

1959

Potential uses of electronic data processing equipment in the public schools of the Tarrytowns, New York

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BOSTON UNIVERSITY

College of Business Administration

THESIS

Potential Uses of Electronic Data Processing
Equipment in the Public Schools of the
Tarrytowns, New York:
An Exploratory Study

By

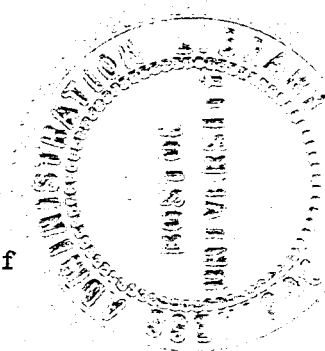
Herbert John Wostrel

(A.B., Boston University, 1949)

Submitted in partial fulfillment of
the requirements for the degree of

MASTER OF BUSINESS ADMINISTRATION

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INTRODUCTION

Business and industrial organizations of today operate in an economy of an extremely competitive nature. Rare is the businessman who does not find the product he manufactures or the service he offers in direct competition with a similar product or service. The successful organization must operate efficiently in order to operate profitably--particularly where the margin of profit is slight. There is, therefore, continual research and experimentation to develop the most efficient methods of employing money, materials, manpower, time and space.

In the United States today, education may quite correctly be included in the category of "big business". Billions of dollars annually are required to support public and private educational institutions from the elementary grades through the graduate level.

"Our total expenditure for education, from elementary school through the universities, today is approximately \$14 billion annually. This is 3.6 per cent of the gross national product. The experts estimate that, in order to attain the goals of quality in a system of quantity, the nation will have to spend \$30 billion measured in terms of today's purchasing power. This would mean, according to the best economists' predictions, about 5 per cent of the gross national product."*

Unfortunately, the growth in size of these public schools has been so rapid that many school systems have been unable to keep pace with improved business methods needed for efficient operation.

While education may be termed a big business, the product of the educational process cannot, obviously, be measured

*16, p. 64

in the same manner that the quality control expert measures the finished article at the end of the assembly line. The product of public education is a personality influenced, in part, by twelve years of interaction with another personality--the teacher.

The teacher is concerned with analyzing the needs and developing the interests and abilities of his students. The public school teacher is a professional. He has undergone years of costly training to prepare him for his profession. Yet, upon his arrival in the classroom he often finds that inefficient business practices force him to devote an unwarranted amount of time to duties below his professional level. He discovers that he must, for example, accumulate and analyze test data, maintain attendance figures, prepare report cards in duplicate, correct IQ and achievement tests and post much of the foregoing information on permanent record cards for each student.

Other members of the professional and clerical staff have similar routine tasks to perform manually. High school guidance counselors and their clerical assistants have a major clerical task to perform bi-annually--student registration for the coming year. School business managers must maintain voluminous records pertaining to supplies and materials. Personnel records must be kept accurately and up to date.

In all of the foregoing areas much of the work now done manually could be accomplished with increased over-all efficiency by the use of electronic data processing equipment. Several companies now manufacture such equipment. For the purposes of this study the equipment produced by the International Business Machines Corporation is examined to determine its adaptability to public school use.

In this study the author examines various procedures (mentioned above) in the Public Schools of the Tarrytowns, New York. He analyzes and evaluates these procedures and, where feasible, suggests the use of electronic data processing equipment.

There is comparatively little published research in this field. Therefore, the method of approach includes the use of interviews, questionnaires and correspondence. Pertinent material from interviews and correspondence is to be found in the Appendix.

It is hoped that this study will also serve as a general guide for the small school administrator regarding the potential uses of electronic data processing equipment.

CHAPTER I

THE PROBLEM DEFINED

Prior to September 1949, the public schools of Tarrytown, New York and the schools of North Tarrytown, New York existed independently in separate districts. For many years the question of consolidating the two districts had been brought up by the respective school boards but, for a variety of reasons, action on the proposal had always been deferred.

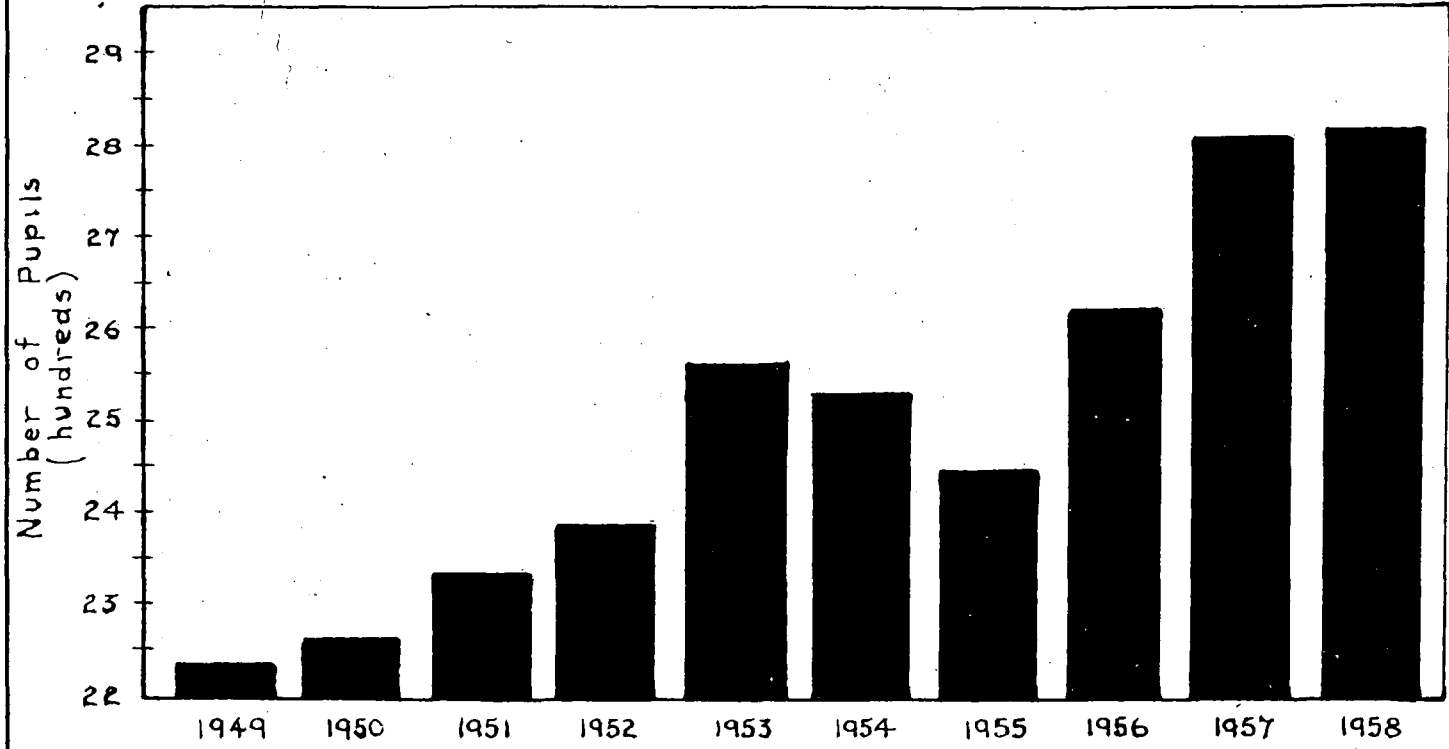
Finally, in 1949, matters came to a head. Despite rather strong voter opposition the consolidation took place and the new district became known as the Public Schools of the Tarrytowns.

Prior to the change the two Tarrytowns each had an enrollment of approximately 1100 pupils. During the academic year 1949-1950 the attendance figures revealed that 2,237 pupils were enrolled. The professional school staff totaled 123. By the fall of 1958 the enrollment had climbed to 2,824, an increase of 22 per cent over the 1949 figure and the staff totaled 148, or an increase of 20 per cent since 1949. These changes are shown graphically in Charts 1 and 2.

THE TREND TOWARD CENTRALIZATION

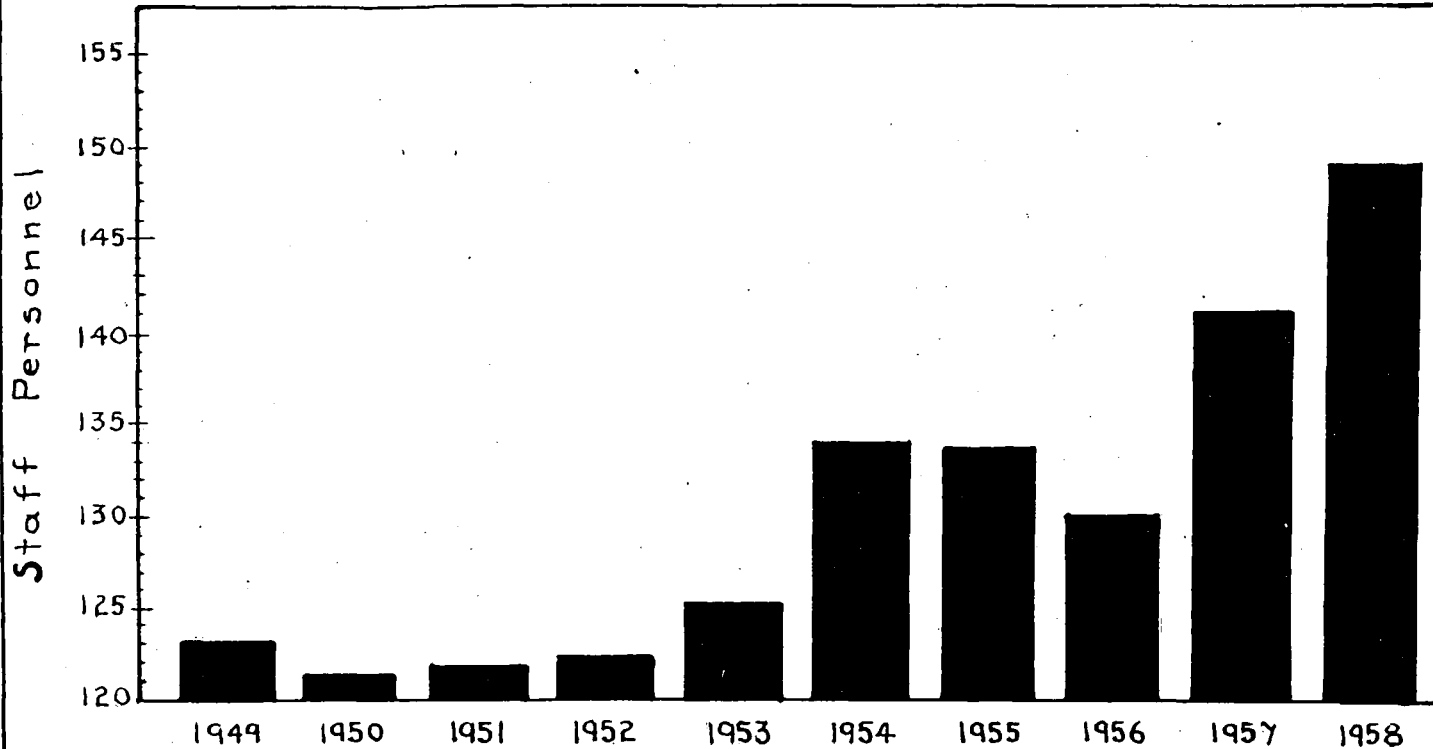
The experience of the Tarrytown schools was a reflection of the statewide trend toward centralization. In 1920 there were 8,600 one-teacher schools in the State. By 1954-55, due both to centralization and expansion, the number had decreased to 378. Correspondingly, the number of school districts in towns, cities and villages showed a marked decline

Chart 1
Pupil Enrollment in the Public Schools of the
Tarrytowns, N.Y. September 1949 to September 1958



Source: Records of the Public Schools of the Tarrytowns, Tarrytown, N.Y.

Chart 2
Number of Staff Personnel in the Public Schools of the
Tarrytowns, N.Y. September 1949 to September 1958



Source: Records of the Public Schools of the Tarrytowns, Tarrytown, N.Y.

from 5,388 in 1944-1945 to 2,242 in 1954-1955--a decrease of 58 per cent. The inclusive figures are shown in Table I.

This downward trend in number of school districts was accompanied by an increase in the school census, elementary and secondary school registration, number of teachers and school expenditure.

In 1945 the number of children from birth to 18 years residing in districts of New York State amounted to 3,385,770. By 1955 this total had risen by slightly more than 36 per cent to 4,606,312, as indicated in Table II. Meanwhile, as shown in Table III, the number of teachers employed at the same time during this period increased from 71,806 in 1945 to 95,572 in 1955--a gain of 33 per cent. Table IV reflects the rise in school expenditures from \$352,480,890 in 1944-1945 to \$925,362,727 in 1954-1955.

The above figures become more meaningful when one realizes that across the nation the statistical trend is similar. There is, moreover, little reason to assume a reversal of the trend in an era of rapidly increasing population and inflationary tendencies.

It is interesting to note that James B. Conant, in his study of the modern American secondary school, awards top priority to the elimination of the small high school (with graduating classes of less than one hundred) as a step toward increased academic quality. "I am convinced," states Conant, "(that) small high schools can be satisfactory only at exorbitant expense....my conviction (is) that in many states the number one problem is the elimination of the small high school by district reorganization."*

*1, pp. 37-38

TABLE I
 NUMBER OF SCHOOL DISTRICTS IN TOWNS, CITIES
 AND VILLAGES: NEW YORK STATE
 1945-1955

YEAR	NUMBER OF SCHOOL DISTRICTS IN TOWNS	NUMBER OF CITIES	NUMBER OF VILLAGES UNDER SUPERIN- TENDENTS	TOTAL
1944-45	5,230	61	97	5,388
1945-46	4,953	62	97	5,112
1946-47	5,663	62	100	4,825
1947-48	4,447	62	100	4,609
1948-49	4,198	62	100	4,360
1949-50	3,767	62	100	3,929
1950-51	3,228	62	100	3,390
1951-52	3,012	62	101	3,175
1952-53	2,798	62	101	2,961
1953-54	2,479	62	107	2,648
1954-55	2,073	62	107	2,242

Source: Fifty-Second Annual Report of the State Education Department of New York, New York, 1956.

TABLE II
 NUMBER OF CHILDREN FROM BIRTH TO 18 YEARS
 RESIDING IN DISTRICTS

YEAR	STATE	INCREASE OR DECREASE
1945	3,385,770	2,230
1946	3,393,363	7,593
1947	3,483,949	90,586
1948	3,553,741	69,792
1949	3,690,195	136,454
1950	3,793,254	103,059
1951	3,941,647	148,393
1952	4,082,869	141,222
1953	4,248,533	165,664
1954	4,441,866	193,333
1955	4,606,312	164,446

Source: Fifty-Second Annual Report of the State Education Department of New York, New York, 1956.

TABLE III
 NUMBER OF TEACHERS EMPLOYED AT THE SAME
 TIME FOR THE LEGAL TERM OF SCHOOL IN EACH YEAR
 (REGULAR DAY SCHOOLS)

YEAR	STATE	INCREASE OR DECREASE
1945	71,806	-528
1946	73,079	1,273
1947	73,686	607
1948	75,025	1,339
1949	77,111	2,086
1950	79,670	2,559
1951	81,930	2,260
1952	83,963	2,033
1953	87,565	3,602
1954	91,384	3,819
1955	95,572	4,188

Source: Fifty-Second Annual Report of the State Education Department of New York, New York, 1956.

TABLE IV
 EXPENDITURES IN PUBLIC SCHOOLS
 1945-55

YEAR	TOTAL (EXCLUDING BONDS AND SINKING FUND)
1944-45	\$352,480,890.19
1945-46	378,143,894.02
1946-47	425,614,877.48
1947-48	477,887,493.23
1948-49	528,719,497.54
1949-50	563,376,270.66
1950-51	616,183,761.44
1951-52	686,883,518.71
1952-53	754,721,653.95
1953-54	821,271,032.44
1954-55	925,362,727.92

Source: Fifty-Second Annual Report of the State Education Department of New York, New York, 1956.

Indeed public education is "big business". The corollary to this fact is that the instruments of education, the public schools, should be operated as big business.

EDUCATION SLOW TO ADOPT

That educators have, generally, been slow to adopt modern business methods may be attributed to several factors. Many superintendents and principals have received training in office management and business practices as part of their course work in educational administration. On the job, however, their time is devoted to matters of more immediate urgency. This is as it should be. Superintendents and principals, particularly the former, are not employed to manage details. Their concern should be with planning, research, matters of policy and supervision of instruction. Unfortunately, few schools have the financial resources to employ business managers. Thus, outmoded business practices tend to be perpetuated.

Other school administrators may have had little, if any, training in business methods. Here the situation is even more difficult. Not only does the administrator find his time for such details restricted but also, even if there was an opportunity, his limited background would hinder him from effective analysis and positive action.

Donald H. Ross, in writing of knowledge and invention as forces for adaptability, states:

"There probably is no part of this nation where the schools are so poor that someone there has not thought of a better way to get something done. Such inventions may be small things, limited in contribution to the achievement of purpose or they may be sweeping--both in the change they indicate from the old ways and in the hope they hold out for better performance.

"No one can condemn an educator, a school system, or a community for consciously rejecting a newer way of doing things. They are expected to weigh the values and costs of the present and the proposed. But it is the tragedy of nonadaptable situations that such judgments are not deliberately made. Too often schools continue with the old technology, not through choice but through ignorance that there is a choice of method."*

Traditionally, education's approach to change in curriculum content, instructional technique and other academic matters has been one of caution tempered by careful research and experimentation. If this were not so, our American schools might well be the pawns of fad and fancy in educational theory. It may be, however, that this cautionary approach to the academic has cast an aura of influence over school business methods as well--and this is regrettable.

The Problem of Non-professional Duties. So far, little has been said of the plight of the teacher due to inefficient business methods. It was pointed out in the Introduction that teachers are subject to many tasks of a clerical nature which encroach upon their professional time. To the layman it might seem that undue emphasis is being placed on this problem. It is difficult, however, for the layman to understand the mental and physical strain experienced by the public school teacher. As many teachers often say, "If only I could devote all my time to teaching and planning I could do a much better job."

Many have written about the seriousness of this situation. In a recent New York Times article the writer had this to say:

*6, p. 12

"All the experts agree that, in the words of the Rockefeller report, 'one way to make better use of the ablest teachers is to eliminate many of the petty tasks which occupy a teacher's time. Less highly trained classroom assistants may accomplish much in the lightening of this burden.' The Fund for the Advancement of Education, putting this theory to the test in Bay City, Michigan, found it successful, and it has spread from there to many communities across the country. A bonus, it was found, came when many of the aides, seeing teaching at its best, became so interested that they went back to college to get their teacher training.*

Another writes:

"Conditions which produce good mental health are vital to creativity. Frequently teachers and administrators are too harried and overworked to do much creative thinking. Furthermore, there is often pressure to produce demonstrable results with a specified time. This is destructive to creativity.

"The work loads of teachers must be revised if these conditions are to be realized. The usual pattern of teaching classes of 30 to 40 youngsters throughout the day, with supervision of extracurricular activities after school, and planning, preparation, and paper-checking at night is inimical to inventiveness."**

In 1957 an interesting project was undertaken by lay members of the residential community of Newton, Massachusetts, near Boston. Under professional guidance these individuals conducted a study intended to "point up various ways of utilizing more effectively the present staff of teachers in the Newton schools." The product of their efforts--a report entitled "Newton Teacher Utilization Study" revealed some

*16, p. 62
**6, p. 40

pertinent information about teachers and their clerical duties. The following quotations are indicative of the general nature of the report.

"Because teachers want to teach, many school systems are making efforts to relieve teachers of some of their nonprofessional (clerical) duties. But most, including Newton, have barely scratched the surface..., a Yale-Fairfield Study and a Los Angeles survey shows this problem as the top cause of teacher dissatisfaction.

"IBM system could save a teacher hundreds of hours during year, give more time to prepare lessons for more children, improve school morale and pay for itself in a short time.

"Bay City (Michigan)--time study in elementary schools showed that the teachers spend 66.1% of their time on professional activities, 21.4% on technical-clerical activities, and 12.1% on miscellaneous activities."*

Questionnaires sent to elementary school teachers in Newton indicated that

"30 out of the 32 teachers, or 94%, work more than forty hours on their school jobs. Only 2 work less. This 94% feel that they spend too much time on details other than teaching. Several declared they would not be concerned about hours at all if they could spend all their time doing what they are trained for, teaching."**

It might be said that to conduct this study and take corrective action places Newton, Massachusetts, in a rather exceptional category. Many talk about the problem, but few relieve it.

It should be pointed out that the ultimate aim of the Newton Teacher Utilization Study was to secure qualified

*12, pp. 3, 26

**12, p. 14

individuals to assist the teacher in performing clerical duties rather than to explore the need for employing business machines. However, the latter objective has become a reality also-- apparently as a by-product of the Study. Late in 1958 the first of several IBM machines were installed and report cards were distributed through the use of the punched card system.

SUMMARY

Clearly, there is an urgent need to relieve teachers and other staff personnel of burdensome, routine jobs. Moreover, the continuing trend toward school centralization will result in greater concentrations of students making even more necessary the adoption of modern business methods to handle efficiently a wide variety of clerical tasks associated with student records and other matters.

In the following chapter the possibilities of using electronic data processing equipment in the public elementary and secondary schools will be explored.

CHAPTER II

ELECTRONIC DATA PROCESSING EQUIPMENT

To the uninitiated much of the terminology used in the field of electronic data processing is somewhat formidable. To view even a simple installation of three machines can be a confusing experience if one attempts to absorb detail rather than get an overview of the entire operation.

The principle of electronic data processing is essentially uncomplicated. The basic instrument is the punched card (see Appendix A, Exhibit 1). The basic objective of punched card systems, simply stated, is information storage and retrieval. The equipment most often used in a small installation is the keypunch, the sorter and the accounting machine.

AN ILLUSTRATIVE PUNCHED-CARD OPERATION

Armed with this preliminary information let us examine in detail a typical punched-card routine. Assume that the principal of Smithville High School, using the new data processing equipment for the first time, wants to obtain three separate listings of his 500 students by age, by sex and by class. The first step is to store this information on a card. For this operation the keypunch is used.

Working from a primary source (such as the student's permanent record), the keypunch operator inserts an unpunched card into the machine and, by depressing keys on the keyboard, actuates the machine to punch small rectangular holes in previously selected positions on the card. Examination of the card in Appendix A, Exhibit 1 will reveal numbers from 1-80 at the top and bottom. For each letter, two holes are punched; for each number, one hole is punched. However, the operator need only depress the "H" key, for example, once, the second punch

occurring simultaneously. A master card is set up previously to provide a guide for the operator. As the card is punched, a printing device prints the information at the top. The operator repeats this procedure for each student, punching in the student's name, age, sex and class. The first operation is now complete. The information has been stored.

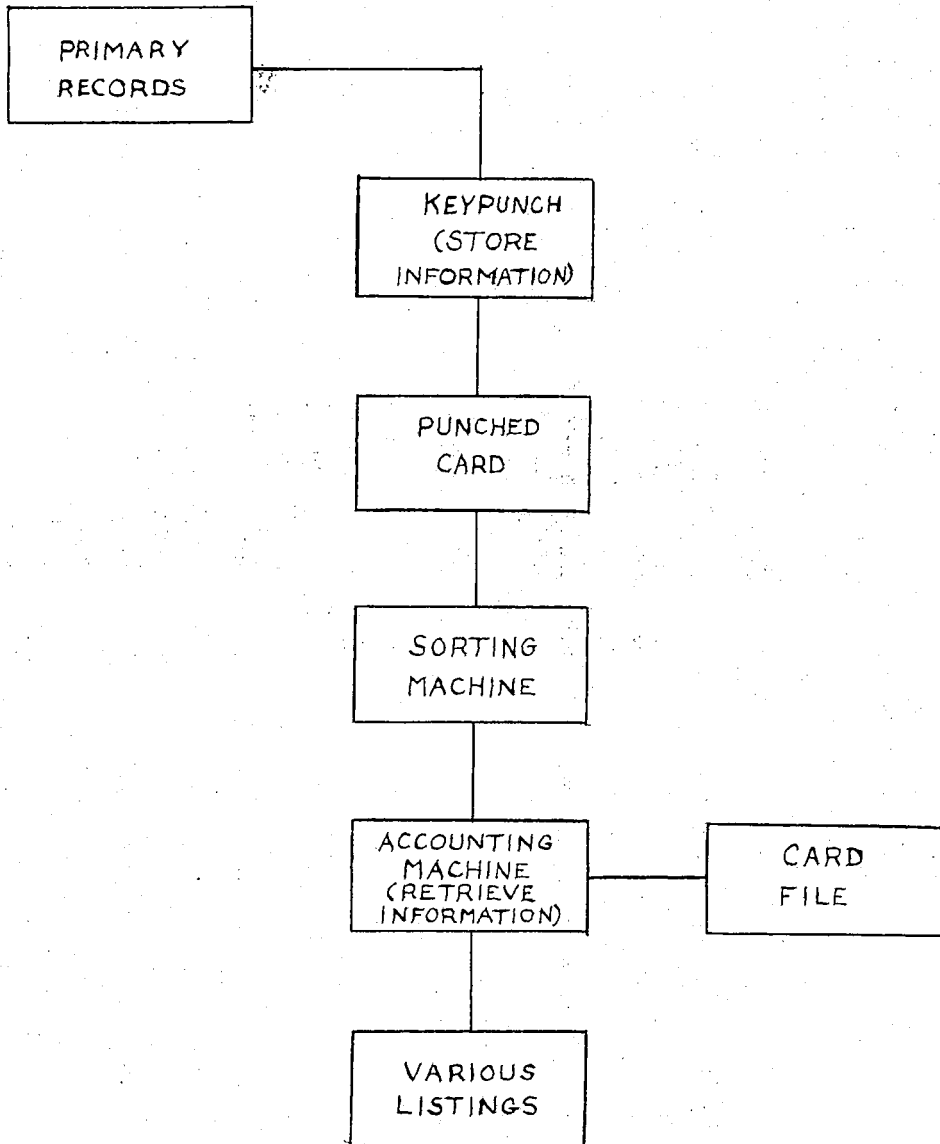
The cards may now be used to produce the listing desired. The first, let us say, is an alphabetic listing by sex. The operator moves to the sorter, operates the column selector to "tell" the machine the column punched on the cards to designate sex--say column 70--and places the 500 cards in the machine. In less than a minute the cards have been sorted by sex. The alphabetic sort is a longer operation since the cards must be sorted 26 times or more, depending on the degree of alphabetization desired. Once completed, however, the cards can be set aside and reserved for alphabetic listing.

The final operation is to print the listing. For this the accounting (tabulating) machine is used. The operator merely places the sorted cards in the machine and turns it on. The machine "interprets" the punched holes and prints the information on a continuous roll of paper. The product is the desired alphabetic listing by sex. Five carbons may be made simultaneously if necessary. The operator can move on to other duties while the machine produces the list. The stored information has been retrieved in the manner desired. The operation is concluded.

It may be helpful to summarize the foregoing procedure by means of the flow chart on page 24.

CHART 3

FLOW CHART OF THE TYPICAL
PUNCHED-CARD OPERATION



ELECTRONIC DATA PROCESSING IN THE PUBLIC SCHOOLS

The punched-card technique is not new. Business and industry have for several decades been using it in increasing measure. Why the public schools have been slow to adopt it has been discussed earlier in this study.

In New York State, however, a dozen or more schools have installed IBM equipment during the past few years and their success has encouraged others to take the step.

Following is a partial list of public schools in New York State with punched card systems installed or on order.

1. Endicott Public School, Endicott
2. Haverstraw City School, Haverstraw
3. Huntington Station, L. I.
4. Kenmore City School, Buffalo
5. Maine-Endwell School, Endicott
6. Massapequa, L. I.
7. Massena Central School, Utica
8. Nyack Public Schools, Nyack
9. Plainview Central School, Plainview
10. Rochester Board of Education, Rochester
11. Shaker Heights High School, Albany
12. Vestal Central School, Vestal
13. Windsor Central School, Endicott

Before examining the schools of the Tarrytowns for possible IBM applications it might be wise to become familiar with the experiences of schools having installations in actual operation.

In Massena, New York, IBM equipment is being utilized for high school registration, report cards, census purposes and scoring of objective tests. In September, 1958, when the high

school opened, all students were furnished with class schedules produced electronically. In addition,

"The teachers received printed lists of each class, homeroom and study hall. Each office was supplied with complete records for pupil accounting purposes. This program eliminated an estimated 2,000 hours of teacher time previously spent in processing student registration and class balancing. The guidance department continued the practice of individual counseling in determining the next year's program."*

In the area of report card production this comment was made:

"Previously a great deal of teacher time was consumed waiting for other teachers to finish with the cards, entering the marks on the cards and then posting those same marks on various reports. Under the present system, the teacher 'mark senses' # a card for each student in each subject, sends these to the IBM office (no need to alphabetize!). The electronic machinery collects and records this information on one sheet and prints the student address on these. These reports are then mailed."**

In Newton, Massachusetts, the advent of IBM equipment in the high school report card area resulted in this eye catching--if somewhat misleading--headline in a Boston paper:

ROBOT TO ISSUE REPORT CARDS

In the article the principal spoke of these advantages:

"First, we will increase instructional time by making use of six days each year that teachers formerly worked exclusively on report cards. Second, our clerical help won't be tied down by laborious work on master records, transcribing marks for colleges and other bothersome details."***

#The "mark sense" process involves marking with an electrographic pencil the card to be punched. A machine picks up the marking and punches the card automatically.

*15, p. 338

**15, p. 338

***19

Joseph M. Carroll, assistant director of business services, had this to say:

"Until the development of this type of machinery, we didn't have a practical way of accurately measuring the success of our business. We now hope to determine what people really do learn. In the guidance field, we hope to predict for pupils their success if they elect certain courses of study."*

It is not always possible to effect immediate cost savings through installation of data processing equipment. More often it is found that the first benefits are an improvement in morale. In Jackson, Michigan, however, after four years of punched-card use, a school official wrote:

"In every application of the punched-card methods to tasks done previously by other methods, the public schools in Jackson, Michigan, saved considerable sums and we have records to prove it. But I would like to emphasize that our savings--though they are real and consistent--are not the significant factors in our program. More importantly, we have improved the quality of instruction in Jackson...."***

This sampling of comments indicates nothing of a negative nature concerning the use of punched cards. Later in this chapter, though, some disadvantages will be presented.

Major areas of application. To state it briefly, there are two major areas of application for electronic data processing in public schools. The first is student records and the second, business applications. For the small school system just beginning to use punched-card equipment the first application would probably be in the area of student records.

*19

**21, p. 38

How large must a school be in order to use a punched-card installation economically? As a general rule of thumb it may be said that if the student records program is carried out completely, a high school registration of around 1,000 students would justify the installation. On the other hand, if use is made of the equipment in the elementary school and if some business applications are made a smaller registration may suffice.

The student record area of application may be subdivided into six elements:

1. Census records.
2. High school registration and scheduling.
3. Attendance records.
4. Report cards and preparation of permanent records.
5. Testing and test analysis.
6. Miscellaneous reports and lists.

The business applications area may be likewise subdivided into six elements:*

1. Payroll.
2. Personnel records.
3. Appropriation accounting.
4. Property accounting.
5. Supply requisitioning and inventory.
6. Cost accounting.

It is apparent that several of these elements would probably be reserved for the larger school system.

The subdivisions for both of the major areas above could be further expanded to indicate the diversified uses.

For example, the original information obtained for the census will provide facts that may be used to determine current and future requirements for the budget, school housing, transportation, teachers, the physically handicapped, new construction and other facilities.

Disadvantages of punched-card use. At the outset it should be explained that most disadvantages of punched-card use are not inherent but are usually caused by poor planning and operator error. All procedures must be carefully worked out prior to actual operation. Written instructions for each routine should be available for operator reference. Check points should be established and adhered to rigidly by the operator so that errors may be discovered before procedures are completed.

The faculty should be briefed on the use of punched cards and should be kept informed--particularly where a new installation is going into operation. As a Newton, Massachusetts, administrator pointed out: "Teachers need much briefing prior to IBM installations. They must be told that mistakes may be made at first, that a particular operation transferred to machines may seem more complicated at first but will grow progressively easier with additional practice."*

Another hazard of machine operation is "dead" or unused time. Whether equipment is purchased or rented, idle time is wasted money. Again, this can be largely a result of poor planning, although in a new installation periods of idleness may occur more frequently than when the full potential of the data processing program is realized.

"Down time", or unused time due to machine breakdown must be anticipated. However, service personnel are generally nearby and are available for rapid repair in addition to regularly scheduled service calls. The list of IBM services in Appendix B spells this out in detail.*

It is wise to remember that most errors in punched-card operations occur before the cards are put into the machines. The following article from a St. Louis, Missouri, newspaper illustrates the result of poor planning and inaccuracies.

"An electronic experiment in education has shortcircuited St. Louis' biggest high school. The Board of Education and officials of the 2,000-pupil Beaumont High School assigned an electric brain to channel students to classrooms and class periods. The machine gave out cards telling students which classes to attend.

It was hoped that the first two days of school, which began September 4, could be used for instruction instead of untangling just where everybody belongs. But seven days later the halls and classrooms are still clogged with nomadic students.

Walter Gammeter, school principal, said about 700 students go on an electronic run-around. He explained that his students probably made a mass of clerical errors last spring when they filled out the punch cards the brain lives on.

A reporter visited the school yesterday and saw seven psychology students sitting on the floor of a filled classroom. 'This,' their teacher remarked dryly, 'is the result of automation.'***

CHAPTER III

POTENTIAL APPLICATIONS OF DATA PROCESSING
EQUIPMENT IN THE SCHOOLS OF THE TARRYTOWNS

HIGH SCHOOL REGISTRATION

The Sleepy Hollow High School in North Tarrytown has a current registration of 800 students. In September, 1959, it is expected to increase to 875. Twice yearly the students, with the assistance of a guidance counselor, select their courses for the next semester. Following is a summary of the various steps leading to permanent class assignment for the fall semester under the present system.

Early in the year (February-March) the guidance counselors schedule conferences with all students. A form (Appendix C, Exhibit 1) requiring the signature of the counselor and parent is completed. Eighth grade students fill out a different form (Appendix C, Exhibit 2) which tentatively blocks out their four year program. From these forms the number of students at each grade level and their course selections are entered on a course enrollment form (Appendix C, Exhibit 3). Thus, the total number of sections is computed. With this information, work on the master schedule begins.

At this point, the guidance counselor, with his knowledge of student background, creates an individualized program. Would this student do better work in a different class section? Is it possible to place him with a different teacher for this particular subject, since apparent personality conflicts with the last instructor have resulted in a bad year? Here, also, is the point at which the guidance counselor expresses concern about punched-card procedure. The Sleepy Hollow Director of Pupil Personnel Services, in an interview with the author,

stated that the individuality of the scheduling procedure must not be sacrificed to the machines.*

After the master schedule has been prepared, the information is distributed to the faculty and on the first day of school in September each student in class transcribes his schedule to his program card (Appendix C, Exhibit 4). Barring unexpected changes, this is the student's schedule for the fall semester. Copies of the schedule must now be prepared for various purposes. Later, class and homeroom lists must be given to the faculty. Counselor's lists--one of boys and one of girls are needed. Much clerical time is spent preparing these lists and schedules.

To what extent can punched-card equipment be used in the registration procedure?

In Nyack, New York, the high school registration procedure was accomplished in September, 1957, with the assistance of punched-cards for the first time. Under their previous system it took five school days for 70 teachers to register and program the students at the beginning of each term. With the IBM machines 1,300 pupils were completely scheduled the day school opened.**

The procedure followed by Nyack can be adopted by many school systems with little change. For Sleepy Hollow High School the registration operation may be summarized as follows.

When the student selects his program for the coming semester he marks his choice on a punched card. The cards are then checked and approved by the guidance counselor who also

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writes code numbers on each card according to the section assignment for each subject (Appendix A, Exhibit 2). The cards are now ready to be punched. After punching, the cards are machine counted to determine the total number of requests for each subject.

When the master schedule (Appendix C, Exhibit 5) has been prepared (manually) it indicates the subject, teacher, number of students electing a course and room assignment. The actual number of students assigned to each period has not yet been determined.

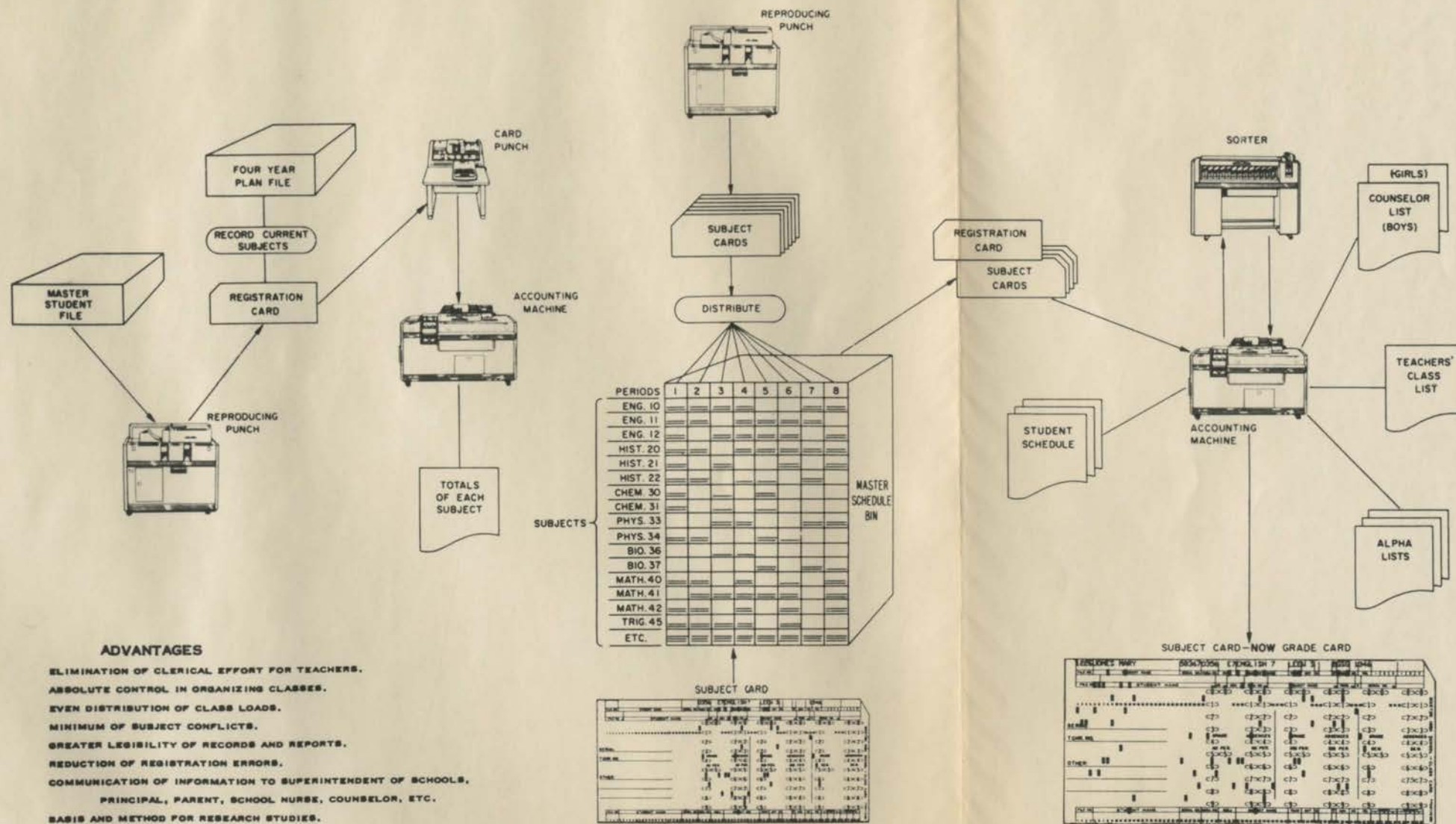
Now a new card is made for each subject on the master schedule. These "master" cards are placed in a convenient tub file. After each master card is placed a subject card for each pupil electing a course. The subject cards do not contain a pupil's name. They are merely indications of requests for courses. Later, after all changes (failures, drop-outs, new pupils) have been processed, the final phase of registration begins.

Using the sorting machine, student requests are then assigned to the least offered courses first, then, progressively to the most offered course. The cards are then resorted and fed to a third machine which prints the individual daily program (Appendix C, Exhibit 6). These programs can be mailed to the students before school opens or they can be distributed on the first day of school.

The same cards can now be sorted by teacher to print a class list for each subject. An IBM flow chart on the following page illustrates the registration procedure.

CHART 4

IBM HIGH SCHOOL REGISTRATION PROCEDURE
(KEY TO FREING TEACHERS FOR TEACHING)



Source: Public Education Student Records. International Business Machines Corporation, New York, 1957.

Report cards. As a by-product of the scheduling procedure each teacher also receives for each student a punched card (Appendix A, Exhibit 3) that may be used to produce report cards. Using an electrographic pencil the teacher fills in the spaces on the card to correspond with the numerical grade. Number codes are established in order that the teacher may also give a citizenship mark and make a remark concerning the student's overall progress.

The cards are then sent to an IBM service bureau to be punched. The report (Appendix C, Exhibit 7) is produced when the cards are processed on the school accounting machine.

School administrators and guidance personnel are not as ready to accept this use of punched cards as they are other uses. Some feel that a machine-produced report card is "too cold" that it lacks the personal touch of the teacher. However, teachers are usually pressed for time when preparing report cards and can seldom make the written observations they would like. If time is saved by use of punched cards it might be utilized by the teacher for individual conferences with students, when necessary. This can often be much more effective than written comments on report cards.

The Jackson, Michigan, public schools have had good results with their IBM-produced report cards.

"Much has been gained. For example, the analyses of grading policies, retentions, and promotions, which had never been done before, could now be accomplished with ease....A great deal of analysis has been brought forth--analysis aimed toward the marking philosophy of each teacher. When the high school became interested in the report card system, we made an experimental run on one semester's high school report cards. We discovered almost immediately, that there were certain discrepancies in the reporting philosophy and procedure used at the high school. Result: a report card

committee has been established and has been working ever since to iron out these problems. The discrepancies would never have come to the surface but for punched-card analysis."*

It is possible, however, to analyze grades without changing to machine produced report cards.

Attendance. Taking the daily attendance and maintaining the attendance register are clerical duties which consume an unnecessary amount of the professional's time. Yet attendance information is important and must be accurately recorded. State law requires every teacher to maintain a register in a prescribed manner. State financial aid to schools takes into consideration the attendance statistics of each school district. Attendance registers have, on occasion, been used in court to verify individual cases of pupil attendance. States vary in the amount of information required in the register, with New York probably demanding as much as any.

The questionnaire on page 37 was distributed to 127 teachers in the schools of the Tarrytowns. Eighty-seven, or 68 per cent were returned. The questionnaires revealed that, on the average 2 hours per attendance period (5 weeks) per teacher were spent maintaining the register. Since there are eight attendance periods in the school year, 2,032 hours of professional time are literally being thrown away annually.

Here, again, the punched-card system can yield fruitful results. To avoid going into somewhat repetitious detail it is sufficient to say that the teacher would simply be required to submit one card for each pupil absence during the day. A permanent card file would be kept in the homeroom and the

*21, p. 39

QUESTIONNAIRE SENT TO TEACHERS IN THE PUBLIC
SCHOOLS OF THE TARRYTOWNS

Several school systems in New York State have been experimenting with business machines to aid the professional and clerical staff in performing routine clerical duties. Two such duties traditionally onerous for the teacher are obtaining daily attendance figures and maintaining the attendance register.

State law does not presently permit the use of business machines (such as those manufactured by International Business Machines, Corp.) for the above purpose. Pending a proposed revision of the law, however, and preliminary to the possible use of business machines in Tarrytown, the following information would be helpful:

1. How much time approximately do you spend obtaining daily attendance figures? _____
2. How much time approximately do you spend during each attendance period maintaining the attendance register? _____

Please return by Friday, January 30th, to me.

Signature of School Principal

students' cards would be returned to the file after use on the machines for daily attendance accounting. Each teacher would receive during the morning session a daily list of absentees. There would be no need for teacher-maintained registers.

Unfortunately, as indicated on the questionnaire, present State law does not permit the use of machines for this purpose. However, a pilot study in the utilization of punched-cards for attendance accounting has been successfully carried out in the public schools of Vestal, New York, with the knowledge of the State Education Department and approval of machine-produced attendance registers is expected within a short time.

Other states are cognizant of the advantages of machine accounting in this area. In Massachusetts, e.g., legislation was filed by the State Board of Education early in 1959 "authorizing the use of automation equipment in keeping school registers." The Committee on Education heard the bill on January 23rd and on February 10th it was with the House Ways and Means Committee.*

Test scoring and Analysis. Tests of ability and achievement occupy an important position in the public schools of today. Much reliance is placed on test instruments in determining class and section placement--in junior high and high school level especially, but also at the elementary level. However, many analyses of test results that educators would like to undertake are often impractical due to shortages of time and clerical help. Electronic data processing equipment is particularly well suited for adaptation in this area as well as for producing simple listings of test results (Appendix C, Exhibit 8).

At present it costs the Public Schools of the Tarrytowns approximately \$600 annually to have tests scored outside the school. In addition, much clerical time is spent preparing various listings of test results. A major disadvantage in "farming out" the test scoring job is the delay in receiving the results. The Director of Pupil Personnel Services at Sleepy Hollow High School reported as much as a 45 day wait before test scores were returned from one agency.

A test scoring machine would eliminate long delays such as this and would cost no more than the figure stated above for outside scoring. The machine rents for \$50 a month--\$600 annually.

This educator was enthusiastic about the statistical analysis made possible in his school by the acquisition of a test scorer and additional IBM equipment.

"When our own test scoring machine was delivered, we were able to get started on the problem that most concerned us. Over a period of years, we had noticed that no real improvements had been made in our testing program. Test data was being collected but relatively little analytical information was available to the teacher. With the equipment in hand, we were able to enlarge our testing program about fourfold. Machine-scored tests were used from fourth grade up. A profile card was developed which contained the test scores for each individual. Using these cards, classroom means were obtained as well as school and grade means in each subject area."*

On the other side of the ledger, one guidance director reported that some of her faculty felt by relinquishing the task of correcting their own tests that they were less aware of their pupils' deficiencies.**

*21, pp. 38-39

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CENSUS

In New York State, school law requires an annual census of all children from birth through 18 years of age. Also required is additional data concerning students in private schools and whether they are attending in or out of their district. Punched cards are ideally suited to this type of work. Ancillary uses of the original census information, such as transportation and housing requirements, were indicated in Chapter II and are readily obtainable.

The census procedure is relatively simple. During the year the punched cards are first used the census taker completes an Enumerator's card (Appendix A, Exhibit 4) for each child. From these cards, using the columns indicated, a School Census Card (Appendix A, Exhibit 5) is prepared. The cards are then ready for listings and statistical analysis.

After the first year the census taker need only fill out an original card for new children in the district. The old census cards are reproduced to provide him with a new set of interpreted cards for the current census. Changes are indicated in pencil in spaces provided on the card. After the first year, then, card punching is reduced to a minimum.

A master student record file can also be created by reproducing the original census cards and adding a student number when the child enters school. Additional data, such as test scores, can be added, providing a master card that can be used for the child's entire public school career.*

ELEMENTARY SCHOOL USES

Punched-card procedures can be widely utilized at the elementary level also. Class listings can be prepared by machine, thus eliminating one typing task.

Teachers can be provided with test score and achievement data for each student from the first day of school. The only alternative method of obtaining this information is for the teacher to examine his student records and compile the data himself--a job that requires several hours work. On the opening days of school this amount of time is seldom available.

OTHER USES

A whole chapter on other uses might easily be written. Just a few might be mentioned here.

The Superintendent of Schools in the Tarrytowns has been working on a plan to evaluate teacher performance in objective and quantitative terms. A large amount of clerical work would be involved. The lack of IBM machines would substantially extend the time needed to put the plan into operation.*

Another school uses punched cards in procedures to determine individual differences.

"We classify all pupils in reading, mathematics and science according to level of progress....Each student is grouped with those of similar levels of progress from Grades Kindergarten to nine. Each year we will add one more grade. A classification card is made out indicating achievement test scores and:

1. Grade level of accomplished material, independent of chronological grade level; i.e., a fourth grader may be classified 7.5 in reading, 5.6 in math, etc.
2. Success of group placement; i.e., High, Average or Low.
3. Quality of work (A,B,C,D,E) based upon teacher observation. These three criteria are used in conjunction with test results to group the pupil for the coming year."**

The IBM application here is apparent.

*10, p.26

**31

In Syosset, Long Island, the Personnel Director of the public schools, using IBM equipment, has conducted a comprehensive personnel study for the use of the administration. A brief questionnaire was sent to all teachers requesting information about college attended, degrees awarded, subjects taken, number of hours earned beyond present degree, etc. An IBM service bureau was used for card processing since the school does not have equipment. The survey cost \$200.*

The problem of "dead" time, mentioned earlier, could be alleviated by putting the machines to a variety of miscellaneous uses. The equipment may be utilized to prepare the school directory. This job usually requires several weeks of clerical effort. With punched cards it could be distributed much earlier in the school year.

Envelopes can be addressed and gummed labels printed mechanically. A card file for audio-visual and library inventory could be set up.

It might be said that the degree of utilization of data processing equipment is limited only by the variety of machines on hand and human ingenuity.

CHAPTER IV

THE HUMAN RELATIONS FACTOR IN PROCEDURAL CHANGE

How important can human relations be in such a seemingly uninvolved matter as the installation of a few machines? To answer this question it may be helpful first to ask another. What is human relations? At the risk of oversimplifying the definition one might say that human relations is a state of understanding existing between two or more individuals. Here, the key word is understanding in the sense of agreement of opinion and adjustment of differences.

As we go about our work and play we all practice human relations to a greater or lesser degree. In our contacts with others there is continual emotional interplay, action and reaction. Constantly we are--or should be--trying to understand the other's point of view, to suppress suspicion and prejudice in favor of tolerance and sympathy. Human relations is the art of understanding.

A former vice president of General Foods suggests that "...in these words 'human relations' we may be involved actually in this difficult and sometimes ridiculed field of semantics. Suppose, for example, instead of the words 'human relations,' we would use the words 'human dignity'...suppose, instead of 'human relations' we used the words 'human values'."*

These words seem to indicate more aptly the vital individual importance of human relations. What is needed is the awareness that in human relations we are concerned with the value, the fundamental worth of the human being. It is more than merely going around with a kindly air and a pleasant word or two. Good human relations never has been as simple as this and it never

*20, p. 80

will be. To the contrary, recognition of the worth of the individual is becoming increasingly difficult in an industrial society tending more and more toward de-emphasis of the personal contribution.

Perhaps at this point, it would be helpful to trace the development of the methods of production from early times up to the present.

In general, it may be said that the trend has been constantly toward breaking down into separate elements the production of a specific item, with specialists assigned the task of producing each element. For example, the manufacture of shoes was formerly the task of a single specialist--the shoemaker. Today the shoemaker has virtually disappeared from the American scene and he is rapidly disappearing from other countries of the world.

Modern shoe manufacturing enlists the help of many "specialists", one assigned to selecting the leather, another to cutting, still another to sewing, and so forth. While each has a part in the production of the end product, he is denied the pride of workmanship and the total responsibility that was the lot of the old time shoemaker.

In various parts of the early Roman Empire "factories" existed for the manufacture of pottery as well as articles of glass and bronze. In Antioch and Tyre, during the Middle Ages, silk factories were in operation. In the late medieval period textile factories began operating in various European countries.

However, although these factories may have actually been a type of mass production, the work was, for the most part, unmechanized. Most of the manufacturing was done under the domestic, or putting out system, by which a worker received the raw materials, performed the labor in his own home and returned the finished product to the supplier of the raw material. Thus, the worker still enjoyed two fruits of his labor--pride of workmanship and financial reward.

During the medieval days, the craft guilds stifled attempts at improved production techniques in order to prevent one shop from producing more and less expensive goods than another. However, the advent of capitalism with its stress on the competitive market and large-scale production brought about the decline of the craft guild and set the stage for the Industrial Revolution.

The Industrial Revolution got under way in England during the 1760's with the invention of the spinning frame, the power loom, the spinning jenny and James Watt's steam engine. In the late eighteenth and early nineteenth century, the Industrial Revolution had spread to America, where textile factories began operating in Rhode Island and Massachusetts. By the middle of the nineteenth century, in Waltham, Massachusetts, watches were being produced on a mass production basis. Similar changes in production techniques spread to other industries. Thus, in America, the era of worker specialization was well underway.

As the mass production factory developed in America, so did the study of production technique and factory organization.

Of all proponents of work techniques and organization none is, perhaps, as well known as Frederick W. Taylor, often called "the father of scientific management". Taylor suggested eight principles of good management intended to: clearly specify the task to be done; provide remuneration proportional to the degree of worker success or failure; increase cooperation between management and the workers; provide adequate working conditions; establish worker selection and training techniques.

Taylor also felt that management should foster individuality among the workers and should actively promote worker welfare.

Taylor's studies and those of his disciples have had wide influence upon business and industrial management. However, of all his principles of good management, that of fostering worker individuality has been--and will be--the most difficult to follow.

THE HUMAN AUTOMATON

In discussing the effect of automatic machinery upon the worker, the writer is reminded of the cartoon illustrating a new employee being introduced to his job. In the background there is a huge machine and, on the side of the machine, a lever with positions marked "on" and "off". Underneath the lever is the worker's chair--nothing else. As the caption, the foreman asks, "Think you can handle it?"

This is, we hope, an exaggerated picture of automation. Nevertheless, it illustrates the problem perfectly. How can management administer to the individual needs of the worker and provide for recognition of the job accomplished when the job has been reduced to a small segment of the total operation?

The importance of studying this question was sharply emphasized for the author on a visit to a Ford assembly plant. On either side of the assembly line were the workers at their stations performing relatively uninvolved tasks. At one station part of the body was lowered to the chassis; at another the body was secured; at a later station the wheels were bolted on by a worker operating an automatic tool. Hour after hour, day after day, this man puts wheels on cars. It is hard to imagine him reflecting with much pride or satisfaction on his daily achievement. There are thousands upon thousands of individuals in our country who similarly perform uninvolved, repetitive tasks--not only on automotive assembly lines but in mills, factories, business concerns, on construction crews and in numerous additional job areas.

Alfred J. Marrow, in commenting on this problem, writes

"The average industrial job consists in repeating the same simple series of manual motions over and over throughout the day... (a) worker...acquires no sense of connection with the enterprise that employs him, or with its product. He is just a part of the machine assembly, employed until someone invents a machine to replace him. He rarely even sees the end product his monotonous chore contributes to. He hardly ever encounters the officials of the company.... Inevitably, this does violence to his sense of his own personality. Everyone wants some part, however small, in shaping the scheme of things he is in. If he is an American, this want of his qualifies every aspect of his way of life.*

Marrow goes on to remark about the effect of worker apathy on national production.

"How much is lost because workers lack interest in their work is almost incalculable. Bernard Holdane in the Harvard Business Review for Autumn, 1947, has written: 'Leading authorities in the field of occupational psychology have frequently pointed out that most people are nowhere near a hundred percent efficient at their jobs.' Carroll L. Shartle puts the typical figure at 30 per cent efficiency. 'It is relatively rare,' he says, 'for men and women to produce the results they might obtain if their talents were more effectively organized.' That this is true is apparent to whoever looks about him in any office or shop and takes note of the indifference which prevails among employees, when no supervisor is at hand to watch them. In routine jobs, they merely try to 'get by' with the minimum effort that is required of them."**

With the advent of automation in industry and business the problem of the repetitive job discussed above will be intensified. While the physical strain of the job decreases, the emotional strain will increase and many psychological problems

*3, pp. 16-17

**3, p. 19

will appear among the ranks of the automation workers. This further emphasizes the need for management to understand human wants both on and off the job and to be prepared to administer to these needs wisely and sympathetically, yet avoiding the dangers of paternalism.

UNDERSTANDING THE HUMAN SELF

In order to understand the nature of the self one must consider the total background of the individual--his cultural inheritance, his environment, his socio-economic level, his biological and emotional needs. Indeed, management must not only possess the skill of the economist but must also be cognizant of the disciplines of the psychologist, the sociologist and the anthropologist. To ignore any one of these areas is to ignore the total nature of the self.

Ordway Tead, in his excellent work, The Art of Administration, writes of the need for self realization.

"...the desire to maximize the ego, or self, is a centrally determining influence. All individuals are constantly seeking to be possessed of a sense of worth-whileness. The wish for worth is tremendously strong. People want...to be identified and acknowledged as individuals or persons. They want to have acknowledged value as a self-first and foremost in their own eyes, and then in varying degrees in the eyes of others...the question arises as to how and where this maximization of the person occurs and may be wisely helped to occur."*

Tead goes on to comment in this manner upon the necessity for satisfaction on the job.

"(The) experience of daily work and of associations at work should be satisfying and truly expressive of vital interests and aptitudes of the individual...if all-round self-expression is to be achieved. For if the individual...finds little satisfying expression in the course of his employment, he is sure to seek

*8, p.46

to register on some other front of living and invest as little as possible energy in the work situation or invest it there in abnormal or destructive ways."*

The reader may wonder what place the foregoing discussion has in a chapter on procedural change. The relationship is this. The author has pointed out the steady transition in business and industry to labor saving machinery. Whenever machines are introduced individual work routines are altered and, frequently, jobs are eliminated. Management must endeavor to carry out procedural changes--whether major or minor--in such a manner that the affected employees continue to find satisfaction in their jobs. That this is easier said than done is certainly true. Too often management is unwilling to expend the effort necessary to effect a smooth transition.

The need for worker involvement. As a guiding principle, management should observe that if employees are involved in the changes to be made they will be more willing to accept them and will cooperate to a far greater degree than if the change was arbitrarily imposed.

This idea of involvement is nothing new. Unfortunately, however, management often feels that to discuss proposed changes with employees and to ask for their opinions and suggestions is to sacrifice authority. This is poor reasoning and can indicate unsureness on management's part. Indeed, it is not that authority is lost but that respect is gained.

Educators have long been aware that to involve children in planning their daily activities is to insure heightened interest in the work to be done as well as facilitating placement of each child in the activity to which he is best suited. Again,

this is not easily done and requires careful preplanning on the part of the teacher.

Marrow writes of the virtues of involvement or, in his words, participation, as follows:

"Participation puts a man's job in a new light. He sees things differently vis-a-vis management. A competitive relation tends to shift toward a cooperative one. If he is consulted, he becomes aware of a mutual interdependence. Participation brings such awareness perhaps because it results in modifications of management's proposals which accrue to the benefit of both, making the worker more willing to match concession from management."

He further states:

"Reciprocal patience, shared responsibility, flexibility... are among the significant conditions of participation. They are notable ingredients of an esprit de corps in an organization, and the business head who creates it changes his status from that of a feared and disliked bureaucrat who can fire and hire into that of a respected and effective leader, symbolizing the unity of his company."*

At this point it is apropos to mention the often cited experiment carried out in Chicago at the Hawthorne plant of the Western Electric Company, a subsidiary of the American Telephone and Telegraph Company.

The experiment was undertaken in 1927 to determine the effect of working conditions upon productivity. Two groups of researchers participated, one from the company and another from the Harvard University Graduate School of Business Administration.

Actually, two separate investigations were performed simultaneously. The first investigation was devoted to a study of employees on group piece-work. One researcher remained with this group for several months observing the reaction of the

*3, p. 113

workers to the company's wage incentive plan. He found that the plan was not, in reality an incentive to increased production. Instead, the workers set their own production level and influenced those who were above or below the quota to readjust their output--even though the above-norm workers increased the wages of the entire group.

The second investigation concerned relay-assembly girls also on group piece-work. Production was measured before and after changes had been made in working conditions such as rest periods, lighting and work hours. At first it was believed that the increased production was a result of improved working conditions. At the end of the experiment, however, the high level of output was maintained despite a return to the original working conditions.

The researchers finally concluded that this unexpected development was due to the fact that the girls had been involved in the experiment. They had been asked to participate in the experiment and thus had been noticed, had been set apart as individuals. They had been given an opportunity to offer their opinions and suggestions about improvements in working conditions. They felt, in effect, a sense of close participation in the experiment--a feeling that remained even after the study was concluded.

We have in this example, then, an indication of the importance of involving workers where changes are to be made.

COMMUNICATIONS AND HUMAN RELATIONS

For several years the writer worked as a job analyst for a banking concern of moderate size. One of his tasks was to interview employees whose job duties had changed as a result of department reorganization, installation of labor-saving machinery, etc. Prior to the interview he reviewed a questionnaire completed

by the incumbent concerning the duties and responsibilities of the job. Occasionally, he discovered that an employee had overstressed the importance of certain duties in an effort to build up the importance of the job. Or, where duties had been entirely eliminated due to the installation of labor-saving machines, the job incumbent had deliberately overestimated the hours spent on his remaining tasks in order that the job grade might not be lowered. These are understandable human reactions but they need not have occurred if the employee had been thoroughly briefed on the reason for the job study.

When job evaluation was initiated at this concern, the staff was reassured that no one would suffer a decrease in salary as a result of the job study and that every effort would be made to reassign employees whose job grades were out of line with their salaries. An atmosphere of trust and good will was fairly well established. As the years passed, however, the original reassurances were forgotten by many of the staff and new employees knew little or nothing about them. Hence, to have one's job studied was often an occasion for uneasiness and even suspicion on the part of the incumbent. This attitude made it difficult of course, for the interviewer to get a true picture of the job.

This illustration is included to show the need of being continually communications-conscious. The attitude of the bank management toward the employees had not changed over the years, but management had done little to reassure the staff that this was so--at least in regard to the job evaluation.

Good communications--up, down, and horizontally--is a part of good human relations in any organization and the lack of communication can affect adversely individual and group morale.

The above-mentioned Hawthorne study also illustrates excellent communication procedure. The relay-assembly girls were constantly kept informed as the experiment progressed. They were free to talk with the observer at any time to offer their opinions and suggestions.

Communication in Management, by Charles E. Redfield, offers some guiding principles for effective communication that management would do well to observe. Redfield suggests the following principles.*

1. Clarity. The administrator should say what he means and mean what he says. Avoid organization jargon--particularly where newcomers are involved. Use "short sentences, short words, and a quota of proper names and personal pronouns." Communicate through channels, "giving intermediates at each level the opportunity to interpret as required."

2. Consistency. Be sure that messages are consistent with the known policy of the organization. For example, if the employee handbook assures an open-door policy, then the door must be open in actuality and not "barricaded by secretaries, lines of callers, or even by expensive furnishings that frighten subordinates into not entering or overwhelm them into saying nothing when they do."

3. Adequacy. Work toward a maximum flow of information--"enough to cover the entire organization but not so much as to smother anyone." Often it is better to issue a number of shorter messages rather than a few lengthy ones.

4. Timing and timeliness. The effect of a message can be seriously undercut if the timing is poor. Opinion polls, for example, should not be taken just prior to or just after a labor

*5, pp. 26-27

dispute since the results are apt to be distorted. The same influences affect executive messages.

Issue messages in time for the information to be effectively used. "Out-of-date information is as bad or worse than none at all."

5. Distribution. Determine the audience before transmitting the message. Make sure that channels are not by-passed.

6. Interest and acceptance. The objective of any message is to elicit a positive response. "(If) there is to be any response... the message must cross the mental threshold of the person to whom it is addressed...he should be interested in and accept the message.... An order-giver depending solely on authority may not always secure interest, although there will necessarily be a passable degree of acceptance."

PLANNING AND EXECUTING THE PROCEDURAL CHANGE

Any change in procedure, whether it be major or minor, should, for best results, be planned in detail and well in advance of the initiating date. All affected by the change should be informed as to the reason for it and the extent of its influence. Provisions for follow-up interviews should be included in the original plans.

In writing of problems encountered in converting to machine processes one school official remarked:

"Office routines and procedures must be altered. There is a period during which other personnel in the system must be educated to the changes in procedures. If the school system has, or can obtain, a person who is trained in systems and procedures work, it will greatly facilitate the change over. The eventual efficiency of the installation, and its integration into the activities

of the school system depend largely upon a good working relationship between the person in charge of the machine unit and a member of the administrative staff who can interpret their needs and desires."*

Before changes in procedure can be instituted existing procedures must be studied. Where automatic data processing machines are to be installed, the personnel whose routines will be affected must be interviewed and their job routines analyzed. It is at this point that difficulties can arise as a result of insufficient communication. One can sympathize with the clerk who, completely unaware that labor-saving machines are to be installed, is confronted with an interviewer who advises her of this fact and then proceeds to question her on her job duties. The status quo has been challenged. What does the administration have in mind? Will part of her job be eliminated? If so, how will it affect her? These fears and suspicions can easily create antipathy toward the interviewer which can diffuse sympathetically among the entire office force.

Much of this can be prevented by having the office manager, superintendent, or some other member of the administrative staff explain the new plan before any interviewing is done.

It is wise to examine, at this point, the peculiar position of the interviewer (or operations analyst, as he is often called in business and industry).

In several ways, the operations analyst starts out with two strikes against him. In the first place, he has been assigned the task of improving operations which cannot be as familiar to him as they are to the incumbent. Yet he presumes to suggest that there are better ways to do the job. Secondly, as mentioned

above, unless preliminary briefing has paved the way for him, he is apt to encounter a degree of hostility.

"If (the analyst)...is oblivious of the inherent forces of hostility, or unsuccessful in mitigating them, his chances of...fruitful result are seriously impaired or blocked entirely. Mild or overt opposition to operations analysis can all too easily modify behavior and yield misleading or meaningless information and conclusions. And, even when good data are obtainable, the opposition of operating personnel can, quite literally, sabotage results."*

In all phases of the procedural change it is important then, to secure the cooperation of the personnel involved. If, through willing participation they identify themselves with the project many of the roadblocks will be removed. However, care must be taken that the attempt to enlist participation is done in good faith and with sincerity. A Machiavellian approach may succeed for a while but, ultimately, it is doomed to failure.**

Occupational Stereotypes. It was mentioned above that the operations analyst may encounter some degree of hostility among the individuals with whom he is working. Some of this feeling can be eased by thorough explanation to the employees of the proposed changes and requests for their suggestions and opinions relative to the change. However, management should be aware of the existence of thought patterns, of stereotyped beliefs in all echelons of the work force which will persist to cause uneasiness and hostility despite all efforts to the contrary.

Pfiffner writes with insight about "belief stereotypes" held by management, supervisors and workers. For example, those in top management, usually having reached their positions by manifesting "such qualities as drive, shrewdness, judgment, energy, enthusiasm, and ambition" tend to judge others--even

*7, p. 77

**7, p. 81

those at the very bottom of the organizational ladder--in terms of the qualities by which they were judged. Management also has a concept of authority as being a one-way street and that to allow questioning of authority is to invite loss of discipline. In a footnote to this comment Pfiffner points out, "It must be remembered that democracy is an innovation in human affairs. Anglo-Saxon political democracy goes back hardly more than a century or two."

Pfiffner also comments on "a worker stereotype toward supervisors that pervades practically all occupations" and identifies it as "a rather universal fear of the boss". In addition, workers have a stereotyped belief about management as being concerned only with profits and having little if any feeling for humanity.*

The stereotyped beliefs that have particular pertinence at this point are those (also mentioned by Pfiffner) of the workers and supervisors toward the production specialist and those of the production specialist toward the workers, supervisors and top management.

"The line supervisors...have pre-conceived notions about the production specialist. They will rationalize that he will be a college graduate, theoretical and impractical, and that he will do his utmost to make the line look bad in order to make himself look good; that his recommendations will overturn and upset the normal and secure mode of life; and that he will recommend the discharge, transfer, or demotion of personnel. The production specialist on the other hand cannot help but know that he is being sent into a situation that is vexing to management. His experience and vocational know-how tell him that he is likely to find certain situations with the following factors present: (1) faulty organization, layout and work flow; (2) obsolete production techniques; (3) failure to weed out superannuated and incompetent

*4, p. 177

supervision; and (4) vested interests of individuals and pressure groups. The result is that the production specialist expects to run into considerable stubbornness, opposition, resistance, and often sheer stupidity. This fact molds his vocational stereotype toward line organizations in general."*

The implication in the foregoing discussion is that if management is aware of the existence of these stereotypes, behavior patterns can be altered to reduce the conflict caused by opposing beliefs.

PLANNING THE MACHINE INSTALLATION

Keeping in mind the points brought out thus far in this chapter, let us plan the steps to be taken in installing automatic data processing equipment in the Tarrytown schools. We assume that an investigation of existing procedures, of which this study is a part, has been completed and that it is considered practical and advantageous to install the machinery.

Since the Board of Education is the approving body where major expenses are to be incurred, the superintendent must undertake to convince the Board members of the worthwhileness of the idea. This is the first major obstacle to be overcome and, consequently, careful and detailed planning is called for to insure success.

Each Board member should be given a summary of the proposed change, including the altering of existing routines, a description of the machinery to be installed, costs of the operation, its advantages and disadvantages and other pertinent information. Care must be taken, however, that this summary is not overwhelming in detail. A packet of IBM cards and forms, numbered for easy reference, should also be given each member. It is often helpful, to make the presentation more effective, to

*4, p. 170

"blow-up" useful graphs and charts for use on an easel or to reduce them to slides for screen projection. A representative of the International Business Machines Corporation should be present to answer technical questions and, generally, to add support to the presentation.

If Board approval is obtained the next step is to plan the mode of communicating with personnel affected by the change, bearing in mind the factor of timing in communication. Generally, the equipment will not be delivered until four to six months following the date of ordering. Therefore, briefing of personnel should be timed to take place one or two months prior to the date of installation.

It is to be expected that there will be a period following the installation to effect gradual changes in routine. The machines would probably not be in maximum operation for one to two years.

The International Business Machines Corporation offers a short training course for machine operators at no expense to the customer as well as an aptitude test to determine if an individual would be well suited to machine operation. The school should take advantage of both of these offers.

During the preliminary study of job routines and during and following the installation, a communication procedure should be set up so that some member of the staff is easily available for consultation. The International Business Machines Corporation will give help on systems and methods also, if requested. Since the administrative offices of the schools of the Tarrytowns are relatively small, it obviates the need for formal communication. Perhaps a responsible, experienced member of the present office force could be designated to handle some of the problems that will arise.

When the machines are employed for attendance purposes the entire faculty should be informed of the procedures to be followed. Since the usefulness of the machines in this area depends upon a thorough understanding of the system by the faculty, this phase should be carefully observed.

In a letter from the assistant principal responsible for IBM installation at Newton High School, Massachusetts, he emphasized the fact that faculty meetings should be utilized for briefings on the new system.*

The faculty should be told that memos will be issued from time to time when difficulties occur. Also, channels of communication should be set up through each school principal to afford prompt action on inquiries from individual teachers.

One might say in summary that if careful pre-planning is accomplished, if the principles of good communication are adhered to, if the cooperation of the staff is enlisted by planned involvement and if a follow-up procedure is set up and religiously followed, the installation should be successfully carried out.

MORALE

Aside from the obvious time-saving and other advantages of electronic data processing equipment, one might argue that the installation would be worth its salt purely through its salutary effect on faculty and office staff morale. To know that the administration has under study new methods which will ease their burden is practically to insure a positive change in morale.

It is interesting to digress for a moment to compare the matter of morale in public education with that of business and industry.

Public education enjoys some advantages in attacking the problem of morale. Because of the obvious social significance of education, school personnel readily identify the common goal. Moreover, the public school administrator is dealing with a group of employees that is homogeneous to this extent: the teaching personnel, although differing in ability, training and experience, have been trained for the same profession. It should, therefore, "be easier to establish a common ground and to develop feelings of loyalty and pride...than with a heterogeneous group of employees in industry."* Nevertheless,

"Teachers, principals, supervisors, school secretaries, and custodians must find genuine pleasure in their everyday experiences at school...or morale will be low despite generous economic rewards."**

One way, certainly, to increase the pleasure of the teacher's daily experiences is to remove from his roster of responsibilities the wide variety of clerical tasks mentioned earlier.

*2, p. 264

**2, p. 265

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

In the previous chapters an attempt has been made to show the possibilities of utilizing electronic data processing equipment in the small public school system and, specifically, in the public schools of the Tarrytowns. A most important facet of the problem, however, has been left for discussion in this final chapter.

COSTS

Earlier it was stated that the basic equipment needed for a small installation would include one sorting machine, a keypunch and an accounting (or tabulating) machine. In addition, a test scoring machine should be added to the battery.

It is recommended to the Board of Education that the above machines be acquired on a rental basis with the delivery date scheduled for June 1960. This would allow a period of familiarization during the summer and would permit actual use of the machines during the 1960-1961 school year. In order to insure delivery by June 1960 it would be necessary for the Board to authorize signing a contract with the IBM company by January 1960. However, if the budget planning in the spring revealed inability to support the machine expenditure the contract could be cancelled at no cost to the Board.

Equipment rental charges vary according to the capacity of the accounting and the sorting machine. Table V on the following page indicates rental costs for the machines indicated above.

TABLE V
EQUIPMENT RENTAL COSTS

QUANTITY	TYPE	DESCRIPTION	MONTHLY RENTAL
1	026	Printing Card Punch	\$ 70.00
1	082	Sorter	40.00
1	402	Alphabetical Accounting Machine	210.00
1		Test Scoring Machine	<u>50.00</u>
		TOTAL	\$370.00

Source: International Business Machines Corporation,
White Plains, New York.

In addition, provision should be made in the budget for these non-repeating costs.

2 Additional type 402 control panels @ \$125.00 each	\$250.00
1 Sorting tray and stand	72.00
3 Card electroplates @ \$45.00 each	<u>135.00</u>
	\$457.00

IBM cards \$1.40 per thousand--f.o.b. Dayton, New Jersey.

Other equipment (card storage cabinets) not sold by IBM approximately \$300.00.

The annual rental fee amounts to \$4,440. With the non-repeating expenses the total cost for equipment is approximately \$4,897 during the first year of operation.

MACHINE PERSONNEL REQUIREMENTS

It is quite possible that a present member of the clerical staff might be trained to operate the new installation. This training would be provided by the IBM company at no expense to the Board.

Clerical time saved by utilization of the machines, might through realignment of duties, make unnecessary the replacement of the staff member released to operate the machines.

In addition, it is recommended that a keypunch operator be employed on a part-time basis. There is an excellent possibility that a high school student could take over this task as part of a work experience plan (discussed below). This method is now being used in Nyack, New York, where one girl is employed four hours each day at \$.75 per hour.*

If on the other hand, the Board decides to employ new personnel, Table VI will give an indication of salary costs.

TABLE VI
SALARY COSTS FOR IBM PERSONNEL

POSITION	ANNUAL SALARY RANGE
Trainee Operator	\$2400 - 2800
Keypunch Operator	2600 - 3100
Sr. Keypunch Operator	3000 - 3600
Principal Keypunch Operator	3300 - 4000
Supervising Operator	3600 - 4400
Tabulating Equipment Operator	3100 - 3800
Sr. Tabulating Equipment Operator	3600 - 4400
Principal Tabulating Equipment Operator	4200 - 5000
Chief Tabulating Equipment Operator	4800 - 5800
Supervisor of Machine Accounting	5500 - 8000

Source: Albright, O. Eugene: Application of Machine Accounting in the Field of Public Education. (Study presented to the New Orleans convention of the Association of School Business Officials of the United States and Canada), October 22, 1957. p. 33.

For more current information, the salary quotations from a recent issue of the New York Times will be helpful (Table VII).

The sorting machine, incidentally, is easy to operate and could be quickly mastered by a good keypunch operator.

The Work Experience Plan. The possibilities of using IBM equipment in a work experience plan should not be ignored. Most high schools offer courses in business practices for those students not electing an academic program. Typist training is regularly included in such courses and, with the increasing usage of punched card and allied equipment there is every reason to believe that operational training on such equipment could be most beneficial for interested students.

It is not intended, at this point, to make a detailed study of work experience plans. The following information, however, should be of interest.

There are several types of work experience plans operating today. The type referred to herein is a nonremunerative, inschool program. A recent government publication describes the program in this manner.

"Some students in most schools will profit from performing regular work tasks. In many schools, students are released from regular classes to act as helping teachers, as assistants and clerks for teachers and administrators, as maintenance workers, etc. This work is generally done without remuneration although in some cities a nonschool agency provides funds for paying for some work when performed by needy students.

Work experience education consists of learning to apply one's self industriously to an assigned task where essential goods or services are produced. It requires

TABLE VII
SALARY COSTS FOR IBM PERSONNEL

POSITION	ANNUAL SALARY RANGE
Keypunch Operator	\$3380 - 3900
Keypunch and Tabulating Operator	4160 - 4420
Keypunch Trainee	to 3380
Keypunch (1 year exp.)	to 3690
Keypunch Operator (Alpha) Heavy experience	to 3120
Keypunch Operator Alpha and Numeric	to 4420
Keypunch Operator 024 Alpha 1 year experience	to 3640

Source: New York Times, March 28, 1959.

learning to work under supervision and developing the ability to follow directions. One desirable component is learning to meet high standards of performance in every task undertaken."*

Obviously, care must be taken that such work is voluntarily performed and exploitation of student labor does not result.

In Oyster Bay, Long Island, there is a work experience program in operation through which "school or regents' credits can be granted for approved work performed during school-released time... In this school, pupils may be dismissed from the seventh or last period classes in order to begin work."**

That clerical workers will be in increasing demand for some time to come is indicated by these statistics.

"A great force of clerical workers--more than 9 million in mid 1958--is employed to take care of the vast amount of recordkeeping and other paperwork essential to the operation of government and private business. Clerical workers represented about 1 of every 7 workers in the United States in 1958, a higher proportion than in any previous year. In 1910, only 1 in 20 workers was in a clerical occupation. By 1940, the proportion of clerical workers had risen to 1 in 10, and in 1950 it was 1 in 8 employed workers. Since then, clerical employment has grown more slowly, but it is still increasing faster than the work force as a whole."***

Chart 5 on page 69 and Chart 6 on page 70 illustrate graphically the foregoing figures.

USING THE SERVICE BUREAU

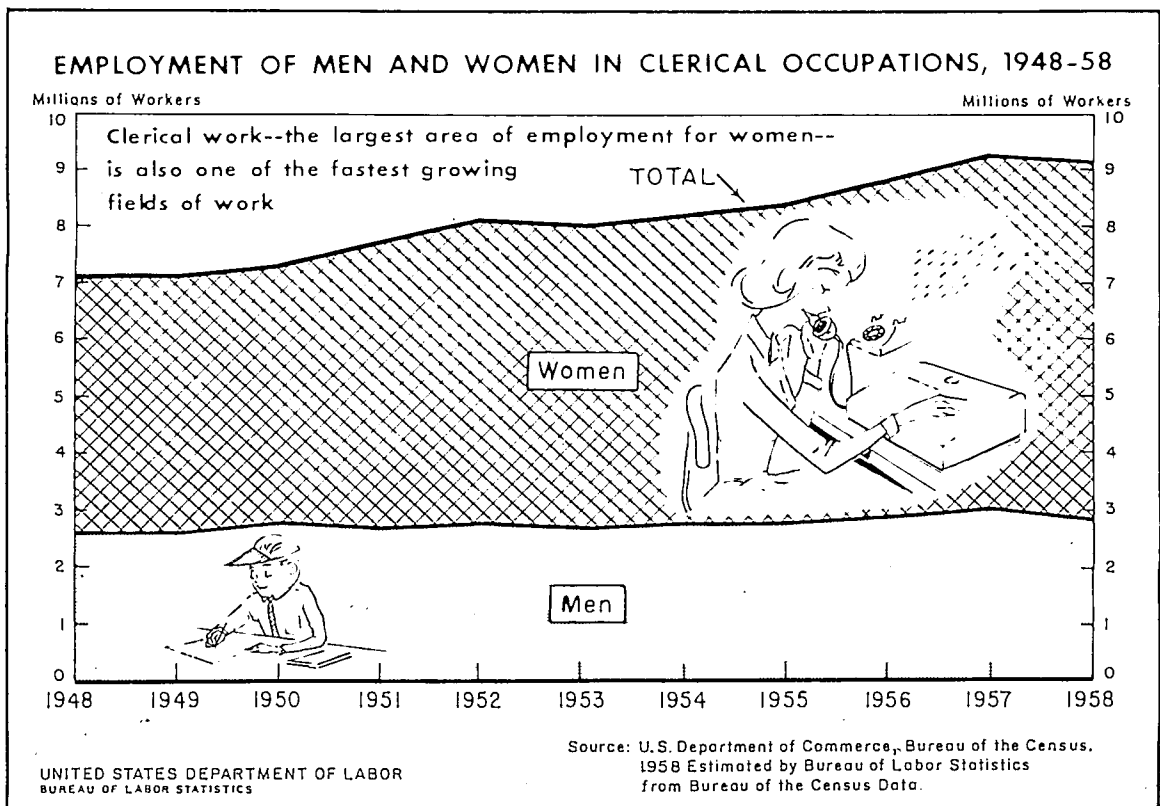
In the event that it is not feasible to install the four machines described above, a school system may "get its feet wet" in the use of punched cards by utilizing an IBM service

*22, p. 17

**22, pp. 50-51

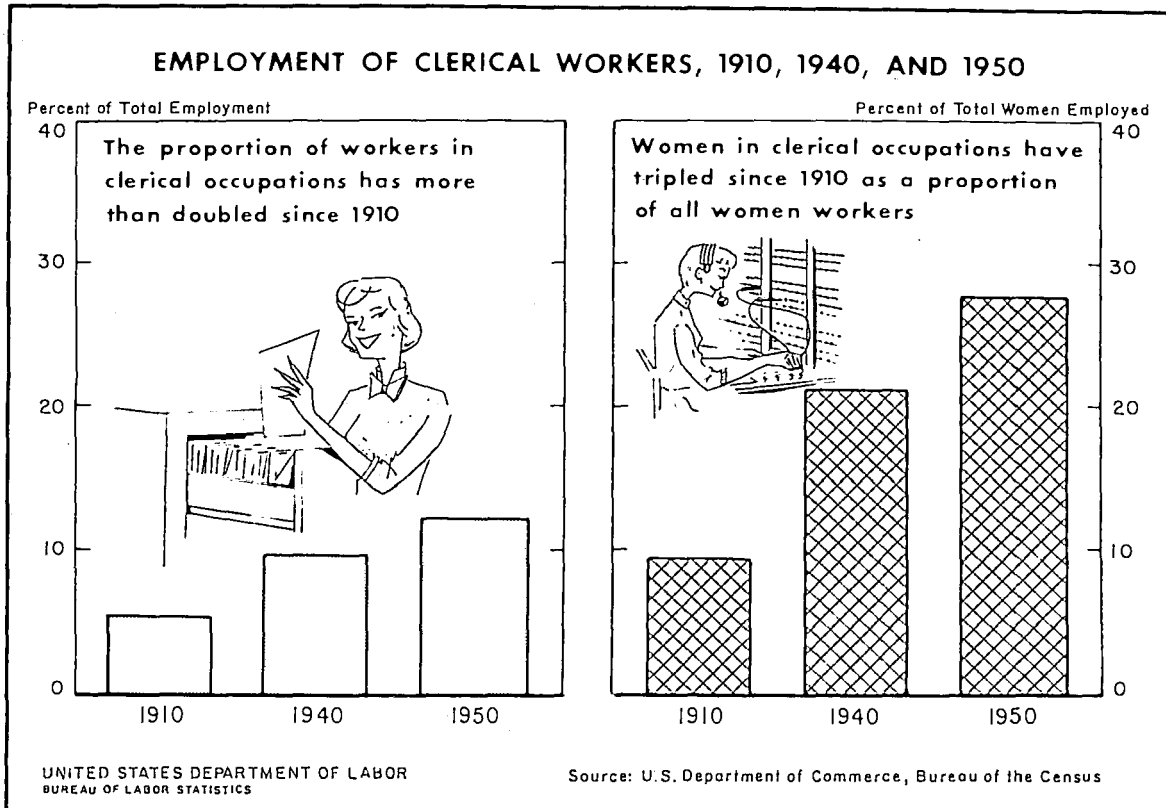
***23, p. 1

CHART 5



Source: U. S. Department of Labor, Bulletin No. 1241,
Automation and Employment Opportunities for
Officeworkers. Washington, D. C., October, 1948.

CHART 6



Source: U. S. Department of Labor, Bulletin No. 1241, Automation and Employment Opportunities for Officeworkers. Washington, D. C., October, 1948.

bureau. If this is done it would be necessary to rent only the keypunch and sorting machines--or, at the minimum, the keypunch alone. In the latter case, the bureau would do the sorting and listing.

However, it must be recognized that many demands are made upon the service bureaus and, if jobs are not scheduled well in advance, delays may be expected.

PUBLIC RELATIONS

In conclusion, the wise school administrator, if data processing equipment is acquired, will take the initiative in informing the public about the advantages accruing to the school and to the taxpayer as direct results of the installation.

It is safe to say that no public agency can satisfy every taxpayer regarding the use of his tax dollar. Better to anticipate criticism with a positive public relations approach than to be placed in a defensive position--however defensible it may be. The public relations program should include well-timed press releases and the dispatch of informative material to all parents of school age children.

APPENDIX A

Exhibit 2

NUMBER	STUDENTS					SERIAL NO																		ADVISOR NO					BOYS	GIRLS	REC'D	ADVISE	H. R.	CONT		
	CODE	REQUESTED	PER	PRESENT	REGISTRAR	REGISTRAR	ENG.	SOC. ST.	MATH.	SC I	LANG	COM.	IND. ARTS	HOME MKG	ART	MUSIC	VOCATIONAL	AGR	MISC	71	72	73	74	75	76	77	78	79							80	
			1			6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			2			3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
			3			7	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
			4			4-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
			5			8	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
			6			5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
			7			2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
			8			2	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
						1	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
							9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9

NYACK PUBLIC SCHOOLS

IBM 891115-0

Exhibit 3

STUDENT NAME		GRADE		TEACHER NAME		SUBJECT		ROOM		UNITS		1ST RATING PER			2ND RATING PER			3RD RATING PER																							
ARRANS MARY JANE		10115444		SCIENCE		RILLIN		209		251112																															
UNITS EARNED		FIRST RATING PERIOD			SECOND RATING PERIOD			THIRD RATING PERIOD			UNITS EARNED																														
63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100				
GRADE			REMARKS			CITIZENSHIP			GRADE			REMARKS			CITIZENSHIP			GRADE			REMARKS			CITIZENSHIP																	
1/2 DAYS PRESENT			1/2 DAYS ABSENT			TARDY			1/2 DAYS PRESENT			1/2 DAYS ABSENT			TARDY			1/2 DAYS PRESENT			1/2 DAYS ABSENT			TARDY																	
THIRD RATING PERIOD																																									
GRADE			REMARKS			CITIZENSHIP			GRADE			REMARKS			CITIZENSHIP			GRADE			REMARKS			CITIZENSHIP																	
1/2 DAYS PRESENT			1/2 DAYS ABSENT			TARDY			1/2 DAYS PRESENT			1/2 DAYS ABSENT			TARDY			1/2 DAYS PRESENT			1/2 DAYS ABSENT			TARDY																	

NYACK HIGH SCHOOL

IBM 416089MS

Exhibit 4

SCHOOL CENSUS - DISTRICT _____

CHILD'S NAME (LAST NAME FIRST) **JONES MARY**

BOY-1 GIRL-2
PHY HNDCPD BOY-3
PHY HNDCPD GIRL-4 **2**

BIRTH DATE

MO.	DAY	YR.
01	15	44

HOUSE NO. **1420** STREET NAME **ACADEMY ST**

STREET CODE **0125** SCHOOL CODE **063** GRADE **7** REASON NON-ATTEND **0**

AREA **11** PARENT OR GUARDIAN **JOHN JONES**

Exhibit 5

JONES MARY 0115441420ACADEMY 00607011JOHN 58357

CHILD'S NAME BIRTH DATE HSE. NO. STREET NAME ST. NO. SCHL. GR. AREA PARENT OR GUARDIAN STUDENT NO.

SCHOOL CENSUS CARD

SCHOOL NO.		TYPE		GRADE		REASON NON ATTEND	
01	C1	1	C1	1	C1	1	C1
02	C2	2	C2	2	C2	2	C2
03	C3	3	C3	3	C3	3	C3
04	C4	4	C4	4	C4	4	C4
05	C5	5	C5	5	C5	5	C5
06	C6	6	C6	6	C6	6	C6
07	C7	7	C7	7	C7	7	C7
08	C8	8	C8	8	C8	8	C8
09	C9	9	C9	9	C9	9	C9

INDEXING KEY

SCHOOL	CODE NO.	SCHOOL	CODE NO.
FAIRFIELD	01	CARMAN	09
PARKSIDE	02	SHOREVILLE PARK	10
EAST LAKE	03	HARRIS RD JR HIGH	11
UNQUA	04	NORTH END HAWTHORN SITE	12
HAWTHORN	05	MERRICK RD ELEMENTARY	13
MASSAPEQUA HIGH	06	MOLE ANNEX	14
BIRCH LANE	07		
BROADWAY	08		
		GRADE NO.	
		SPECIAL CLASS 98	
		KINDERGARTEN 99	

CHILD'S NAME BIRTH DATE HSE. NO. STREET NAME ST. NO. SCHL. GR. AREA PARENT OR GUARDIAN STUDENT NO.

APPENDIX B

IBM SERVICES

The very nature of the IBM Accounting Machines Service Agreement makes continuous satisfactory performance essential to your acceptance of our service. Therefore, a very important part of our business is to insure that you obtain a maximum of satisfactory results from your IBM equipment. To this end, IBM provides the following services to assist in achieving the desired results.

Systems Engineers

IBM maintains a staff of trained and qualified men experienced in accounting and management procedures. These men are available to confer and advise as to requirements, procedures, programming, organization and results. Prior to, during and subsequent to the installation of IBM system, their activity is directed toward the establishment and maintenance of an effective operating unit.

Systems Service

This group of men and women supplement the organized training and instruction given to customer personnel in IBM schools. During the initial period of installation, the availability of this service is of material assistance in achieving a smooth transition to the new method and in developing a qualified staff to operate the equipment and process the work.

Customer Engineers

A completely competent and adequate staff of factory-trained customer Engineers would be maintained in your area to make regular inspections of your machines, to provide a continuing preventative maintenance service, and to handle your service requirements promptly and efficiently. This staff has a complete parts department immediately accessible for parts replacement at no additional cost to you.

Customer Supervisor and Operator Schools

In order that users of IBM equipment may receive the full benefits of organized training on machine operation, machine methods, programming and applications, a continuing program of scheduled courses is provided at convenient locations or at local IBM offices. These courses are available to present and potential supervisors and operators of our customers without charge.

APPENDIX C

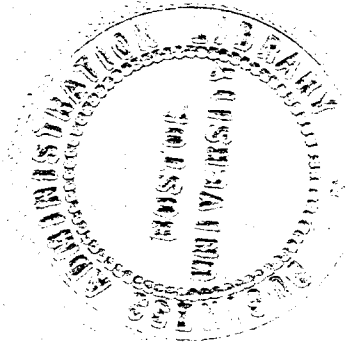


Exhibit 1

SLEEPY HOLLOW HIGH SCHOOL

DEPARTMENT OF PUPIL PERSONNEL SERVICES

Program of Studies 1959-60

(Name)	(Present Grade)	(Present Homeroom)
--------------	-----------------------	--------------------------

1. Number of credits anticipated by June, 1959 ()
2. Possible failures to be checked in June: _____

3. Proposed Program for 1959-60:

Work Space ----- Leave Blank

Subjects	Classification If Applicable	Period	Room
English _____			
Physical Education			
Band () Check if "yes"			
Orchestra () Check if "yes"			
Chorus () Check if "yes"			

Approved: _____

* Approved: _____

(Signature of Counselor)

(Signature of Parent)

* Requests for program changes made after July 1, 1959 will not be approved unless there is a valid reason for making such a change.

Exhibit 2

SLEEPY HOLLOW HIGH SCHOOL

Proposed Program of Studies

Student's Name _____ Date Entering S.H.H.S. _____

Entering from _____ School, _____
(Address)

Course _____ Candidate for Regents _____ Honors _____ Diploma
Local _____

Grade 12	ENGLISH IV	CIT. ED. III				Band _____ Orch _____ Chorus _____
Grade 11	ENGLISH III					Band _____ Orch _____ Chorus _____
Grade 10	ENGLISH II	CIT. ED. II	BIOLOGY Col. _____ Gen. _____			Band _____ Orch _____ Chorus _____
Grade 9	ENGLISH I	CIT. ED. I	GENERAL SCIENCE 9			Band _____ Orch _____ Chorus _____

We approve the above course with the understanding that changes may be made later subject to the curricular requirements of the school and after consultation with the Director of Pupil Personnel Services.

Date _____ Parent's Signature _____

Date _____ Counselor's Signature _____

REMARKS

Exhibit 3

SLEEPY HOLLOW HIGH SCHOOL

Department of Pupil Personnel Services

COURSE ENROLLMENTS 1958 - 1959

SUBJECTS	APPROXIMATE ENROLLMENTS					Number of Sections Required
	Grade 9	Grade 10	Grade 11	Grade 12	Total	
English I (Honors)						
English I (Regents)						
English I (Com.Sk.A)						
English I (Com.Sk.B)						
English II (Honors) (Speech 1st Term)						
English II (Regents)						
English II (Com.Sk.A)						
English II (Com.Sk.B)						
Journalism - 1st Term						
Shakespeare - 1st Term						
Semantics - 1st Term						
Dramatics - 2nd Term						
Classical Lit. - 2nd Term						
English Lit. - 2nd Term						
Adv. Writing - 2nd Term						
English III (Regents)						
English III (Com.Sk.A)						
English III (Com.Sk.B)						
English IV (Regents)						
English IV (Com.Sk.)						

Exhibit 4

LAST NAME		FIRST NAME		INITIAL		HOME ROOM NO.				
PERIOD	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY	
	CLASS	ROOM NO.	CLASS	ROOM NO.	CLASS	ROOM NO.	CLASS	ROOM NO.	CLASS	ROOM NO.
HR										
1										
2										
3										
4										
5										
6										
7										

Exhibit 5

	Mr. 214 Desmond	Mrs 213 Foley	Mr. 32 Murphy	Miss 137 Paulus	Dr Roody	Miss 219 Ross	Mr 29 Templin	Mr 31 Wray	Mr 136 Kliebard	Miss 25 MacLaren
1	English 9C 214	Prep. & Con. 213	English 12B 32	Eng. 11C 137	Supervision	English 10C 219	English 10B 29	English 11A 31	Reading Workshop 136	Speech 25
2	English 9 AD 214	English 9AD 213	English 11B 32	Study Hall 27	Supervision	English 9B 219	English 12C 29	English 12B 31	Speed Reading 136	Speech 25
3	English 9B 214	English 10B 213	Prep. & Con 32	English 10A 137	English 12A 32	Prep. & Con. 29	English 10AD 29	Prep. & Con. 31	Prep. & Con. 136	Speech 25
4	Study Hall 27	English 10B 213	English 12B 32	English 11B 137	Prep. & Con.	English 11B 219	Prep & Con	English 11A 31	Reading Workshop 136	Speech 25
5	LUNCH	LUNCH	LUNCH	English 11B 137	Supervision	English 11B 219	Supervision Adult Educ	LUNCH	LUNCH	Prep & Con.
6	English 9B 214	TOWER 213	English 10B 133	LUNCH	LUNCH	LUNCH	LUNCH	English 11B 31	Reading Workshop 136	LUNCH
7	English 9C 214	Study Hall 220	Study Hall 221-222	Prep. & Con.	English 12 AD 32	English 10C 219	English 12C 29	English 12A 31	Reading Workshop 136	Speech 25
8	Prep. & Con.	English 10 AD 213	English 11B 32	English 10A 137	Supervision	Study Hall 220	English 10B 29	Study Hall 221-222	Speed Reading 136	Coaching 25

ENGLISH DEPARTMENT

- 59 -

READING

SPEECH

Exhibit 6

RECEPTIONIST

NYACK HIGH SCHOOL INDIVIDUAL DAILY PROGRAM

STUDENT'S NAME

ACKERSON ELIZABETH

12

240

PARENT'S NAME

C I ACKERSON
103 HIGH AVENUE
NYACK N.Y.

GRADE

PHONE NO.

LOCKER NO.

SUBJECT TITLE	SUBJ. SYM.	ROOM NO.	PER. NO.	TEACHER
HOMEROOM		19		10
RETAILING 1		33	1	120
HIST 12A		23	2	530
ENG 12A		32	3	500
BUS LAW		33	4	120
LUNCH		221	5	
SEC PRACT		128	6	140
PHYS ED TF		100	7	60
S HALL MWF		27	7	360
WORK EXP			8	120

TIME SCHEDULE

MONDAY

8:20 - DOORS OPEN
8:28 - HOME ROOM WARNING BELL
8:30 - HOME ROOM BELL & ROLL CALL
8:40 - PASS TO PERIOD 1

Period

1 8:43 - 9:22
2 9:25 - 10:04
3 10:07 - 10:46
4 10:49 - 11:28 (11:08 - 11:28 LUNCH)
5 11:31 - 12:10 (1ST LUNCH)
6 12:13 - 12:52 (2ND LUNCH)
7 12:55 - 1:34
8 1:37 - 2:16
H.R. 2:19 - 3:01 RELIGIOUS TRAINING
3:05 HALLS CLEARED

TUES. - WED. - THURS. - FRI.

8:20 - DOORS OPEN
8:28 - HOME ROOM WARNING BELL
8:30 - HOME ROOM BELL & ROLL CALL
8:48 - PASS TO PERIOD 1

Period

1 8:51 - 9:34
2 9:37 - 10:20
3 10:23 - 11:06
4 11:09 - 11:52 (11:30 - 11:52 LUNCH)
5 11:55 - 12:38 (1ST LUNCH)
6 12:41 - 1:24 (2ND LUNCH)
7 1:27 - 2:10
8 2:13 - 2:56
H.R. 2:59 - 3:01
9 3:04 - 3:30

VOCATIONAL

MONDAY

8:40 - 11:40
12:30 - 3:30

TUES. - WED. - THURS. - FRI.

8:48 - 11:52
12:38 - 3:30

Exhibit 7

NYACK HIGH SCHOOL

NYACK, NEW YORK

STUDENT REPORT CARD

MAILED
TO

C BABCOCK
57 WALDRON AVE
CENTRAL NYACK

REPORT OF

BABCOCK BEVERLY

LAST NAME

FIRST NAME

1710

STUDENT NO.

PERIOD ENDING		
MO.	DAY	YR.
10	15	58

SEMESTER	PERIOD
1	1

SUBJECT	TEACHER
OFF PRACT 1	FOSTER
CIT ED 9C	LLOYD
S HALL MWF	LATHROP
PHYS ED TH	CLARKE
ENG 10C	ROSS

- CITIZENSHIP
1. Superior citizen
 2. Excellent citizen
 3. Good citizen
 4. Fair citizen
 5. Poor citizen
- REMARKS
1. Incomplete
 2. Work improving
 3. Does not do homework
 4. Shows real effort
 5. Does not pay attention
 6. Does not make up back work
 7. Does not do well on tests
 8. Does not work up to ability level
 9. Assignments poorly prepared
 10. Should come in 9th period for help

GRADES			REMARKS			CITIZENSHIP			UNITS
1	2	3	1	2	3	1	2	3	
50						1			
70						4			
						3			
70						3			

NOTE: SYSTEM OF GRADES EXPLAINED ON REVERSE SIDE

HOMEROOM

WITTMER

½ DAYS PRESENT			½ DAYS ABSENT			TIMES TARDY			TOTAL UNITS TO DATE
1	2	3	1	2	3	1	2	3	
5	8	5	0	0	0	0	0	0	58

Exhibit 8

D A T TEST SCORES
 Fall 1957
 Grade 9
 Page 3-

	I Q	Verbal	Numeric	Abstract	Space	Mechanical	Clerical	Spelling	Sentences
HARTL RITA		65	90	90	70	70	75	65	70
HARTMANN JUNE	114	95	95	80	65	40	75	75	90
HASLINGER BARBARA		55	90	95	85	25	80	85	85
HAUSS GEORGE		60	85	85	35	55	40	90	55
HEFTER MELVIN		90	90	99	90	99	45	3	95
HEIMER HELENE	106	75	90	75	75	55	70	35	55
HEINSOHN MARGARET		90	90	95	90	99	65	95	97
HESS BRADFORD	121	65	60	90	90	15	40	3	90
HEYWARD HARVEY	102	55	15	50	30	1	55	80	85
HINES ELIZABETH		55	45	45	75	45	70	30	25
HLADIK JEFFREY	101								
HOGAN KATHLEEN		5	30	5	3	15	20	15	25
HONG PATRICIA		70	90	80	85	85	75	75	65
HOPE SUZANNE	150	97	97	99	95	90	30	97	95
HUDSON ALICE J		50	75	99	97	95	75	75	65
HUNT CHERYL		40	5	90	70	80	75	30	20
INKPEN THOMAS	115	85	30	45	55	60	80	70	60
JACKSON DENNIS							40		
JACOBS KARL	133	80	65	75	75	80	35	95	85
JANKOVIC JOSEPH S		85	55	55	30	80	60	70	40
JELENEVSKY SERGE		30					95		
JEVENS ARTHUR	109	60	35	60	50	55	95	70	20
JOHNSON KAREN		75	70	97	85	99	90	15	60
JOHNSTON CATHERINE		97	97	97	99	95	85	80	90
KAPLAN DIANE		3	60	85	35	50	90	55	45
KAPLAN PATRICIA	142	99	95	90	95	80	60	80	95
KEARNEY JOHN J		65	20	20	5	35	60	85	55
KEENAN JOHN DENNIS	102	35	65	85	75	85	65	3	20
KEHOE SHARON		45	60	70	70	65	85	35	20
KELLER FRANK		75	95	65	55	80	55	70	45
KENDALL RICHARD	101		60	35	85	85	75	15	65
KEYRUSE MARY ANNE		30	75	85	70	60	50	80	90
KINDLE ELIZABETH	148	75	90	75	85	99	35	90	95
KING DAVID J	127	85	55	75	75	75	75	70	97
KING MELVIN	145	85	99	95	95	90	40	65	90
KING SANDRA									
KIRK KENNETH	83		5	25	15	5	85	30	15
KLEIN GERALD		20	65	80	15		60	35	55
KNARICH JOSEPH	88	35	35	60	50	35	95	35	30
KNUDSEN PHYLLIS M		70	65	80	75	70	15	35	65
KOMONCHAK ANDREW		97	95	99	85	60	65	85	95
KOVACS ROBERT		55	35	55	45	55	25	70	50
KROSS JESSICA		99	97	97	85	95	55	90	97
KUHN DIETRICH	112	45	35	75	30	65	90	75	75
LAHEY JUDITH ANN		50	80	80	20	95	90	85	55
LATKA HENRY	114	55	85	95	65	99	55	55	70
LAWRENCE HERBERT		85	80	20	25	40	40	90	95
LEMM KENNETH		30	50			15	80	15	50
LEMM RUTH ANN	122	90	65	85	80	90	30	25	55
LENTI JOSEPH	118	35	80	85	1	20	97	50	85
LEONARD WILLIAM		10	30	25	20	60	60	3	30
LEROUX THOMAS	119	60	40	25	10	30	15	45	50
LICHTNEKER ANN GAIL		25	15	65	1	10	35	55	60
LUDWIG BARBARA		3	5	5	30	35	30	3	10

BIBLIOGRAPHY

I. Books

1. Conant, James B.: The American High School Today, New York, McGraw-Hill, 1959.
2. Elsbree, Willard S. and Reutter, E. Edmund, Jr.: Staff Personnel in the Public Schools. New York, Prentice-Hall, 1954.
3. Marrow, Alfred J.: Making Management Human. New York, McGraw-Hill, 1957.
4. Pfiffner, John M.: Supervision of Personnel. New York, Prentice-Hall, Inc., 1951.
5. Redfield, Charles E.: Communication in Management. Chicago, University of Chicago Press, 1953.
6. Ross, Donald H.: Administration for Adaptability. New York, Metropolitan School Study Council, 1958.
7. Roy, Robert H.: The Administrative Process. Baltimore, Johns Hopkins Press, 1958.
8. Tead, Ordway: The Art of Administration. New York, McGraw-Hill, 1951.

II. Booklets, Pamphlets, and Publications of Associations

9. Albright, O. Eugene: Application of Machine Accounting in the Field of Public Education. (Study presented to the New Orleans convention of the Association of School Business Officials of the United States and Canada) October 22, 1957.
10. Gaffney, Matthew: A Differential Salary Schedule for Instructional Employees. (An unpublished paper written by Superintendent of Schools, Tarrytown, New York), February 1959.
11. IBM Series 50 for Public Schools. International Business Machines Corporation, New York.
12. Newton Teacher Utilization Study. Newton, Massachusetts, 1957.
13. Pollen, David S.: Report Prepared for the Board of Education. New Rochelle Public Schools, New Rochelle, New York.
14. Public Education Student Records. International Business Machines Corporation, New York, 1957.

III. Newspapers and Periodicals

15. Driscoll, Eleanor D.: "Machines Take Over." New York State Education, Vol. XLVI, No. 5, February 1959.

16. Hechinger, Fred M.: "Five Basic Problems of Education." New York Times Magazine, January 25, 1959.
17. Fifty-Second Annual Report of the Education Department for the School Year ending June 30, 1955. Vol. 2, The University of the State of New York, Albany, 1956.
18. "Look How They've Simplified High School Scheduling", School Management, September 1957.
19. Roche, Charles.: "Robot to Issue Report Cards". Boston Herald, November 23, 1958.
20. Spates, Thomas G.: "Human Relations: How Far Have We Come?". Management Record. Vol. XXI, No. 3, March 1959.
21. Spencer, Richard E.: "Do Punched-Card Methods Save Money?". The Education Digest. Vol. XXIV, December 1958.

IV. Publications of Government Agencies and Departments

22. U. S. Department of Health, Education and Welfare: Hunt, Dewitt: Work Experience Education Programs in Secondary Schools. Bulletin No. 5, 1957, Washington D. C.
23. U. S. Department of Labor, Bulletin No. 1241, Automation and Employment Opportunities for Officeworkers. Washington, D. C., October 1948.

V. Personal Sources of Information, Correspondence, Interviews

24. Interview with IBM supervisor, Nyack Public Schools, Nyack, New York.
25. Interview with Mr. Joseph M. Carroll, Assistant Director, Business Services, Newton Public Schools, Newton, Mass.
26. Interview with Mr. Cushman, Director of Pupil Personnel and Services, The Public Schools of the Tarrytowns, Tarrytown, New York.
27. Interview with Dr. Matthew Gaffney, Superintendent, The Public Schools of the Tarrytowns, New York.
28. Interview with Dr. Beatrice Wightwick, Guidance Director, New Rochelle Public Schools, New Rochelle, New York.
29. Interview with Mr. David S. Pollen, Personnel Director, Syosset Public Schools, Syosset, Long Island, New York.
30. Letter from Mr. John F. Wostrel, Supervisor, Private Trade Schools, Mass. Dept. of Education, Boston, Mass.
31. Letter from Mr. Donald P. Troyer, Assistant Treasurer, Jackson Public Schools, Jackson, Michigan.
32. Letter from Mr. George A. Neilson, Assistant Principal, Newton Public Schools, Newton, Massachusetts.