
- c. Water _____ f. Other (list) _____
- C. Owned home (yes, no)..... _____
- 1. Date of purchase..... _____
- 2. Purchase price..... _____
- 3. Amount of mortgage or debt..... _____
- 4. Did you buy through a realtor?..... _____
- D. Heating plan (underline)
- 1. Steam, hot air, stove, fireplace
- 2. Fuel: coal, gas, electricity, oil, wood
- E. Lighting (underline): electricity, gas, kerosene
- F. Total investment in furnishings..... _____
(Include all household equipment from basement up)

- III. Father's occupation..... _____
- Length of employment (in weeks per year)..... _____
- Mother's occupation..... _____
- Length of employment (in weeks per year)..... _____
- Length of vacation (in weeks per year)..... _____
- Average length of working week (8-hour days).... _____

IV. Annual income: Total per month _____ Per year _____

A. Income from father's occupation..... _____

B. Income from investments..... _____

1. Real property..... _____

2. Stocks and bonds..... _____

3. Gifts..... _____

4. Other (list)..... _____

C. Annual income of mother..... _____

D. Income of children..... _____

E. Income from boarders or roomers..... _____

F. Other..... _____

V. Expenses: Total per month _____ Per year _____

A. Foods: Total per month _____ Per year _____

1. Cost of bread per month _____ Per year _____

2. Cost of butter per month _____ Per year _____

3. Cost of milk per month _____ Per year _____

4. Cost of meat per month _____ Per year _____

5. Cost of other groceries
per month _____ Per year _____

6. Cost of meals per
month _____ Per year _____

B. Clothing: Total per year..... _____

1. Father..... _____

2. Mother..... _____

3. Children..... _____

4. Dependents..... _____

C. Housing: Total per year..... _____

1. (Fill in blanks if you own your home)

Payment on debt..... _____

Interest on debt..... _____

General tax on home..... _____

Paving tax..... _____

Insurance on home:

Face of policy..... _____

Annual premium..... _____

Repairs on home..... _____

Improvements..... _____

Expense on garage..... _____

Other (list)..... _____

2. (Fill in here if you rent)

Rental fee per year..... _____

Repairs..... _____

Garage..... _____

Furniture tax..... _____

Insurance on furniture:

Face of policy..... _____

Premium per year..... _____

Other (list)..... _____

Note: "Total per month" and "Total per year" in item IV and in all succeeding items should balance with the total of all the separate items listed under the general division.

- D. Other home expense: Total per year.....
- 1. Lighting.....
- 2. Heating and cooking.....
- 3. Ice or electric refrigeration.....
- 4. Telephone and telegraph.....
- 5. Servants.....
- 6. Personal supplies
 - Tooth brushes.....
 - Combs and brushes.....
 - Shoe polish.....
 - Toilet soap.....
 - Mouth wash, drugs, etc.....
 - Other items (list).....
- 7. Housecleaning supplies
 - Soap.....
 - Washing powders.....
 - Other (list).....
- 8. Laundry supplies.....
- 9. Furniture.....
 - New furniture.....
 - Repairs and replacement
 - linen.....
 - bedding.....
 - towels.....
 - curtains.....
 - Kitchen and table ware.....
 - electric bulbs.....
- 10. Furniture tax.....
- 11. Other (list).....
- E. Recreation: Total per year:.....
- 1. Public entertainment
 - Moving pictures and theatre.....
 - Sports.....
 - Dances.....
 - Pool or billiards.....
 - Music and art.....
 - Other (list).....
- 2. Vacation: Total per year above regular living expenses.....
- 3. Private entertainment
 - Entertainment in the home.....
 - Club dues and expenses.....
 - Other.....
- F. Vehicles: Total per year.....
- 1. Cost of automobile.....
- 2. Insurance on automobile.....
- 3. Other vehicles (list).....
- 4. Total cost of maintenance per year.....

- G. Education: Total cost per year.....
- 1. School
 - Tuition.....
 - Books.....
 - Paper, pencils, etc.....
- 2. Magazines.....
- 3. Newspapers.....
- 4. Books for home library.....
- 5. Private lessons.....
- 6. Other (list).....
- H. Investments and savings: Total per year....
- 1. Real estate.....
- 2. Stocks and bonds.....
- 3. Life insurance.....
- 4. Health and accident insurance.....
- 5. Savings account.....
- 6. Other (list).....
- I. Church: Total per year.....
- J. Charity: Total per year.....
- K. Dependents outside the home: Total per year.
- L. Health: Total per year.....
 - 1. Fees to medical doctor.....
 - 2. Fees to dentist.....
 - 3. Hospital expense.....
 - 4. Prescriptions at drug store.....
 - 5. Nursing.....
 - 6. Eyeglasses.....
- M. Expenses of profession: Total per year....
 - 1. Professional organizations.....
 - 2. Professional books and magazines.....
 - 3. Value of office equipment.....
 - 4. Upkeep of office equipment.....
 - 5. Hired help.....
 - 6. Stationery, stamps, etc.....
 - 7. Other (list).....
- N. Tobacco, candy, etc. Total per year.....
- O. Gifts: Total per year.....
 - 1. Christmas.....
 - 2. Birthday.....
 - 3. Wedding, etc.....
- P. Incidentals: Total per year.....
 - 1. Moving.....
 - 2. Barber and beauty operator.....
 - 3. Lawyer and court fees.....
 - 4. Other (list).....

VI. Amount of surplus or deficit.....

VII. Are these figures based on actual accounts.....

HE