THE COMPUTER, THE INDUSTRIAL RELATIONS ASPECTS,

A CASE STUDY

by

ARTHUR ANTHONY MALINOWSKI

A Thesis Submitted to the Faculty of the Graduate School
of Loyola University in Partial Fulfillment of the
Requirements for the Degree of Master of
Social and Industrial Relations

February
1958
LIFE

Arthur Anthony Malinowski was born in Chicago, Illinois, April 4, 1929.

He was graduated from Weber High School, Chicago, Illinois, June 1947 and from DePaul University, Chicago, Illinois, June 1956 with the degree of Bachelor of Science.

From 1947 to 1951 the author was employed in the Accounting Department of the Conrad Hilton Hotel and served in the Army of the United States from February 1951 to February 1953.

He began his graduate studies at Loyola University in June 1956.
The author thanks all those management employees who generously gave their time during the period of research; particularly, Mr. Kammer, Assistant Manager of Accounting, Mr. Simpson, Assistant to the Director of Employee Relations, and Mr. Meegan, Personnel Administrator in the Revenue Accounting Department.

Gratitude is expressed also to the members and officers of the Local 1472 International Brotherhood of Electrical Workers (AFL-CIO) for their splendid cooperation in this study.

The author hopes that this study may be a contribution in the area of human relations through providing a clearer view, a keener understanding and a more mature appreciation of the problems and objectives of management and the workers in the future use of commercial electronic computers.

In order that the company and the individuals could not be identified, all the names have been changed.
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CHAPTER I

INTRODUCTION

Recently, there has been a tendency to automate the routine office procedures with new electronic machines which have been developed and which are adaptable to work of a clerical nature. This study is primarily concerned with the effect of an installation of the International Business Machine Company's Electronic Data Processing Machine type 702 upon the people who worked in the department in which the change was made.

It is hoped that the study, which is illustrative rather than representative, will give an insight into the impact of the change and the administrative skills required to facilitate the introduction of such technological change into other offices.

Method of study

This installation was chosen because it was the first of its type in Midland and the first to be used by any public utility.¹ The case study method was chosen because this is an intensive investigation of how one particular organization administered the change from a highly mechanized system of accounting to one involving an electronic computer. Included in the research were formal and informal interviews with both management and union personnel, and the detailed examination of company records.

¹Information from a telephone interview with George Smith, public utility sales representative IBM, on January 10, 1958.
CHAPTER II

BACKGROUND OF THE COMPANY

The Midwest Electric-Public Service System is an electric utility which serves an eleven thousand square mile area including Midland and most of the northern section of the state in which it is located. The system serves four hundred ninety-one communities with a population, at the end of 1956, of 6,100,000 and with a total of 1,895,000 customers. There were over fifteen thousand employees in the company on December 31, 1956 with the average age determined to be thirty-nine years and one month and the average length of service in the company shown to be fifteen years and three months.\(^1\) Net generating capability at the end of 1956 was 3,859,000 kilowatts and by 1960 will be almost 5,303,000 kilowatts. It is estimated that six hundred fifty million dollars will be spent on construction in the four years 1956-1959.

An electric utility differs from most other businesses in several ways. For one thing, it must furnish electricity whenever a customer decides to flip a switch day or night. There is another difference. Unlike most businesses, the utility cannot raise or lower the rates without authorization of a state regulatory commission. An electric utility operates under a franchise that designates it as the supplier of electricity in a certain area. The rates

\(^1\)Information from a personal interview with Russel Simpson, assistant to the Director of Employee Relations, on July 19, 1957.
which may be charged require the utility to run with maximum efficiency; consequently, sound management and efficient operation are most vital.

From the standpoint of years of service, the Midwest Electric Company is an old and established company, tracing its beginnings to 1887. It has plans for expansion to provide better customer service. Mergers of several utilities in the years 1907, 1911, 1937, 1950, and 1953 have culminated in the Midwest Electric Company—Public Service System.

The company's growth is tied in closely with the growth of the territory it serves. The Middle West is one of the world's highly industrialized regions. Construction of manufacturing facilities is growing, and residential users of electricity have been increasing constantly.

In 1951, by agreement with the Atomic Energy Commission, a Midwest Electric Company research group began a study which dealt chiefly with the development of nuclear power plant designs. The company in 1955, submitted plans to the Atomic Energy Commission for the construction of a full-scale nuclear power plant. A major part of the financing will be done by the company, which in addition, will provide the site for and transmission lines from the plant and will own and operate it. Through a non-profit corporation, the member companies, will make research contributions covering the balance of the contract price for the plant and will participate in developmental and technical work on the project.

During the years of growth and expansion the Midwest Electric—Public Service System has developed into a billion dollar corporation and has maintained a sound financial position. Quarterly dividends have been paid continu-
ously since 1890, with a quarterly dividend of fifty cents per share on the
common stock declared in 1956. 2

CHAPTER III

THE REVENUE ACCOUNTING DEPARTMENT BEFORE CONVERSION

The functions of the Revenue Accounting Department in December 1955, the month preceding the conversion of the departmental functions to the new IBM type 702 computer, were primarily those of processing orders of customers, billing the industrial, residential and commercial users, and recording the cash payments of Midland users. A bi-monthly meter-reading and billing schedule was used, so arranged that the daily work load was approximately equal throughout the two months.

A noteworthy characteristic of this procedure is the small amount of the typical residential bill. It averages $6.60 per month. As a result, the electric utility has a higher billing and bookkeeping cost per revenue dollar than in many other types of business.

Each day in 1955 two hundred eighty employees, ninety-two of whom were women were required to examine, check, and process the transactions for electrical service furnished by the company. The following table shows the various job titles and maximum hourly rates of these employees.

1 Information from a personal interview with George Kammer, assistant manager of accounting, on June 7, 1957.
### TABLE I

**MIDLAND REVENUE ACCOUNTING DEPARTMENT CLASSIFICATION OF JOBS AS OF OCTOBER 1, 1955**

**PROMOTIONAL SERIES A**

<table>
<thead>
<tr>
<th>Job title</th>
<th>Maximum wage hour</th>
<th>Number of employees</th>
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<tr>
<td>Output records analysis clerk</td>
<td>$3.00</td>
<td>1</td>
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<tr>
<td>Industrial rate reviewer</td>
<td>2.93</td>
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<td>Rate application clerk</td>
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<tr>
<td>Power contract clerk</td>
<td>2.83</td>
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<td>Industrial bill computing clerk</td>
<td>2.83</td>
<td>3</td>
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<tr>
<td>Electrical energy tax clerk</td>
<td>2.83</td>
<td>1</td>
</tr>
<tr>
<td>Accounts control clerk</td>
<td>2.74</td>
<td>1</td>
</tr>
<tr>
<td>Records review clerk</td>
<td>2.74</td>
<td>2</td>
</tr>
<tr>
<td>Merchandise accounts analysis clerk</td>
<td>2.74</td>
<td>2</td>
</tr>
<tr>
<td>Meter records analysis clerk</td>
<td>2.74</td>
<td>3</td>
</tr>
<tr>
<td>Bookkeeper</td>
<td>2.71</td>
<td>4</td>
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<tr>
<td>Bill record clerk</td>
<td>2.71</td>
<td>2</td>
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<tr>
<td>Ledger entry clerk</td>
<td>2.71</td>
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<td>Customer deposit clerk</td>
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<td>Accounts balance and review clerk</td>
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<td>19</td>
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<td>Junior revenue accounts analysis clerk (Accounts adjustments)</td>
<td>2.52</td>
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<td>Junior revenue accounts analysis clerk (Rate and order review)</td>
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<td>Junior revenue accounts analysis clerk (Meter records)</td>
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<tr>
<td>Junior revenue accounts analysis clerk (Output records)</td>
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<tr>
<td>Work assignment clerk, printometer records</td>
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<td>Demand checking clerk</td>
<td>2.40</td>
<td>3</td>
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<tr>
<td>Account station clerk</td>
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<tr>
<td>Senior revenue accounts clerk</td>
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<tr>
<td>Accounts clerk</td>
<td>2.26</td>
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<td>Revenue accounts clerk</td>
<td>2.07</td>
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TABLE I (continued)

MIDLAND REVENUE ACCOUNTING DEPARTMENT CLASSIFICATION
OF JOBS AS OF OCTOBER 1, 1956

PROMOTIONAL SERIES A

<table>
<thead>
<tr>
<th>Job title</th>
<th>Maximum wage hour</th>
<th>Number of employees</th>
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<tbody>
<tr>
<td>Revenue accounts clerk (demand computing)</td>
<td>$2.07</td>
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<tr>
<td>Senior typist</td>
<td>2.07</td>
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<tr>
<td>Typist</td>
<td>1.94</td>
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<tr>
<td>Junior revenue accounts clerk (Reference numbers)</td>
<td>1.94</td>
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<tr>
<td>Junior revenue accounts clerk (Output records)</td>
<td>1.94</td>
<td>4</td>
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<tr>
<td>Senior office clerk</td>
<td>1.85</td>
<td>2</td>
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<tr>
<td>Key punch clerk</td>
<td>1.81</td>
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<tr>
<td>Office clerk</td>
<td>1.73</td>
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<tr>
<td>Junior office clerk (Printometer entries)</td>
<td>1.65</td>
<td>7</td>
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<tr>
<td>Junior office clerk</td>
<td>1.65</td>
<td>14</td>
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<tr>
<td>Junior typist</td>
<td>1.65</td>
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<td>Total</td>
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PROMOTIONAL SERIES B

<table>
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<th>Job title</th>
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<th>Number of employees</th>
</tr>
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<tbody>
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<td>Revenue summary analysis clerk</td>
<td>$2.83</td>
<td>2</td>
</tr>
<tr>
<td>Billing operations analysis clerk</td>
<td>2.83</td>
<td>1</td>
</tr>
<tr>
<td>Revenue statistics clerk</td>
<td>2.74</td>
<td>4</td>
</tr>
<tr>
<td>Junior revenue accounts analysis clerk</td>
<td>2.52</td>
<td>9</td>
</tr>
<tr>
<td>Senior accounting machine clerk</td>
<td>2.30</td>
<td>19</td>
</tr>
<tr>
<td>Accounting machine clerk</td>
<td>2.09</td>
<td>22</td>
</tr>
<tr>
<td>Junior revenue accounts clerk</td>
<td>1.94</td>
<td>8</td>
</tr>
<tr>
<td>Tax exemption clerk*</td>
<td>2.77</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>66</td>
</tr>
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* Not in promotional series
At this time the Revenue Accounting Department enjoyed a highly mechanized system for customer billing.

1. The meter-reading card used the mark sensing principle, which is the picking up of special high graphite content pencil marks and converting the marks into corresponding punched holes.

2. Bill amounts were computed by the IBM type 604 electronic calculator.

3. A post card bill was made with the IBM type 528 accumulating reproducer machine, punching in the payment stub.

4. The meter-reading card became the receivable ledger record.

5. When the stub was returned with the payment, its punching made possible mechanical processing which reduced the receivable ledger. The remaining ledger cards joined with the next meter-reading card in calculating the next bill.2

In that system the punched card played an important role. The same card moved through several steps and was available for visual reference.

In addition, files were maintained for the accounts receivable, advance deposits, collection data and credit information. Detailed clerical work was required to maintain such records. Although the billing process proper was highly mechanized, a rather large clerical force was necessary for the exceptions; for example, the customer who inquired about his account, or the customer whose account was in arrears, required a great deal of clerical time.

Departmental organization before conversion

In December 1966, the following organization was carrying out the functions of the Revenue Accounting Department. (See Table II.) Mr. Peters, the revenue accountant, managed the department. He was directly responsible to Mr. Paul Barnes, manager of accounting. The assistant to the revenue accountant was Mr. Fritz and it was to him that the supervisors of the three divisions, Revenue Billing, Revenue Records, and Industrial Records reported. The supervisors of these divisions were E. M. Bailey, J. J. Billings, and A. Dvorak respectively. The Revenue Records Division was further divided into the Clerical and the Tabulating machine sections. Mr. M. Lawson and Mr. W. Peterson were assistant supervisors of these sections. Mr. Lawson in clerical had three section chiefs, Mr. Peterson had two section chiefs. The Revenue Billing Division had one assistant supervisor and three section chiefs. The Industrial Records Division had one assistant supervisor and one section chief. This organization was that of the Midland divisions only and was not connected with the Public Service Division Revenue Accounting Department, which did the bookkeeping and billing for the users outside of the corporate limit of the Midwest Electric Company.
TABLE II

ORGANIZATION CHART MIDLAND REVENUE ACCOUNTING
DEPARTMENT AS OF OCTOBER 1966

Revenue Accountant
Mr. Peters

Assistant to
Revenue Accountant
Mr. Fritz

Revenue Billing Division
Mr. Bailey

Assistant Supervisor
Mr. Lacey

Assistant Supervisor
Clerical
Mr. Lawson

Assistant Supervisors
Tabulating
Mr. Petersen

Industrial Records Division
Mr. Dvorak

Assistant Supervisor
Mr. Bressler

Section Chief
Section Chief
Section Chief

Section Chief
Section Chief
Section Chief

Section Chief
Section Chief
Section Chief

Section Chief
Section Chief
Section Chief

Section Chief
Section Chief
Section Chief

Section Chief
Section Chief
Section Chief

Section Chief
Section Chief
Section Chief
Functions of the three divisions

Each of the three divisions carried out the functions of the department for the Midland geographical area. The Revenue Billing Division had the following functions:

1. Process meter orders
2. Extend and interpret amounts of the bill
3. Mark sense the meter reading card
4. Obtain billing control figures
5. Obtain rate statistics
6. Punch payment stubs
7. Print address and amount sides of bill
8. Print current billing information on back of history card
9. Trim bill to post card size
10. Weigh and send bills to post office

The clerical section of the Revenue Records Division carried out these functions:

1. Maintained account stations
2. Checked statements for payment
3. Maintained the merchandising accounts
4. Gave account information
5. Filed miscellaneous credits and debits
6. Maintained controls and reports

The tabulating accounting machine section of the Revenue Records Division was responsible for:

1. Account balancing
2. Cash listing
3. Preparation of meter reading cards
4. Preparation of delinquent statement
5. Cash payments processing

3 Kammer, June 7, 1957.
The Industrial Records Division carried out the functions of billing and bookkeeping of Midwest Electric and Public Service Industrial accounting. Under this were found the following:

1. Tax work
2. Output records
3. Governmental accounts
4. Revenue reports
5. Special contracts
   a. Midland Transit Authority
   b. Midland Sanitary District
   c. Other utilities
   d. Steel companies

The jobs of supervisors

The supervisor of each division was responsible for various activities within the division. A detailed knowledge of accounting procedure was required of each supervisor and department head and each was expected to know the rules and the regulations of the company to the extent that they could make the required decisions. There were no job specifications for supervisors but there were available general-duties descriptions, for example, that of supervisor, Industrial Records Division. Among his several duties were the following:

1. To supervise the sections of the Industrial Records Division.
2. To be responsible for making approved changes in method and procedures in the division.
3. To conduct studies and tests to determine the effectiveness of such changes.
4. To be responsible for assigning, directing, and coordinating the work, and to see that work is performed in accordance with approved practices and schedules.
5. To settle complaints.
6. To make recommendations for promotions or demotions and to be responsible for disciplinary actions.

7. To act as one of the raters of employees in the division.

The systems and procedures used before conversion

The system of processing the transactions required the use of manual methods as well as IBM equipment. Briefly the following is the method used in Midland residential billing as of December 1955.4

1. Prepare the meter reading card in bookkeeping. The name, previous date, and reading come from the utility card itself while the address and meter information comes from the history card.

2. The meter readers then mark the utility card.

3. As the marks are sensed, the reproducing machine punches the corresponding reading.

4. Extend the rate through the IBM 604 electronic calculator for current amount, interpretation, printing for the top line, and proof of extension.

5. Obtain billing control figures which are the balancing figures.

6. Obtain rate statistics for revenue report.

7. Accumulate open items and current charges through the IBM 528 card punch machine - the amount of the bill and the account number are punched into the payment stub.

8. Print the amount side of the bill, the current charges card and the arrears items included.

9. Process meter history card with utility cards for address side printing, the name comes from the utility card and the address comes from the history card.

Kammer, June 7, 1957.
10. Print the address side on the IBM type 403 multiple line printer.

11. Print continuous record; present charges only on reverse side of history card from present utility card.

12. Trim bill to post card size, weigh, and send to post office.

The jobs of clerks before conversion

In 1955 the jobs of clerks varied with the different functions carried out by the various sections of the divisions. Not all clerical jobs were simple, as the following job specification set up by the company for an accounting machine clerk will clearly indicate.

**ACCOUNTING MACHINE CLERK**

(Receipts and card printing)

Revenue Accounting Department

Revenue Records Division

**Duties:**

Under semi-direct supervision, to prepare payment cards and listings for source and balancing unit cash receipts; to collate tabulating cards with accounts receivable records; to print billing data on tabulating cards; and to perform related work as assigned. Typical examples of the duties are:

1. To prepare payment cards and listings for source and balancing unit cash receipts, involving such work as:

   a. Operating reproducing, sorting, interpreting and tabulating machines, involving making the required adjustments, inserting the proper plugboards, and taking tests to insure the accuracy of machine setup and operation;
b. Placing source control leader cards in their proper position with cash receipt stubs, selecting unit control cards requiring review by others, placing cards in correct index order, and coding irregular accounts;

c. Operating key punch machines in preparing new or correcting tabulating cards as required.

2. To collate tabulating cards with accounts receivable records, involving making the necessary machine adjustments for the sequencing of customer payment cards with charge and credit cards and other payment cards according to account numbers and in accordance with established filing schedules, spot-checking merged cards for the accuracy of machine operations, and forwarding cards for those accounts with irregularities to others for manual filing.

3. To print billing data on balance, meter history, and utility cards, involving such work as:

   a. Operating sorting, tabulating, and interpreting machines by making required adjustments and machine tests;

   b. Checking the accuracy and completeness of printed data on statements and cards;

   c. Computing and recording the total number of meters within reading and balancing units;

   d. Reproducing new history cards and interpreting account reference data as required.

4. To prepare statements of delinquent accounts receivable using a tabulating machine to list the accounts.

Qualifications:

1. Education equivalent to graduation from high school.

2. Usually, one year of experience in the department.

Immediate supervisor:

Section Supervisor (Balancing), or

Section Supervisor (Receipts).
The policies of the Midwest Electric Company as regards personnel were very clearly defined in the Collective Bargaining Agreement Article III, between the company and the International Brotherhood of Electrical Workers and Local Union 1472. The responsibility for the administration of these policies within the department was given to Mr. Kammer. The policies and their administration were important factors in the opportunities for advancement of the employees.

The personnel department of the company hired new employees only into the entrance job classification. When a vacancy occurred or when a new position was created within the bargaining unit above the entrance job classifications, consideration was given in the order indicated to the following methods of filling the vacant position:

(a) Return of a laid off, transferred, or demoted employee to the job in accordance with the provisions of Section 24 of Article III.

(b) Promotion of an employee in accordance with the provisions of Section 8 of Article III.

(c) Transfer within the same department of a qualified employee from another job classification which has the same schedule maximum.

(d) Transfer from another department of a qualified employee who has an application for transfer on file.

(e) Posting of notice of vacant position on the bulletin boards in accordance with the provisions of Section 13 of Article III.
(f) Selection of any employee or hiring of someone in accordance with the provisions of Section 14 of Article III.  

**Company policy on job security**

The policy of the company was to give as steady and as stable employment as possible and under normal circumstances employees were discharged only for "proper cause" which included serious infractions of company rules. However, each case was judged on its own merits to determine "proper cause." Since the Collective Bargaining Agreement provided for departmental seniority, the employees knew exactly where they stood as regards promotions and layoffs, and most of them were secure in their jobs because of the high number of years service most employees enjoyed.

---


**TABLE III**

REVENUE ACCOUNTING DEPARTMENT EMPLOYEES*  
AS OF OCTOBER 1, 1955

<table>
<thead>
<tr>
<th>Years of service in company</th>
<th>Number of employees</th>
<th>Per cent of total</th>
<th>Years of seniority in job classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 1</td>
<td>9</td>
<td>4.13</td>
<td>Under 1</td>
</tr>
<tr>
<td>1-3</td>
<td>23</td>
<td>10.55</td>
<td>1-3</td>
</tr>
<tr>
<td>4-7</td>
<td>7</td>
<td>3.21</td>
<td>4-7</td>
</tr>
<tr>
<td>8-11</td>
<td>10</td>
<td>4.59</td>
<td>8-11</td>
</tr>
<tr>
<td>12-15</td>
<td>14</td>
<td>6.42</td>
<td>12-15</td>
</tr>
<tr>
<td>16-19</td>
<td>2</td>
<td>.92</td>
<td>16-19</td>
</tr>
<tr>
<td>20-23</td>
<td>4</td>
<td>1.83</td>
<td>20-23</td>
</tr>
<tr>
<td>24-27</td>
<td>15</td>
<td>6.88</td>
<td>24-27</td>
</tr>
<tr>
<td>28-31</td>
<td>64</td>
<td>29.36</td>
<td>28-31</td>
</tr>
<tr>
<td>32-35</td>
<td>38</td>
<td>17.44</td>
<td>32-35</td>
</tr>
<tr>
<td>36-39</td>
<td>22</td>
<td>10.09</td>
<td>36-39</td>
</tr>
<tr>
<td>40-43</td>
<td>6</td>
<td>2.75</td>
<td>40-43</td>
</tr>
<tr>
<td>44-47</td>
<td>4</td>
<td>1.83</td>
<td>44-47</td>
</tr>
<tr>
<td>Total</td>
<td>218</td>
<td>100.00</td>
<td>Total</td>
</tr>
</tbody>
</table>

* excluding Industrial Records Division employees
Hours of work

The basic work week consisted of five regularly scheduled days with two regularly scheduled days off. The basic work day usually consisted of eight hours of work, from eight A.M. to five P.M. There was however one group of six machine operators who worked a shift from ten A.M. to seven P.M. and who rotated weekly with eight other operators in the same job classification. Their work, cash processing, when done on Saturday was not considered as overtime; rather, another day off was substituted.

Wage and salary administration

There were several important issues in the company's policy on wage and salary administration. First, both clerical and physical jobs throughout the company were covered by Collective Bargaining agreements with nineteen local unions; eighteen of which were locals of the International Brotherhood of Electrical Workers and one was a local of the United Mine Workers of America. All covered jobs were given values and graded in order to provide consistent wage administration in all departments of the company. The method of grading jobs was that of job ranking. Second, the Collective Bargaining Agreement provided for time step increases at various month intervals.

The job classification shown in Table IV, however, consists of the six month interval only.
The job evaluation was done entirely by management personnel. The writer found that the union was not too interested in the detailed steps leading to job evaluation. Rather, it was vitally concerned over the prices attached thereto.

**Turnover and job progression**

As the figures in Table III, page 18, clearly indicate the problem of employee turnover was negligible.
By referring to the two promotional series (Appendix XIII of the Revenue Accounting Department, it can be seen that each employee could be reasonably assured of his movement in the department. Because the specific lines of promotion and demotion were spelled out there and workers also had knowledge of company's past practice in periods of change as well as in periods of relative stability.

Proposed conversion

In May 1954, the computer committee was formed and it set up the agenda for the project. This included (1) programming, (2) installation, (3) personnel, (4) conversion, and (5) operations. The Midwest Electric Company was to be the first public utility to install the IBM type 702 computer and was to pioneer what would be a great transition. This conversion presented a challenge to the company, the union and the employees. The committee recognized that cooperation was the answer to profitable and peaceful living under the collective bargaining agreement while managing a major change to a most vital economic factor, manpower.

Summary

In December 1955, the Revenue Accounting Department was an organization of two hundred eighty people, ninety-two of whom were women. For over thirty-eight years this department had experienced a considerable number of changes, some of which were major changes; for instance, that of bi-monthly billing in 1961.


9 Kanmer
TABLE V

CHANGES IN THE REVENUE ACCOUNTING DEPARTMENT

1919 - Manual billing; even the bills were written by hand

1923 - Elliot Fisher billing machines brought in; the stub plan of payment first instituted.

1938 - Numerio IBM introduced with the first use of key punching; the meter readers continued to write the present readings into a book; the names of customers were printed by addressograph; the bills were put into sequence manually.

1947 - Alphabetic IBM introduced; the meter readers now mark sense the utility card; manual sequencing of bills eliminated; the bill is now punched and automatic cash processing results.

1950 - Post card billing inaugurated.

1951 - Bi-monthly basis of billing introduced; an employee pool resulted because of a surplus created; these workers were not transferred to other departments and the employees became unhappy with their temporary jobs; long service employees were put to work on anything to keep active. The surplus was not eliminated for two years.

Over these years and through the periods of growth and change, the policies of the company and their administration by the department remained favorable from the point of view of the employee, with one exception. This one exception was that a labor pool was created in 1951. The excess employees, however, were not worried about their jobs. The long service of the employees indicated that they accepted the slow rate of promotion and were satisfied to work in a company which offered in return job security.

In January 1956, the conversion to the IBM type 702 computer began and once again the existing picture of the department would be altered.
CHAPTER IV

THE DECISION

The decision to convert accounting methods to an electronic computer was an outgrowth of the company's earlier interest in mechanization of its clerical accounting work. In 1949, a Committee of two men, Mr. Barnes, the machine accountant and Mr. Andrews, the machine procedures accountant, was formed. These two men, who reported to Mr. Dressler, the Comptroller and Vice-President of the Midwest Electric Company, were asked to study the feasibility of using large scale computers in commercial accounting work. At this early date, the only working computers were those specifically designed for work of a scientific nature. The committee had no idea whether a machine could be built for commercial use, and neither did the three manufacturers of successful scientific machines, General Electric, International Business Machine Corporation, and Remington Rand, Incorporated, to whom the query was presented.¹

The Committee presented to the manufacturers requirements for a commercial computer that would deal principally with the procedures of the Revenue Accounting Department: a large volume of work with relatively simple mathematical computations. This posed a problem to the manufacturers since the scientific machines were built to handle a minimum of input with complex equations and again a minimum of output. Added to this was extra information, for

¹Information from a personal interview of the author with Mr. Barnes, Manager of Accounting, on August 6, 1957.
input into the computer, which had no bearing on the actual computation of the bills: for example, the name, dates, and account number.  

During the period of 1949 to 1952 the Committee witnessed the building of many experiment models of machines, in an attempt to find a computer that could handle the procedures required.

In 1951, three employees from the Machine Procedures Department who worked in part on machine accounting problems joined the committee. In 1952, the Committee spent two weeks in programming simple problems relating to their work to see if the Remington Rand Univac I might be the computer sought.

In 1953, several manufacturers, IBM and Remington Rand included, began bidding for the installation job with the Midwest Electric Company. A company programming staff was formed, composed of sixteen employees from the Machine Procedures Department and five employees from the accounting firm of Arthur Andersen and Company. The people from Arthur Andersen were experts in the field of systems design and had had experience in computer work. This staff now began to program the very simple procedures of the Revenue Accounting Department to determine whether the then available computer might be able to handle the work.

During 1953, the programming staff, under the watchful eye of engineers from both IBM and Remington Rand, was busy designing a system within the scope of requirements and specifications given to the manufacturers.

\[\text{Ibid.}\]

\[\text{Ibid.}\]
In the early months of 1964 three men from the Quaker Gas Light and Coke Company were added to the programming staff, at their request to gain experience for possible later decision by their company.

By January 1964, it became a matter of choice between the 702 and Univac. At this date, Mr. Cartwright was the Comptroller and Vice-President and the committee reported to him that the tests of feasibility were completed and the committee had found that a computer could do the accounting work and it had recommended that a computer be installed. Representatives of Arthur Andersen and Company had spent the latter months of 1953 studying the specific company problems and they also agreed that the estimated potential savings of seven hundred fifty thousand dollars per year before Federal Income Taxes and a reduction of two hundred employees were so great that the computer should be installed. 4 Mr. Cartwright made the decision to recommend to the Board of Directors, that a computer be installed. He continues to make periodic reports on the computer to the Board.

It now was the time for choosing the computer. The field was narrowed to the IBM 702, the Univac I which was available or a new and as yet not built Univac II. On April 27, 1964, the Company ordered the IBM 702 for delivery in July 1965. The following are the factors which were considered before the choice was made:

4 In an address delivered by Mr. Cartwright before the "Automation for Senior Officers" Conference, University College. The University of Chicago, on November 14 and 15, 1955.
1. Equipment available
2. Lease or purchase terms
3. Delivery dates
4. Relative load - work performance - reliability
5. Internal checking facilities
6. Relative economies
7. Possible excess employee problem
8. Excise tax
9. Vendor considerations

Three of the important reasons for the choice of the IBM 702 computer follow:

1. The modified Univac II had not yet been built and it could not be delivered until 1956. It would not be built unless the Midwest Electric Company were to order it.

2. The IBM 702 and the present Univac I would cost about the same.

3. Although the reliability of the IBM 702 was criticized for its lack of internal checking facilities, the company felt its past favorable experience with the IBM Corporation more than offset this difficulty. To meet this problem the company planned to duplicate all computer operations, at first, to insure against any serious deficiencies. Also, IBM had agreed to make the 702 lease cancellable on thirty day notice. With this arrangement the company could drop the 702 at any time and switch to another machine, if a better one came along.

Arthur Andersen and Company concurred in recommending the IBM 702.

Beginning in April 1954 and ending in July 1955, the programming staff devoted its entire time to programming the fifteen basic operations in the

5In an address delivered by Mr. Cartwright before the Board of Directors, Midwest Electric Company on April 27, 1954.
revenue accounting billing and accounting function, as well as the program of conversion which was to be used only once. There were in addition the difficulties of testing the reliability and accuracy of the computer, and key punching information, (which was formerly on visual records,) to cards for the initial conversion program. The first six months of 1955 were devoted to debugging the programs on the 702 in the IBM center in Poughkeepsie, New York.

When the computer was delivered in July 1955, the programming staff, which by now numbered thirty-seven men, began to program and debug on the company machine. In November 1955 and for a period of six weeks the programming staff began their parallel runs. This is the method by which one thousand accounts for each of six days were run through the computer and compared for accuracy with the same accounts handled by the old system. These were the weeks of final testing and it was at this time that the bargaining unit programmers were used; however, they were assigned to the clerical jobs, which consisted of visually comparing the listings obtained from the parallel machine runs.

Thus ended the period of early research and testing of the computer capabilities, reliability and accuracy.

Summary

The early work in the commercial usage of electronic data processing machines was carried on principally by two men of the Midwest Electric Company. In 1949 when their feasibility studies began, computers were used only for scientific work, and it became necessary to design and build a machine for a new concept of work.

6 Information from a personal interview with Mr. Lacey, Supervisor, Programming Division, August 5, 1957.
In April 1954, the Vice-President and Comptroller made the decision to recommend that the company order the computer, based on the findings of the committee that (1) the computer was reliable and (2) a substantial savings would result. The IBM 702 computer was chosen and delivered in July 1955. A period of developing a programming force to devise, prepare and debug the programs for the billing operations of the Midland Revenue Accounting Department was then continued.

The 702 procedures and programming staff was comprised of the following:

1. Twenty-four management employees in the Machine Procedures Department.
2. Six people from Arthur Andersen and Company.
3. Three employees from Quaker Gas Light and Coke Company.
4. Four engineers from IBM.

In spite of the extensive preliminary work, it took longer than originally anticipated to program the operations. The development of these procedures and programs required thirty-five man-years, nearly double the original estimate of twenty man-years. The debugging operation, which is the technique of taking written programs and testing them on the computer, thus proving the logic of the program and finding of the clerical and logical errors in the program, took nearly fifteen man-years and one thousand computer hours, once again longer than anticipated. Although the staff was continually increased from

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7 Mr. Cartwright, "Automation for Senior Officers."
early 1964 and overtime was used to a major degree, the programming and de-bugging, which continued through December 1965, took eighteen months, or two months longer than scheduled.

In June 1965, a new position was established in the company. The post of Manager of Accounting was given to Mr. Barnes, and as such he is responsible to the Vice-President and Comptroller, and is charged with the record keeping, and operations of the computer as well as other accounting functions. The new manager is not an officer of the company, although about two-thirds of the thirteen hundred employees in the financial and accounting area report to him. The Vice-President and Comptroller remained the chief financial and accounting officer.
CHAPTER V

THE PERIOD OF CONVERSION

Administration of the computer installation

Although the Revenue Accounting Department was highly mechanised, the transition to a computer was a great change and had to be introduced in an orderly fashion. In May 1964, the Management Computer Committee was formed, composed of Mr. Barnes, as chairman, Mr. Kammer, Mr. Robertson, Mr. Andrews, Mr. Peters as secretary, and Mr. Simpson. This committee was responsible for all matters having to do with the computer. Reporting to Mr. Kammer was Mr. Andrews, who was charged with the technical development of procedures including programming. Mr. Andrews had several management employees on his staff on loan from various areas in the company, including Messrs. Peterson and Lacey from the Midland Revenue Accounting Department; Mr. Bauer from the service and meter department; Mr. Holland from the budget department and Mr. Southworth from the rates and economic research department. This team was aided by the representatives from IBM, Arthur Andersen and Company and the Quaker Gas Light and Coke Company.

On May 26, 1964, the Computer Committee detailed the following agenda:

1 Memorandum of Computer Committee meeting dated May 18, 1954, see Appendix IV, page 30
Programming:
1. Additional space for machine procedures department
2. Additional personnel and training
3. Participation by IBM
4. Participation by Arthur Andersen and Company
5. Participation by the Quaker Gas Light and Coke Company
6. Availability of computer equipment for testing out programs, late in 1954.
7. Development of detailed procedures
8. Operation instructions and procedures
9. Determination of auxiliary equipment requirement
10. Detail coding of computer programs and wiring boards
11. Design of source documents and report forms
12. Development of controls and related procedures
13. Temporary programs for conversion
14. Question of customer service files

Computer manual:
1. To be approved by the Midwest Electric Company and IBM.

Installation:
1. Location of equipment
2. Space for expansion
3. Building problems i.e., power supply and air conditioning
4. Communication
5. Supplies
6. Furniture
7. Delivery problems
8. Temperature and humidity
Personnel: 1. Job requirement under computer operation, organization and training.

2. Plan prior to computer installation to minimize later "surplus" problems.

3. Determination of surplus
   a) by job classification on seniority basis
   b) by work group on seniority basis

4. Problems of shift rotation
   a) would shifts rotate

Conversion: 1. Development of conversion procedures

2. Temporary equipment for conversion, additional card to tape machine

3. Temporary help for conversion

Operation: 1. Organization

2. Working hours
   a) five day, ninety-five hour week operation or
   b) six day, ninety-six hour week operation

3. Auxiliary punched card equipment needed
   a) reproducers, type 528
   b) tabulators, type 403

4. Communication of information required by other areas

5. Safety of personnel, grounding of machine

6. Protection of tapes and other records
This team calculated that a conversion rate of ten thousand accounts per day was the maximum which could be handled without upsetting the regular work of the department. The daily billing procedures took precedence over the conversion, in any given day's work.

The scheduling, as well as planning, was made known to both management employees, at luncheon meetings where Mr. Barnes explained the operation of the computer and its effects upon the various departments, and to the officers and stewards of Local 1472. The union was first informed of the decision to install the computer at the regularly scheduled monthly union-management meeting held on April 28, 1964. As further information became available it was discussed on almost a monthly basis.

The management employees who made up the Computer Committee were all capable men, experienced in their particular fields, and enjoyed many years of company service. Their varied experience is shown in the following table. This weighed heavily in their favor in administering the installation of the computer since they were familiar with accounting procedures, machine capabilities as well as company rules, regulations and policies.
## TABLE VI

**WORK HISTORY OF MANAGEMENT EMPLOYEES ON**

**COMPUTER PROGRAMMING AND PLANNING**

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Service</th>
<th>Background in company</th>
<th>Department and position</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bauer</td>
<td>49</td>
<td>32</td>
<td>Section supervisor and clerk in meter department</td>
<td>Revenue accounts methods analyst</td>
<td>4 years high school</td>
</tr>
<tr>
<td>Barnes</td>
<td>51</td>
<td>29</td>
<td>Auditing; general accounting; machine accounting</td>
<td>Manager of accounting</td>
<td>B.S. degree in Commerce and English</td>
</tr>
<tr>
<td>Holland</td>
<td>45</td>
<td>30</td>
<td>Clerk and assistant supervisor in meter department</td>
<td>Staff analyst budget department</td>
<td>2 years high school; 2½ years general courses in college</td>
</tr>
<tr>
<td>Peterson</td>
<td>47</td>
<td>29</td>
<td>Machine operator; accounting machine clerk; staff assistant procedures department; methods analyst</td>
<td>Assistant supervisor revenue accounts</td>
<td>4 years high school</td>
</tr>
<tr>
<td>Andrews</td>
<td>47</td>
<td>30</td>
<td>Chief clerk revenue accounts; staff assistant procedures department; improvement and comptrollers office</td>
<td>Machine procedures accountant, Machine Procedures Department</td>
<td>4 years high school</td>
</tr>
<tr>
<td>Kammer</td>
<td>57</td>
<td>40</td>
<td>Clerk, supervisor Revenue Accounting Department, and Revenue Accountant</td>
<td>Revenue accountant Revenue Accounting Department</td>
<td>4 years high school</td>
</tr>
</tbody>
</table>
### TABLE VI (continued)

**WORK HISTORY OF MANAGEMENT EMPLOYEES ON COMPUTER PROGRAMMING AND PLANNING**

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Service</th>
<th>Background in company</th>
<th>Department and position</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lacey</td>
<td>46</td>
<td>23</td>
<td>Clerk; air conditioning engineer; staff analyst</td>
<td>Assistant supervisor Revenue Accounting Department</td>
<td>B.S. degree in Engineering</td>
</tr>
<tr>
<td>Peters</td>
<td>55</td>
<td>38</td>
<td>Assistant treasurer; division comptroller, Public Service Company</td>
<td>Assistant revenue accountant Revenue Accounting Department</td>
<td>4 years high school</td>
</tr>
<tr>
<td>Robertson</td>
<td>55</td>
<td>31</td>
<td>Procedures office; chief, staff, general accountant Illinois Northern Utilities -Public Service System</td>
<td>Assistant to comptroller</td>
<td>B.S. degree Electrical Engineering</td>
</tr>
<tr>
<td>Simpson</td>
<td>50</td>
<td>28</td>
<td>Senior clerk, staff assistant, staff analyst records department; office of vice-president Industrial Relations</td>
<td>Assistant to director of employee relations</td>
<td>B.A. degree Economics</td>
</tr>
<tr>
<td>Southworth</td>
<td>46</td>
<td>23</td>
<td>Statistics clerk; power accounts and power contract clerk; analyst; statistics, procedures, methods department</td>
<td>Methods analyst Revenue Accounting Department</td>
<td>2 years college commercial credits 2 years college general courses credits</td>
</tr>
</tbody>
</table>


The union's role in the conversion

Although the union was not represented on the Computer Committee, it played a vital role in the communication of the progress of the installation. It was through the union that the company continued to reassure the employees of their security. 2

The union, which was concerned with the possibility of surplus employees, formed a Committee of its own. 3 This Committee was composed of the following:

1. Mr. Sanford, Chief steward commercial department and former president of Local 1472
2. Mr. Gaylord, Secretary of the Executive Board, and former president of Local 1472
3. Mr. Ubert, Chief steward general accounting
4. Mr. Walters, Chief steward Midland revenue accounting
5. Mr. Bremner, Chief steward Midland revenue accounting
6. Mr. Morrison, President Local 1472
7. Mr. Keller, Vice-President Local 1472

This Union Committee in June 1955 enrolled at Roosevelt University in Chicago and took a three session course in Automation. This course dealt principally with basic information about electronic computers and their operation.

2Simpson, February 6, 1957

3Information from a personal interview with Mr. Morrison, President of Local 1472, on July 29, 1957.
The first union-management meeting concerning the installation of the computer was held on July 8, 1965. The last meeting was held on April 20, 1966. Between these dates, there were twenty-two meetings during which the following subjects were discussed:

1. Number of shifts in the computer area
2. Establishment of a job classification to provide an avenue for bargaining unit employees for console operating work
3. Broadening of job specifications
4. By-passing of employees, in case of promotion, because they have no experience on certain activities included in the broadened job specifications
5. Rotation of employees as provided for in the job specifications
6. Selection of several employees for the IBM school for bargaining unit programmers and console operators
7. Question of unassigned employees, their placement and wages
8. Prevention of an "employee pool" as created by the change to bi-monthly billing in 1961
9. Consideration of granting more favorable terms to employees going on the service annuity payroll
10. Possibility of giving separation allowances
11. Creation of bargaining unit jobs for programmers and console operators with those specific titles
12. Skills required for application for the proposed jobs of programmer and console operator
13. Wages attached to all the job classifications proposed
14. Limitation of downgrading an employee two job levels with no reduction in pay
15. Establishment of programmer and console operator as entrance job classifications
These negotiations were held on both company premises and time. Here are the comments of Mr. Walters, one of the union representatives, regarding the result of the bargaining:

For such a change, the negotiations and understanding between the parties were very successful. The union felt that at each meeting they were forging ahead, never losing ground. The union thinks it got a good deal; however, it feels that management did not take full advantage of the employees' knowledge of the job; instead, they relied heavily on supervision.

Mr. Morrison, the President of Local 1472, said, "the union came out fairly well, in the end."

Nine months of conversion

On January 6, 1956 the actual conversion of customer accounts began. During the early months of 1956, the management methods analysts were programming and operating the console. The bargaining unit employees assisted as part of their training as future operators.

The following table indicates the number of accounts converted in the nine month period.

---

4 Information from a personal interview with Mr. Carl Walters, Chief Steward Revenue Accounting Local 1472, on February 20, 1957.

5 Morrison, July 29, 1957.
### TABLE VII

**SUMMARY OF ACCOUNTS CONVERTED FOR THE PERIOD**

**JANUARY 1956 THROUGH SEPTEMBER 1956**

<table>
<thead>
<tr>
<th>Division</th>
<th>Month</th>
<th>Accounts converted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midland North</td>
<td>January</td>
<td>26,212</td>
</tr>
<tr>
<td></td>
<td>February</td>
<td>53,256</td>
</tr>
<tr>
<td></td>
<td>March</td>
<td>172,028</td>
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<tr>
<td></td>
<td>April</td>
<td>144,056</td>
</tr>
<tr>
<td>Midland South</td>
<td>May</td>
<td>33,651 *</td>
</tr>
<tr>
<td></td>
<td>June</td>
<td>205,965</td>
</tr>
<tr>
<td></td>
<td>July</td>
<td>176,615</td>
</tr>
<tr>
<td>Midland Central</td>
<td>August</td>
<td>156,088</td>
</tr>
<tr>
<td></td>
<td>September</td>
<td>160,350</td>
</tr>
</tbody>
</table>

* Test month: change in auxiliary equipment

Beginning in June 1956, and continuing for three and a half months, ten methods analysts were flown, two at a time, for a period of two weeks to the Southern Chemical Company plant in St. Louis, Missouri. The men worked on Southern's IBM 702, from 11 P.M. to 7 A.M., converting the Midwest Electric Company accounts. This action was taken when it was found that working three shifts, seven days a week was not enough time. Mr. Lacey said, "the extra hours I put in were equal to three months working time. I had no vacation and dropped all social life, I never knew when I would be home. I was on call twenty-four hours a day."\(^6\)

The following table indicates the estimated number of employees required during the period of conversion:

\(^6\)Ibid.,


<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Old system, Midland</td>
<td>282</td>
<td>282</td>
<td>262</td>
<td>278</td>
<td>263</td>
<td>235</td>
<td>202</td>
<td>73</td>
<td>72*</td>
<td>72*</td>
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<td>21**</td>
<td>21**</td>
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<td>166</td>
<td>130</td>
</tr>
<tr>
<td>Old system, Lakewood</td>
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<td>147</td>
<td>147</td>
<td>147</td>
<td>147</td>
<td>147</td>
<td>147</td>
<td>147</td>
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</tr>
<tr>
<td>New system, Midland</td>
<td>9</td>
<td>20</td>
<td>20</td>
<td>27</td>
<td>39</td>
<td>54</td>
<td>67</td>
<td>79</td>
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<tr>
<td>Conversion, Midland</td>
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<td>11</td>
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<tr>
<td>Excess or (-shortage) Midland</td>
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<td>-27</td>
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<td></td>
</tr>
</tbody>
</table>

*Industrial records  

a Determined to be inadequate; increased to 110, by adding 30 from excess

**Merchandise  

b The excess was distributed to the new system; and, the remaining 59 transferred to Public Service bookkeeping
Reassignment of workers

The change caused some shifting of workers from jobs in reduced activities to jobs where activities increased. The shift downgraded some workers and upgraded others. A total of seventy-eight promotions resulted. 7

The employees most affected were the Account Station Clerks. Every effort was made to place them in other jobs. The company recognized that these employees had been involved in previous departmental changes and gave the incumbents an increase in wages of six cents per hour above the wages negotiated for them between the union and the company. 8

The following table shows the requirements of the Revenue Accounting Department under the computer system and indicates the distribution of the employees needed under the old system, in the area affected by the installation of the computer.

7Simpson, February 6, 1957.

8Meegan, July 10, 1957
<table>
<thead>
<tr>
<th>Clerks</th>
<th>No. of employees</th>
<th>Scheduled maximum</th>
<th>Clerks</th>
<th>OP</th>
<th>C</th>
<th>MR</th>
<th>KP</th>
<th>EAM</th>
<th>EDPM</th>
<th>MDSE</th>
<th>PS</th>
<th>X</th>
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</thead>
<tbody>
<tr>
<td>Accounts control</td>
<td>1</td>
<td>2.89 to 3.08</td>
<td>Acctg clerk I</td>
<td>1</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>Records review</td>
<td>2</td>
<td>2.89 to 3.08</td>
<td>Acctg clerk I</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
</tr>
<tr>
<td>Customer deposit</td>
<td>1</td>
<td>2.72 to 2.65</td>
<td>Acctg clerk III</td>
<td>1</td>
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<td>-</td>
<td>-</td>
<td></td>
<td>-</td>
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</tr>
<tr>
<td>Accounts balance and review</td>
<td>17</td>
<td>2.72 to 2.86</td>
<td>Acctg clerk II</td>
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<td>7</td>
<td>-</td>
<td>-</td>
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<td></td>
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<td></td>
<td>Acctg clerk II</td>
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<td>Acctg clerk III</td>
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<td>2</td>
</tr>
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<td>Jr. revenue accounts</td>
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<td>-</td>
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<td>10</td>
<td>32</td>
<td>6</td>
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<tr>
<td>Sr. revenue accounts</td>
<td>2</td>
<td>2.43 to 2.43</td>
<td>General clerk I</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>-</td>
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<tr>
<td>(File room)</td>
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<tr>
<td>Sr. revenue accounts</td>
<td>2</td>
<td>2.43</td>
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<tr>
<td>(Record control)</td>
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<td>1</td>
<td>1</td>
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<tr>
<td>Sr. acctg machine</td>
<td>8</td>
<td>2.43 to 3.21</td>
<td>Console operator</td>
<td>-</td>
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<td>-</td>
<td></td>
<td>1</td>
<td>-</td>
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<tr>
<td>(After balance)</td>
<td></td>
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<td></td>
<td>-</td>
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<tr>
<td>Sr. acctg machine</td>
<td>5</td>
<td>2.43 to 2.65</td>
<td>Acctg clerk III</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>(Commercial accts)</td>
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</tbody>
</table>
### TABLE IX (continued)

COMPARISON OF EMPLOYEE REQUIREMENTS AND HOURLY WAGES
FOR THE OLD AND NEW SYSTEM AS OF NOVEMBER 15, 1956

<table>
<thead>
<tr>
<th>Clarks</th>
<th>No. of employees</th>
<th>Scheduled maximum from</th>
<th>to</th>
<th>Clerks</th>
<th>OP</th>
<th>C</th>
<th>MR</th>
<th>KP</th>
<th>EAM</th>
<th>EDPM</th>
<th>MDSE</th>
<th>PS</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sr. acctg machine (Finals &amp; specials)</td>
<td>6</td>
<td>2.43-2.43</td>
<td></td>
<td>General clerk I</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>9</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>Acctg machine (Receipts &amp; card punch)</td>
<td>12</td>
<td>2.21-2.19</td>
<td></td>
<td>General clerk II</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>-</td>
<td>-</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Acctg machine (After proof)</td>
<td>5</td>
<td>2.21-3.21</td>
<td></td>
<td>Console operator</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
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<tr>
<td>Acctg machine (Bill corrections)</td>
<td>2</td>
<td>2.21</td>
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<td>Acctg machine (Mark sense)</td>
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<td>2.21</td>
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<tr>
<td>Revenue accounts (Receipts control)</td>
<td>3</td>
<td>2.19</td>
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<td></td>
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<td>-</td>
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<td>3</td>
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<tr>
<td>Sr. Revenue accounts (Balance listing)</td>
<td>2</td>
<td>2.06-1.94</td>
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<td>Clerk I</td>
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<td>Sr. Revenue accounts (After billing)</td>
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<td>2.06-1.84</td>
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<td>Clerk II</td>
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<td>-</td>
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<td>2</td>
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</tbody>
</table>
### TABLE IX (continued)
COMPARISON OF EMPLOYEE REQUIREMENTS AND HOURLY WAGES
FOR THE OLD AND NEW SYSTEM AS OF NOVEMBER 15, 1956

<table>
<thead>
<tr>
<th>Clerks</th>
<th>No. of employees</th>
<th>Scheduled maximum from</th>
<th>to</th>
<th>Clerks</th>
<th>OP</th>
<th>C</th>
<th>MR</th>
<th>KP</th>
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<th>MDSE</th>
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<tr>
<td>Sr. Revenue accounts</td>
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<tr>
<td>Key punch clerk</td>
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<td>1.90-1.94</td>
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<td>Key punch clerk</td>
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<td>Clerk II</td>
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<td>1.87-1.84</td>
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<td>Clerk II</td>
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<td>Jr. Office clerk</td>
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<td>(Arrears)</td>
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<tr>
<td>Billing operations analyst</td>
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<td>2.98-3.08</td>
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<td>Acctg clerk I</td>
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<td></td>
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<tr>
<td>analysis clerk</td>
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<tr>
<td>Meter records analysis clerk</td>
<td>3</td>
<td>2.89-3.08</td>
<td></td>
<td>Acctg clerk I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Revenue statistics</td>
<td>4</td>
<td>2.89-3.21</td>
<td></td>
<td>Console operator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.08</td>
<td></td>
<td>Acctg clerk I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>
**TABLE IX (continued)**

**COMPARISON OF EMPLOYEE REQUIREMENTS AND HOURLY WAGES**

**FOR THE OLD AND NEW SYSTEM AS OF NOVEMBER 15, 1966**

| Clerks | No. of employees | Scheduled maximum | Clerks | OP | C | MR | KP | EAM | EDPM | MDSE | PS | X |
|--------|------------------|-------------------|--------|----|---|----|----|-----|------|------|-----|----|---|
| Jr. Revenue Accts Analysis (Current review balance) | 2                      | 2.65 to 2.86      | Acctg clerk II | -  | - | -  | 1  | 3   | -    | -    | -   | -  | - |
| Jr. Revenue Accts analysis (Review proof) | 6                      | 2.65 to 2.86      | Acctg clerk III | -  | - | -  | -  | 2   | -    | -    | 1  | 1  | - |
| Jr. Revenue Accts analysis (Rate & order review) | 6                      | 2.65 to 2.86      | Acctg clerk II | 6  | - | 2  | -  | -   | -    | -    | -   | -  | - |
| Jr. Revenue Accts analysis (Meter records) | 11                     | 2.65 to 2.86      | Acctg clerk III | -  | - | 7  | -  | -   | -    | -    | -   | -  | - |
| Merchandise Accts analysis | -                      | 2.89 to 3.08      | Acctg clerk I | 1  | 1 | -  | -  | -   | -    | -    | -   | -  | - |
| From other areas | -                      | - to 3.21         | Console operator | - | - | -  | -  | 4   | -    | -    | -   | -  | - |
| **Total** | **199**         |                   |                   | **Totals** | 20 | 13 | 15 | 19 | 28  | 15   | 13  | 59 | 17 |

* Does not include industrial records employees

**NOTES:***

- EAM = Tabulating section
- OP = Order process section
- C = Control section
- MR = Meter records section
- KP = Key punching section
- MDSE = Merchandise
- PS = Public service bookkeeping
- X = Excess eliminated through normal attrition
Selection of computer employees

The original employees chosen for work in the programming and console operating areas were the Methods Analysts. They were selected (1) from employees with supervisory standing, (2) from the bargaining unit employees, and (3) hiring from outside the company. A test was then given and those who passed it were sent to the IBM school in Poughkeepsie, New York where they trained on the IBM 702. Their period of formal training was nine weeks. This method of selection resulted in definite promotions. In one case related to the writer, by Mr. Meegan, an employee who had a degree in mathematics, was engaged in clerical work at the time of selection and when her record was reviewed she was recommended for the job. She took the test, was trained, and is now a management employee. There were four people hired into this management job classification during 1956, two have Master’s degrees and two have Bachelor degrees in mathematics.

At the time of the union-management negotiations it was agreed that the bargaining unit employees would perform certain operations in connection with programming and operating the console. Since these jobs were made entrance job classifications, seniority did not enter into the selection of employees. The company also looked through its transfer files in the Employment office for possible candidates and over one hundred names were considered. The first group of bargaining unit employees was selected in November 1955 and started their training at IBM school in Chicago in January 1956. They were trained in programming by the Methods Analysts for four weeks on the IBM 702 and for five weeks on the console. In selecting the first group the company
chose five men from the following areas: 9

- Two men from revenue accounting
- Two men from machine accounting
- One man from general books

This group was chosen on the basis of the following criteria: 10

1. Demonstrated aptitudes for logical reasoning as shown by the written test
2. Knowledge of company operations in general and accounting operations in particular
3. Ability to convey ideas, during interviews
4. Aptitude for numerical analysis
5. Scholastic background

The first group took a test made up by Mr. Andrews while the second group of seven men selected in July 1956 took a test prepared by IBM. Mr. Lacey said, "there is a correlation between good scores and good programmers as findings have shown particularly on examination of the IBM test results."

The problem of training

In preparing the operating employees, throughout the affected areas, there was a personnel training program. 11 The affected supervisors and their employees were equipped with charts and exhibits of the records and forms they

9 Mr. Lacey, August 5, 1957.
10 Minutes of union-management meeting dated September 27, 1955, see Appendix V, page
11 Mr. Cartwright, "Automation for Senior Officers."
would use under the new system. It was necessary to teach the employees how to get information off the new records. The people involved with input for the computer were equipped with detailed instructions and reference charts because this system stressed source accuracy more than ever.

Mr. Brooks of the programming staff was responsible for the training of the clerical employees. During the period of parallel runs, prior to the conversion, he set up a series of six, two hour lectures and prepared a manual which exhibited the various types of forms used in order processing. The supervisors and a principle clerk of the various departments were his first pupils. Everything was entirely different in the new system and the people had to begin learning a new procedure. The big problem was that of coding the orders. Since the work and orders varied so much the employees had to remember more than ever before.

Once the conversion began the supervisor and his principle clerk were charged with training the other employees. This was done on the job. Mr. Brooks continued however, to present his lectures and it was May 1957 when he was taken from that job and began his duties as Methods Analyst in the programming staff. By this date a nucleus of trained employees was formed and they were able to train the new employees.

Job content of the new jobs

As shown in the job specifications for the Programmer, Console Operator, Programming Projects Clerk found in Appendix X page 123 the programmers deal with tested programs while the methods analyst is concerned with
developing, adapting and testing new systems. He deals with policy and planning, consequently, he is a management employee.

The use of a single promotional series broadens the promotional opportunities in that the employees are no longer limited to promotions within one phase of work. The incumbents of the Revenue Accounting Department are not by-passed in case of promotion to jobs where they have little or no experience. This has caused a temporary problem for supervision since a man promoted is not necessarily the best qualified for the job. The result is a problem of training. Of course the single promotional series gives the department new flexibility and movement.

Delay of the 705 computer

It was originally planned that the 702 computer would be placed in operation in November 1955 and that the entire billing procedure for the Midland residential users as well as the Public Service customers would be placed thereon by December 1956. This was changed however when it was found that the Public Service accounts could not be placed on the 702, since the 702 was not capable of handling the additional eight hundred forty thousand accounts in a three shift day. Thus the IBM 705 was ordered to replace the 702 in January 1957. It was then decided to postpone delivery of the 705 and thus allow more time for preparation of new procedures and programs. It was estimated that with the delivery of the 705, forty man-years would be used in program preparation for that machine alone, and this would be a minimum requirement.

13 Information from a personal interview with Mr. Petersen, Assistant Supervisor Tabulating, on August 9, 1957.

14 Mr. Cartwright, "Automation for Senior Officers."
Summary of the conversion period

The way in which the Computer Committee planned and approached the problem of the installation is an indication of the importance of the many complex problems with which it had to deal. This team was hampered in one respect in that it had no other company's experience to which it could refer.

The tone of the union-management negotiations is noteworthy; although the union was not represented on the Computer Committee, it did play an important role in the installation.

The period of conversion indicated a never ending need for the well trained employee. It appears that the company selected the computer workforce with care and did offer on-the-job training. It possibly, did not anticipate the problems resulting from the complex nature of the new system especially in the clerical division jobs. In order to lessen the problem of surplus employees, it was decided that there would be no hiring during the conversion unless a low level clerk's job became vacant. As a result a large number of hours were worked overtime by the incumbent employees. To aid in the work eight former and experienced Revenue Accounting Department employees were borrowed from other areas for the conversion period.

The departmental organization was not changed during the conversion although the machine procedures group was merged into the Revenue Accounting Department. This action was taken in the latter months of 1956. The structure of the department was changed in January 1957, see page...
CHAPTER VI

THE REVENUE ACCOUNTING DEPARTMENT AFTER CONVERSION

On October 1, 1966, the transfer of the billing of the Midland residential and small commercial users to the IBM type 702 computer was completed. It was on April 17, 1957 when the faster and more advanced IBM type 705 computer was put on rental. It then became the task of the employees to transfer the information from the 702 to the 705 and thus prepare it for operation. The purpose of this chapter is to show the situation in the Revenue Accounting Department as of October 1, 1956 when the main conversion job as planned in 1953 was finished.

In October, 1956 the department was able to handle a much larger volume of transactions and was also in a position to give better information to the customer service area than under the old system. One day's work with the computer was made up of the following:¹

**Input:**
1. 9,000 order cards
2. 30,000 payment and adjustment cards
3. 30,000 meter reading cards

¹Information from a personal interview with William Warners, Assistant Supervisor, Computer Division, on July 10, 1957.
Output: 1. 30,000 new meter reading cards 2. 70,000 bill printing cards 3. 300,000 lines of printing (billing record) 4. 30,000 bills to be sent to users

The reduction by eighty-nine in the number of employees required for the operation of the department under the computer system made the anticipated problems of personnel placement and training difficult ones.

The excess was eliminated when fifty-nine employees were placed on bookkeeping of Public Service accounts, which work was brought in from Lakewood. This procedure had been the same in both Midland and in Lakewood and presented no great problem in training. Another thirteen employees were loaned to the commercial department of the company and sent to the three Midland divisions. These employees were experienced and are now giving customer information at the divisions. Prior to the conversion, information on customer status was given from the Revenue Accounting Department itself. The thirteen employees continue to accumulate seniority in the Revenue Accounting Department although the matter of duties to be performed as well as prices of the jobs has not been settled between the Local 1472 and the company. The distribution of the remaining seventeen excess employees follows:

a) retirement - 8  
b) transfer - 6  
c) death - 3  
Total 17
Although there were two separate clerical local unions in Midland and in Lakewood, Local 1472 IBEW in Midland and Local 1593 IBEW in Lakewood, there was no problem of bringing the Public Service bookkeeping into Midland as one might expect. The excess employees in Lakewood created by the move was quickly absorbed because (1) the expansion in the population of the suburbs is four times greater than that in Midland, (2) the Public Service system has division wide seniority, (3) the turnover of employees was very high in Lakewood, (4) there were many vacant jobs. In addition, there was little difficulty with Lakewood employees who might have expressed a desire to follow their work to Midland. An opportunity was given to do so, with two employees finally accepting. The company negotiated with the Local 1472 the amount of seniority each employee was to keep, and each of the two employees was given three-fourths of his seniority on the job and was thus slotted into the Midland Revenue Accounting Department seniority list.

Departmental organization after conversion

On January 1, 1967 a new management organization of the Revenue Accounting Department was completed. Mr. Peters, the former Revenue Accountant was appointed Revenue Accountant in Lakewood. Mr. Arthur Morton who was the assistant general accountant succeeded him. There are four divisions (1) Clerical (2) Computer (3) Industrial Records and (4) Programming. Mr. Carlson, who was an Assistant Revenue Accountant in Public Service Company became the Clerical Division head. Mr. T. S. Jackson, Staff Assistant to Manager of

Meegan, July 5, 1957.
Accounting, became the Computer Division head. Mr. Dvorak remained as head of the Industrial Records Division, and Mr. Lacey, who was Assistant Billing supervisor, became the Programming Division head. All these division heads carry the title of Assistant to the Revenue Accountant. Mr. Meegan who was the revenue accountant in Lakewood was brought into Midland as an Assistant to the Revenue Accountant. Mr. Meegan handles the daily problems that concern employees.

Additional functions include (1) monthly union-management meetings (2) selection and placement of employees (3) promotion and transfer of employees. This new position of personnel administrator permits the other four division heads to be relieved of personnel problems, to concentrate on production problems.
TABLE X
ORGANIZATION CHART MIDLAND REVENUE ACCOUNTING DEPARTMENT
AS OF JANUARY 1, 1957

Revenue Accountant
Mr. Morton

Clerical Division
Mr. Carlson
  - Assistant Supervisor
    - Mr. Lawson

Computer Division
Mr. Jackson
  - Assistant Supervisor
    - EAM
      - Mr. Petersen

Industrial Records Division
Mr. Dvorak
  - Assistant Supervisor
    - EDPM
      - Mr. Warner

Programming Division
Mr. Lacey
  - Supervisor
    - Mr. Akin
      - Assistant Supervisor
        - Mr. Gordon

Personnel
Mr. Meegan
  - Assistant Supervisor
    - Mr. Borgue
The jobs of division heads

The division head's responsibility is that of supervising his division functions only, and the skill and training required varies, especially in the computer and programming areas. Messrs. Jackson, Lacey, and Carlson each attended the IBM schools in New York and Chicago. The IBM Corporation also conducted a school for the management employees of the department on the premises of the Midwest Electric Company. A great deal of instruction and training is required in this area because the computer will reject all information which is fed into it, and which is not perfectly correct. The computer is very exact but it cannot think for itself and it will perform only the operations given it by man. There is no magic connected with its operation. 3 While the earlier system also called for specialists, this need was intensified with the computer. Briefly, however, the basic responsibilities of any administrator, that is, (1) knowledge of procedures, (2) knowledge of company rules and regulations, (3) settling of complaints, and (4) assigning, directing, and coordinating the work, have not been changed, the mobility of supervisors has been curtailed because of the installation. 4

The physical layout

The physical layout of the Revenue Accounting Department is not too different because of the computer. There was a slight difference in required space. The most important change took place in the need for a constant temperature and humidity; these two factors are rigidly controlled. Since the elec-

3Warners, July 10, 1957.
4Meegan, July 5, 1957.
Electronic components are very sensitive, the computer must be operated in a relative humidity range of forty to sixty per cent, with the temperature between sixty-five and eighty degrees Fahrenheit. Special equipment was installed for control purposes as well as for power supply. There is background music in both the computer room and the auxiliary equipment area as there was before the computer.

**Organization and functions of the divisions**

The division of the Revenue Accounting Department has been organized on a functional basis and each division is headed by a Divisional Manager who is an assistant to the revenue accountant. The Clerical Division has an Assistant Manager and all divisions are divided into sections headed by Section Supervisors. There are three such section supervisors in each of the four divisions.

The functions performed by the divisions require a highly integrated work force. The new computer system demands close cooperation of all concerned. Team effort is vital. The Clerical Division's functions are (1) order processing (2) controlling and (3) key punching. The Computer Division handles the computer operation and the auxiliary IBM machine equipment such as (a) collator (b) sorters (c) reproducers (d) interpreters (e) tabulators. The Industrial Records Division continues to prepare billing information of industrial accounts and large commercial users for both the Midwest Electric and the Public Service customers. The Programming Division is charged with (1) establishing programs (2) testing and research in programs and (3) debugging operations. This

Kammer, June 7, 1967.
division has the seven Programmers who are members of the Local 1472. The twenty-six Methods Analysts, who are the management employees engaged in programming work are in the division also. (See job descriptions, Appendix X, page 120.)

Procedure used after conversion

The processing of bills and orders requires an extensive use of IBM equipment. There are six basic components (1) the central processing unit, (2) the operator's console, (3) magnetic tape units, (4) card readers, (5) card punches, and (6) printers.

<table>
<thead>
<tr>
<th>Machines</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Collator type 077</td>
<td>statistical work and miscellaneous activities</td>
</tr>
<tr>
<td>Three sorters type 083</td>
<td>billing routines</td>
</tr>
<tr>
<td>Two reproducers type 519</td>
<td>mark sense meter reading cards and miscellaneous reproductions</td>
</tr>
<tr>
<td>Four reproducers type 528</td>
<td>reproduces the electric service bills, customer reminders, notices, and the cash payment stubs</td>
</tr>
<tr>
<td>(accumulating type)</td>
<td></td>
</tr>
<tr>
<td>Three interpreter type 552</td>
<td>bills and miscellaneous</td>
</tr>
<tr>
<td>(numeric)</td>
<td></td>
</tr>
<tr>
<td>Two interpreter type 557</td>
<td>meter reading cards</td>
</tr>
<tr>
<td>(alphabetic)</td>
<td></td>
</tr>
<tr>
<td>Three tabulators type 402</td>
<td>(1) statistical work and miscellaneous</td>
</tr>
<tr>
<td>(2) billing amount side</td>
<td></td>
</tr>
<tr>
<td>Six tabulators type 403</td>
<td>billing address side</td>
</tr>
</tbody>
</table>

6 Information from a personal interview with T. S. Jackson, Manager, Computer Division, on July 5, 1957.
At this point it is important to explain (1) the steps in bill computation (2) the methods of handling cash receipts and (3) procedures for accounts found to be in arrears.

**STEPS IN BILLING COMPUTATION**

1. Meter reading procedure just about the same - mark sense with a special pencil the present reading off meter at residence.

2. Put that meter reading card through a mark sense reproducer IBM 519 which punches appropriate numbers off meter into the meter reading card itself.

3. The punched meter reading card then goes through a card-to-tape procedure using an IBM 712 card reader connected to a IBM 727 magnetic tape unit, with the control unit for interpretation. The punched card is the medium used to get the data on tape. The procedure is (1) reading (2) interpreting (3) translation.

4. It now becomes a matter of combining that information for the specific customer with information already on tape. The previous data includes (1) the previous reading (2) dates (3) rates (4) previous uses for a one year period (5) location of meter and (6) meter reading information which concerns for example warnings of vicious dogs, and instructions against walking on the lawn.

5. Actual bill computation

   a. The computer must subtract the previous reading from the present reading to arrive at the current usage.

b. Then the computer checks to see if usage is normal, or above or below normal for that customer. If not normal, the computer writes out an investigation notice, on tape, and the billing is held.

c. If normal, the computer actually makes the computation by applying the proper rate, related to the number of days service.

d. This tape is taken to a tape-to-card machine IBM 722 card punch, connected to an IBM 727 magnetic tape unit with the control unit, where this billing information is transcribed to a billing information card.

e. By use of an IBM 528 reproducer, certain information, i.e. account number, due date, bill amount is reproduced from the billing information card to an IBM size billing card.

f. This billing information card, punched in step "d" above is put through printing machines, IBM tabulating 402 and 403. This is a two feed operation - the first operation on the 402 prints the bill amount, the present reading, the service date, the kilowatt hours and the 403 prints the address side of the billing card.

g. The next step is the interpretation of the top line, which includes the due date, the account number, the reference number from the punched stub of the billing card itself. The interpreting machine is an IBM 552 interpreter.

h. The billing card is then cut to post card size, weighed and sent to the post office. This is a manual operation.
PROCEDURE AFTER CASH PAYMENT

1. The punched cash stub is returned with the customer's payment; if the actual stub is lost another is made up.

2. The stub is reproduced to a full size IBM cash payment card; these cards are then converted to tape by use of the card reader and magnetic tape unit.

3. The payments are then sorted by computer operation into account number sequence to prepare them for posting to each individual customer's account. This is a subsequent operation which is called file maintenance.

   There are forty-two days with six reading cycles - each customer's account is reviewed once in every seven days for any change in status i.e. change of address, change of rate, final billings. It is feasible that a customer's bill is paid but not credited to his account on the tape until six days after payment. However, a daily cash receipts file is kept and this information is sent out to the Commercial Division for a complete and current status on customers' accounts. The Commercial Division would know that the bill was paid but the credit was not posted.

CUSTOMERS' ACCOUNTS IN ARREARS

There is a program in the computer which scans for customers accounts and which will produce a credit and collection document for use by the commercial division.

Two reminders and one final notice are sent out to the customer, each at seven day intervals.
It is clear now that the preparation of detailed information on customer status is now a relatively easy matter of running the correct set of punched cards through the proper machine. The whole system depends on the punched card as it is the primary source of information.8

Jobs of clerks after conversion

In April 1957, the jobs of clerks were changed considerably. For one thing, there is now one promotional series in the Revenue Accounting Department and not two as was the case previously. This change of course permits greater flexibility and allows more rotation and movement. Second, the old job specifications were eliminated and new ones were written. Third, there are now fewer job classifications and fourth, the new jobs required broader knowledge and greater skills. (See job descriptions, Appendix XI, page 125.)

The following is an example of how the new job specifications were written by combining functions of several of the old specifications. In this instant case the General Clerk II (accounting machines) duties were written on the basis of the former Senior Revenue Accounts Clerk (arrears, review and inquiries), Junior Revenue Accounts Clerk (after billing), Junior Revenue Account Clerk (billing), Accounting Machine Clerk (bill corrections), and Accounting Machine Clerk (after proof).9

8 T. S. Jackson, July 5, 1957.
9 Information from a personal interview of the author with Bill Lesters, Senior Personnel Analyst.
The entrance job in the department is that of clerk III and after a period of training the employees can promote to clerk II as provided in the collective bargaining agreement dated May 1957. Since the conversion, the functions of many of the clerks in the various divisions are similar, which once again permit a flexible work team.

Selection and placement after conversion

The selection and placement of bargaining unit employees was not changed basically. However, with the elimination of the two promotional series and with the substitution of one series, there is a greater number of employees eligible for a particular vacancy. Along with this, there is a greater problem of training employees for both clerical and machine duties. Then too, and this is significant, there is the freedom given management to select, from anywhere in the company, replacements for the (1) Console Operator (2) Programmer and (3) Programming Projects clerk. Although these jobs are part and parcel of the bargaining unit they are not included in the promotional series as shown in the collective bargaining agreement.
TABLE XI

MIDLAND REVENUE ACCOUNTING DEPARTMENT CLASSIFICATION
OF JOBS AS OF MARCH 31, 1957

<table>
<thead>
<tr>
<th>Job title</th>
<th>Maximum wage/hour</th>
<th>Number of employees</th>
<th>Per cent of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial accounting clerk</td>
<td>$3.21</td>
<td>5</td>
<td>1.85%</td>
</tr>
<tr>
<td>Accounting clerk I</td>
<td>3.08</td>
<td>21</td>
<td>7.75</td>
</tr>
<tr>
<td>Accounting clerk II</td>
<td>2.86</td>
<td>38</td>
<td>14.02</td>
</tr>
<tr>
<td>Accounts balance and review clerk</td>
<td>2.72</td>
<td>4</td>
<td>1.48</td>
</tr>
<tr>
<td>Accounting clerk III</td>
<td>2.65</td>
<td>30</td>
<td>11.07</td>
</tr>
<tr>
<td>Account station clerk</td>
<td>2.50</td>
<td>45</td>
<td>16.61</td>
</tr>
<tr>
<td>General clerk I</td>
<td>2.43</td>
<td>27</td>
<td>9.96</td>
</tr>
<tr>
<td>General clerk II</td>
<td>2.19</td>
<td>27</td>
<td>9.96</td>
</tr>
<tr>
<td>General clerk III</td>
<td>2.06</td>
<td>18</td>
<td>6.64</td>
</tr>
<tr>
<td>Clerk I</td>
<td>1.94</td>
<td>23</td>
<td>8.48</td>
</tr>
<tr>
<td>Clerk II</td>
<td>1.84</td>
<td>5</td>
<td>1.86</td>
</tr>
<tr>
<td>Clerk III</td>
<td>1.74</td>
<td>13</td>
<td>4.80</td>
</tr>
<tr>
<td>Console operator</td>
<td>3.21</td>
<td>7</td>
<td>2.58</td>
</tr>
<tr>
<td>Programmer</td>
<td>3.21</td>
<td>7</td>
<td>2.58</td>
</tr>
<tr>
<td>Programming project clerk</td>
<td>2.78</td>
<td>1</td>
<td>.37</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>271</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>
The manner of filling a vacancy in the programmer classification would be briefly this:

1. The transfer files of the Employment office would be reviewed for possible candidates.

2. Those interested who were not on file may write a letter to the revenue accountant or the Industrial Relations Department, requesting the job and listing their qualifications.

3. Those employees who appear qualified would be interviewed by Mr. Lacey, the Programming Division head.

4. After the preliminary interview a written test would be given to all employees still interested, this test is one devised by the IBM Corporation.

5. A detailed interview would be given to the employees with high scores. The individual with the best composite profile on the test would be sent to the IBM school in Chicago with no loss in wages. On successful completion of the IBM course, the applicant would be placed on the job getting both higher wages, and seniority from the date of entering the IBM school.10

10 Jackson, July 24, 1967.
This freedom to select any employee for a vacancy in the computer and programmer area was negotiated between the company and the union in a series of meetings at which time the union was given the jobs and the titles of Console Operator and Programmer, for employees of the bargaining unit. It is believed that this action will set a precedent, and the union considers it an important step forward in the area of automated offices.  

Mr. Kammer believes the company was wise to have given up the jobs and titles for the freedom to select and because the company, the union and the employees so selected have benefited.

Security

There is no fear of losing employment and the traditional policy of security has not been changed. There is still concern, however, in the case of those employees who are not yet permanently placed.  

This would include the fifty-nine employees who are doing the Public Service bookkeeping. They do not fear for their future employment but naturally wonder what will eventually become of them and where they will be assigned, once the Public Service accounts are placed on the IBM type 705 computer. As it stands today, this conversion to the 705 is not immediately expected, even though the company had originally planned to have the work converted to the 702 computer.

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11 Information from a personal interview of the author with Mr. Bob Keller, Vice-President, Local 1472.

12 Walters, February 20, 1957.
Hours of work

This area found some change but only fifteen men are affected by it. These fifteen men make up the computer teams which work three shifts, and which rotate every two weeks. The shift work is new for all the individuals concerned but the employees were warned that the work of programmer and console operator was shift work. In addition, the employees were given by the company the opportunity to choose between rotating and non-rotating shifts. As it turned out one individual has chosen and was given permission to be assigned permanently to the third shift. It appears that those hours were best suited for him. He is the only exception to the rotation rule.

The company assigned five men to each shift, two of whom are bargaining unit Console Operators and three of whom are Auxiliary Machine employees. The supervisor on duty with the shifts is a Management Methods Analyst.

The present schedule of hours is the following:

1st shift 8:00 A.M. - 4:45 P.M.
2nd shift 3:30 P.M. - 12:00 midnight
3rd shift 11:00 P.M. - 7:00 A.M.

The company has decided on these shifts which overlap in two instances because of the transportation problem. It was found that public transportation is better before midnight than after; consequently, the third shift comes in at 11:00 P.M. and the second shift leaves at exactly 12:00 P.M.

At the outset there was some difficulty with the scheduled hours of work. In one case related to the writer, an employee who lived outside the city rode the train to and from work. When he worked the second shift he would not arrive at his suburban station until the early morning hours. In the mean-
while his wife had to leave their home, drive to the station and on a lonely, and deserted road, wait for him. 13 Needless to say, a situation of that type was not pleasant. After a series of such problems developed the company agreed to change the schedule of hours.

There is need for shift work in the computer area since it is then possible to give daily information to the commercial divisions as regards the status of customer accounts and collection data. On April 1, 1957 the computer was in operation twenty hours per day with four hours devoted to preventive maintenance. The cost of renting the computer is of course increased by shift work but it enables the company to make more efficient use of the 702.

**Employee attitude**

Few changes can be detected in employee attitude unless it is a change for the better. Those employees who are permanently assigned to their new jobs are happier than before because (1) they have a new and more interesting job (2) they are receiving the best wages they have had to date and (3) their future is brighter since they can promote to more promising jobs. 14

Those employees who are not completely settled have not made any formal protest. It was pointed out to the writer that a written grievance has not been presented in the Revenue Accounting Department since 1952 and this grievance had no relation to the computer installation. There were thirty-two

13 Meegan, July 10, 1957.

14 Kammer, June 7, 1957.
quits in the Revenue Accounting Department during the planning and the conversion period January 1953 through June 1957. Most of the quits were due to marriages and pregnancy, rather than job dissatisfaction. This low number is noteworthy when considering employee attitude.

On April 1, 1957 the total number of employees of the Revenue Accounting Department exclusive of management was two hundred seventy-one, of which number ninety-seven were women. Of the total number, two hundred sixty-one employees had worked in the department more than one to three years and were a part of the Revenue Accounting Department during most of the conversion period.

At this time an estimated one hundred thirty-four employees were members of the "Pioneer Club" which was a social club made up of Revenue Accounting Department employees who had a minimum of twenty-five years of service in the department. The Revenue Accounting Department is the only department in the Company that has such a club.

The following table indicates the length of service the employees enjoyed as at April 1, 1957.

---

15 Kammer, January 10, 1958.

## REVENUE ACCOUNTING DEPARTMENT EMPLOYEES
### AS OF APRIL 1, 1957

<table>
<thead>
<tr>
<th>Years of service in company</th>
<th>Number of employees</th>
<th>Per cent of total</th>
<th>Years of seniority in job classification</th>
<th>Number of employees</th>
<th>Per cent of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 1</td>
<td>2</td>
<td>1.00</td>
<td>Under 1</td>
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<td>1- 3</td>
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<td>4- 7</td>
<td>8</td>
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<td>4- 7</td>
<td>10</td>
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<tr>
<td>8-11</td>
<td>14</td>
<td>7.00</td>
<td>8-11</td>
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<td>23.00</td>
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<tr>
<td>12-15</td>
<td>7</td>
<td>3.50</td>
<td>12-15</td>
<td>19</td>
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<td>16-19</td>
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<td>5.50</td>
<td>16-19</td>
<td>4</td>
<td>2.00</td>
</tr>
<tr>
<td>20-23</td>
<td>4</td>
<td>2.00</td>
<td>20-23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24-27</td>
<td>4</td>
<td>2.00</td>
<td>24-27</td>
<td></td>
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<td>43</td>
<td>21.50</td>
<td>28-31</td>
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<td>32-35</td>
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<td>23.50</td>
<td>32-35</td>
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</tr>
<tr>
<td>36-39</td>
<td>27</td>
<td>13.50</td>
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<td></td>
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</tr>
<tr>
<td>40-43</td>
<td>7</td>
<td>3.50</td>
<td>40-43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44-47</td>
<td>4</td>
<td>2.00</td>
<td>44-47</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total | 200 | 100.00 | Total | 200 | 100.00 |

* excluding industrial records division employees
Training

The area of training did not end with the conversion of accounts in October 1956. It is a continuous process and even at this date the new employees or transferred employees are receiving training on the job. There was little difficulty with the formal training program for the Programmers and Console Operators. These employees were trained by the IBM Corporation and the Methods Analysts. The employees doing machine work had little additional to learn since the IBM accounting machines have not been changed. The area most affected was that of the clerical work where the new system called for new forms and new clerical procedures. These employees had the most to learn.

During the conversion period the management employees were charged with the training. Today employee group leaders have that responsibility.

Summary of the Revenue Accounting Department after conversion

On October 1, 1956 the primary conversion was at an end. The IBM type 702 computer was in operation on the Midland residential and small commercial customer accounts. During the four years of planning, conversion and operation some very vital changes were made in the department. In some respects there is a marked difference between the department as between October 1955 and April 1957. However, some very fundamental policies were not changed at all.

Functions of the department

The Revenue Accounting Department was able to function efficiently and faster with the coming of the 702 computer. The daily work load was volu-
minous and yet the department was pioneering the use of computers in public utilities. The Revenue Accounting Department was testing some of the new IBM equipment while getting out the work assigned. In April 1957, for example, the Commercial Divisions received information each day on customer account status. Theoretically, it was possible for a customer to pay his bill at 3:29 P.M. on Tuesday, call the commercial divisions at 8:00 A.M. on the next day and find that the amount of cash payment was credited to his account.

Personnel selection and placement

This area was not fundamentally affected since the collective bargaining agreement clearly defines the company policy on procurement and promotion of personnel. The new employee is hired only into an entrance job classification. He can then be promoted, via a single promotional series into any job in the department with the following exceptions (1) Programmer (2) Console Operator and (3) Programming Projects Clerk. These three jobs were negotiated into the bargaining unit but were not made part of the promotional series. This action gives the company the right to choose any one for the job regardless of seniority. The company has the right to go outside its own employees to fill a vacancy if it so desires.

The departmental organization in 1957

In April 1957 the departmental organization was changed from that found in December 1955. For all practical purposes, the old Billing Division was eliminated and so was the job classification of Account Station Clerk

18 Warners, July 10, 1957.
except for the incumbents who are assigned to the Public Service bookkeeping. (See Appendix XII, page 133)

Two new divisions, the Computer and the Programming, were added to the Revenue Accounting Department organization.

The systems of billing are different, although much of the repetitive recording functions are still carried out with IBM accounting equipment. Under the old method, customer information was on cards; today it is on magnetic tape, one reel of which is two thousand five hundred feet long and contains information on eleven thousand accounts.

The jobs of division heads, assistant supervisors, section supervisors, and clerks throughout the department were changed and the effect was an increase in wages, skills required and a new interest in the job. The physical layout was changed with the installation of special air conditioning and humidity control equipment. There was a need for relocating space for the computer and its auxiliary units.

The personnel administration was changed somewhat. It was pointed out earlier that Mr. Meegan, the Revenue Accountant in Lakewood, was assigned to the post of Assistant to the Revenue Accountant under the new organizational set up. This appointment was not made until January 1, 1957.
CHAPTER VII

SUMMARY, CONCLUSIONS AND OUTLOOK

Early in 1963, after four years of preliminary research, the Midwest Electric Company decided that a large scale computer could be applied to its customer billing and accounting operation and began intensive studies for the conversion of its punched card and manual system to the electronic data processing system.

In April 1964, the company ordered and in July 1965 received the IBM type 702 computer. In adapting the old system of billing to the computer the company reorganized its approach to billing and methodically analyzed the steps from the initial meter reading through the final financial, statistical and customer history reports.

Programming the billing system involved almost eighty-five thousand separate instructions which are constantly improved and revised for greater efficiency. In spite of the extensive preliminary studies, the development of the 702 programs for customer billing took thirty-five man-years with an additional fifteen man-years and one thousand hours of computer time required to test and put the electronic system into operation.

When the 702 was installed in July 1965, it was both the first of its kind in Midland and the first to be put into service by any public utility. The first area to be placed on the computer was the billing operation for the
one million accounts within Midland. Conversion of these accounts from the old punched card system was started in January 1966 and was completed at the end of September 1966. At the beginning of this period, almost fifteen hundred accounts were translated daily while the conversion rate reached a maximum of ten thousand accounts as the months progressed. When the computer was in full scale operation, a total of thirty thousand bills were processed daily. In addition to this billing, the computer handled the posting of cash, changes, and credits and collections. In seventeen and a half hours the computer handled one hundred sixty-eight thousand accounts, which were made up of the six reading days processed each day.

Under the computer billing system the "customer record file" electronically consolidates on magnetic tape all necessary data formerly on cards and manual records. Meter readings are marked with a special pencil directly on a card provided for each customer. These marks are converted to punched holes and then processed to magnetic "meter reading" tapes. "Customer record" and "meter reading" tapes are then matched in the computer and the billing amount calculated for each customer. The combined information is then recorded on magnetic tape and later transferred to punched IBM cards from which the customers' bills are prepared. Present bills are similar to those used under the old system. They include a punched stub which serves as a payment record. The punched information on the stub is transferred to tape which is then processed through the computer to record the cash payment on the proper customers' account. In addition, the machine accumulates data for the preparation of financial and statistical reports. It also prepares data used in answering
customer questions as regards their account status.

As a result of his research, the writer discovered the following:

1. The company had a clear understanding of its objectives and it set out to find whether or not its accounting work could be adapted to a giant electronic computer.

2. When the feasibility study was ended and the computer ordered the company formed a committee to plan for the installation. This committee was responsible for the technical as well as the human relations aspects of the change. The men on the committee were specialists in their own fields and were familiar with the previous system of billing as well as company rules, regulations and policies.

3. A time table was set up for the conversion of accounts, with the daily billing routine of the former system taking precedence. This scheduling proved very tight and the conversion was accomplished by working three shifts, seven days a week, borrowing employees from other areas and converting accounts on a 702 computer in a firm in St. Louis, Missouri.

4. The formal organization was changed with a new position of Manager of accounting being established. In addition, the Revenue Accounting Department had undergone a structural change. The new function of Personnel Administrator established in January 1967, was in the writer's opinion, established at a late date. It could have been utilized more fully if it were created
at the beginning of the conversion period. It would appear that employee difficulties, which might arise, would arise during the conversion, at which time the division heads were busily engaged in production and had enough to do without taking care of the employee relations.

5. The company and the Local 1472 worked as a team in the installation; the union was the medium used by the company to inform the employees as to the progress in the initial stage of planning, actual conversion and final operation. The employees were continually reassured that their security was not disturbed and that no one would lose his employment because of the change.

6. The company did not allow sufficient time for training of the employees; especially those in the clerical jobs and those employees in the commercial divisions. These clerks received on the job training during the conversion period itself and had little real knowledge and understanding of the new work. This lack of formal training accounts in part for the large number of "kick-out", which are rejections of any input transaction that is not compatible with the programmed instructions, experienced by the department during the conversion period and on into the full operation period. The Programmers and Console Operators received their training both from IBM and the Management Methods Analysts so they had fared a little better but even these employees, did not have sufficient programming
experience prior to the conversion.

7. The long service, security, and company loyalty of the management and the bargaining unit employees was an asset in the whole installation.

8. The company regards the computer as another tool of management and considers the change evolutionary rather than revolutionary.

Results of the conversion

1. No employee was laid off or downgraded more than two job levels and to this date no surplus has developed.

2. No employees' wages were reduced because of transfer to a lower level job; in fact, the employee continues to receive regular time step increases as called for in his former job classification even if he is working in a lower level job.

3. The installation of the computer resulted in three new bargaining unit jobs, those of Programmer, Console Operator and Programming Projects Clerk.

4. There was a considerable upgrading of jobs with a greater need for skill and training for the employees. The single promotional series allows greater flexibility and movement and gives the employee a better job into which he can be promoted. The jobs are interesting and present a challenge. As Mr. Walters said, "Today the job must be done precisely, this makes each worker his own supervisor." The computer did not make the
5. There is an increase in the average straight time hourly wages for the employees due to the installation of the computer itself and the negotiations between the union and the company.

6. While the functions of the supervisors remained virtually the same, the computer calls for specialized supervisors in the Programming Division and the Operating Division and this tends to limit the movement of supervisors.

7. There was no evidence that, in itself, the installation of the computer was followed by conflict in the organization.

8. There was evidence that skillful administration is necessary to put into effect such a far reaching change without a great deal of difficulty. As Mr. Jackson stated, "the biggest defense to no problems was informing the employees."

9. The employees who were permanently placed are satisfied and those employees temporarily assigned to the Public Service bookkeeping were not a serious problem since they knew their security was not in any danger.

10. There was no change in the social groupings since the employees continue to work near each other, and continue to have coffee breaks and lunch together as they did under the former system.

11. The Revenue Accounting Department is operating efficiently and was able to provide better information to the customer service area.
Outlook

From the beginning the company viewed the installation of the computer as evolutionary and not revolutionary. It was another management tool used in bringing about greater efficiency and better customer service.

The company has discussed the possibility of establishing an Electronic Data Processing Center, which will be a centralized department whose functions will be programming and machine operating, as a service department for other areas in the company. Although no other areas in the company are under active review, the following functions may be adapted to the computer in the future. These functions include:

1. Inventory control
2. Payroll accounting
3. Sales
4. Stock transfer and
5. Engineering

Reflection on the problems which arose during the entire period of the computer installation and operation points up the fact that technological change may be successfully administered by a careful mixture of economic, technical and human factors.
BIBLIOGRAPHY

I. PRIMARY SOURCES

The case material presented is the culmination of a six month period of research conducted at the Midwest Electric Company. The principle sources of the data were (1) personal interviews with management and union representatives and (2) examination of company records.

II. SECONDARY SOURCES


"How to Listen to Peoples' Troubles," Changing Times, X (October 1956), 46.


APPENDIX I

THE MIDWEST ELECTRIC COMPANY TRANSLATES ITS ACCOUNTS TO THE IBM 705

On May 9, 1957, after only seventeen working days, the Midwest Electric Company finished its conversion from the IBM 702 to the IBM 705 Model II Electronic Data Processing System.1

Since December of 1956 the programming staff reviewed the eighty-five thousand computer instructions contained in fifteen separate major 702 programs and made some modifications to conform with the requirements of the 705. The programs were tested in IBM's 705 Test Center, and when the 705 was installed on April 17, 1957 most of the fifteen new programs had been successfully run in parallel tests with the 702 system.

The new IBM 705 has forty thousand characters of magnetic core storage plus a magnetic drum storage unit. The new system has a new high speed printer, capable of listing five hundred lines of up to one hundred twenty characters per line in a minute. These features provide additional speed, flexibility and operates at lower operational expense. The machine is presently processing one hundred sixty-eight thousand accounts in eleven and a half hours, which is six hours faster than the 702. As future programs are changed the time is expected to be reduced to seven hours. It is thought that the new system can process in excess of three hundred thousand accounts and produce over fifty thousand customer bills in fourteen to fifteen hours. The bills are in the mail three days after the initial meter reading. This compares favorably with the five day interval required under the punched card system.

One major change is still being planned in the billing procedures. This is the development of a punched card service file of customer records, which is now a manual operation, to ease the process of customer account changes and filing of new customer data. This work is scheduled for the fall of 1957.

Because the master file of customer account cards is to be revised, the conversion of the nearly nine hundred thousand Public Service accounts will not begin until January 1958. This conversion, to the 705, is expected to be completed in November, 1958.2

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2 Kammer, January 10, 1958.
<table>
<thead>
<tr>
<th>Age</th>
<th>Year started with company</th>
<th>Background in company</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>1925</td>
<td>Meter department; clerical and supervisory</td>
<td>4 years high school; courses in business organization and effective speaking at Northwestern University</td>
</tr>
<tr>
<td>31</td>
<td>1950</td>
<td>Staff accountant in auditing department</td>
<td>Business Administration degree at Northwestern University</td>
</tr>
<tr>
<td>41</td>
<td>1935</td>
<td>Bill delivery boy; key punch operator in general accounting; machine accounting; machine procedures; extensive IBM experience</td>
<td>4 years high school; courses in business english and accounting at De Paul University</td>
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<tr>
<td>30</td>
<td>1954</td>
<td>Staff accountant in comptrollers office</td>
<td>Business Administration degree at Northwestern University</td>
</tr>
<tr>
<td>51</td>
<td>1930</td>
<td>Statistician; general procedures department machine procedures</td>
<td>4 years high school; one year at Art Institute of Chicago; 2 years of company courses in electricity; 2 years mechanical engineering at Armour Tech of Chicago</td>
</tr>
<tr>
<td>42</td>
<td>1933</td>
<td>General procedures department</td>
<td>B.S. degree in Industrial engineering at Illinois Institute of Technology</td>
</tr>
<tr>
<td>48</td>
<td>1925</td>
<td>Treasury department; customer department; service office manager; machine procedures department</td>
<td>4 years high school; courses in business organization, business law, accounting, business english, office management economics, business finance at Northwestern University</td>
</tr>
<tr>
<td>Age</td>
<td>Year started with company</td>
<td>Background in company</td>
<td>Education</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------------</td>
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<td>-----------</td>
</tr>
<tr>
<td>46</td>
<td>1929</td>
<td>Treasury department; employment department; statistical department; power accounts; rates and economic research department; revenue accounting department</td>
<td>4 years high school; courses in accounting, economics, public speaking, english, finance, taxes, statistics, business law at Northwestern University</td>
</tr>
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<td>53</td>
<td>1924</td>
<td>Meter reader; addressograph operator; traveling auditor; staff accountant</td>
<td>4 years high school; 3 courses in accounting at Walton School of Commerce</td>
</tr>
<tr>
<td>35</td>
<td>1940</td>
<td>Revenue accounting; machine accounting; extensive IBM machine experience</td>
<td>4 years high school; company course in IBM; secretarial course at Bryant &amp; Stratton College; course in introduction to symbolic logic at the University of Chicago</td>
</tr>
<tr>
<td>69</td>
<td>1923</td>
<td>Plant accounting; machine procedures department; extensive IBM equipment experience</td>
<td>4 years high school; course in mathematics at Lewis Institute; course in accounting at Northwestern University; course in electrical engineering at Armour Tech</td>
</tr>
<tr>
<td>25</td>
<td>1956</td>
<td>Methods analyst</td>
<td>B.S. in mathematics at Loyola University of Chicago, Masters degree in mathematics at De Paul University; one year of mathematics at Northwestern University; one summer at Chicago Teachers College</td>
</tr>
<tr>
<td>44</td>
<td>1929</td>
<td>Paymaster office; addressograph operator; machine accounting</td>
<td>4 years high school; company course in basic supervision</td>
</tr>
<tr>
<td>34</td>
<td>1941</td>
<td>Revenue accounting; machine accounting; extensive IBM experience</td>
<td>4 years high school; courses in accounting and business law at Northwestern University</td>
</tr>
<tr>
<td>Age</td>
<td>Year started with company</td>
<td>Background in company</td>
<td>Education</td>
</tr>
<tr>
<td>-----</td>
<td>--------------------------</td>
<td>-----------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>52</td>
<td>1923</td>
<td>General accounting; some IBM experience</td>
<td>4 years high school; courses in accounting and business law at Walton School of Commerce</td>
</tr>
<tr>
<td>34</td>
<td>1941</td>
<td>General accounting; general procedures department; some IBM experience</td>
<td>4 years high school; course in shorthand at Bryant &amp; Stratton College; courses in accounting, english, business law at Northwestern University.</td>
</tr>
<tr>
<td>46</td>
<td>1929</td>
<td>Revenue accounts department; machine accounting; extensive IBM experience</td>
<td>4 years high school; company courses in elementary electricity and company organization.</td>
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<tr>
<td>23</td>
<td>1956</td>
<td>Method's analyst</td>
<td>B.S. degree in mathematics at University of Illinois</td>
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<tr>
<td>25</td>
<td>1956</td>
<td>Method's analyst</td>
<td>B.S. degree in mathematics at Harvard University; M.S. degree in mathematics at University of Illinois</td>
</tr>
<tr>
<td>55</td>
<td>1925</td>
<td>Engineering department; statistical department; power accounts; machine procedures department; extensive IBM experience</td>
<td>B.S. degree in electrical engineering at Purdue University; course in industrial electronics at Illinois Institute of Technology; course in introduction to symbolic logic at University of Chicago</td>
</tr>
<tr>
<td>27</td>
<td>1956</td>
<td>Method's analyst</td>
<td>B.S. degree in mathematics at Ohio State University</td>
</tr>
<tr>
<td>38</td>
<td>1942</td>
<td>Power accounts in Revenue Accounting Department; auditors office</td>
<td>B.S. degree in mathematics at DePaul University; five courses in accounting at Northwestern University</td>
</tr>
<tr>
<td>38</td>
<td>1937</td>
<td>Revenue Accounting Department in Public Service; extensive IBM experience in U. S. Navy</td>
<td>4 years high school; courses in accounting and business law at Northwestern University; company courses in essentials of electricity, effective speaking and IBM equipment</td>
</tr>
<tr>
<td>Age</td>
<td>Year started with company</td>
<td>Background in company</td>
<td>Education</td>
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<td>--------------------------</td>
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<td>----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>46</td>
<td>1933</td>
<td>Meter department; statistical department; power accounts in revenue accounting department; rates and economic research department; machines procedures department</td>
<td>4 years high school; 8 courses in accounting, one course in business law, industrial management, and corporate finance at Northwestern University</td>
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<tr>
<td>48</td>
<td>1927</td>
<td>Revenue Accounting Department; extensive experience on IBM equipment</td>
<td>4 years high school; one course in English at Northwestern University</td>
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<tr>
<td>35</td>
<td>1945</td>
<td>Machine procedures department; extensive experience on IBM equipment.</td>
<td>4 years high school</td>
</tr>
</tbody>
</table>

* includes three women employees
### APPENDIX III

## HISTORY OF MIDLAND REVENUE ACCOUNTING DEPARTMENT

### BARGAINING UNIT CONSOLE OPERATORS

### AND PROGRAMMERS

<table>
<thead>
<tr>
<th>Age</th>
<th>Year started with company</th>
<th>Background in company</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>1940</td>
<td>Machine operating; IBM machine work for six years.</td>
<td>4 years high school; one company course in IBM.</td>
</tr>
<tr>
<td>28</td>
<td>1947</td>
<td>IBM machine work; budget department; plant accounting; semikerical and machine work.</td>
<td>4 years high school; company course in distribution and electrical equipment; electronic training in U. S. Army.</td>
</tr>
<tr>
<td>28</td>
<td>1948</td>
<td>IBM machine accounting many outstanding promotions; extensive board wiring experience.</td>
<td>4 years high school; course in electronics, radio, industrial electronics, analytic geometry, applied electronics at Illinois Institute of Technology; company courses in IBM.</td>
</tr>
<tr>
<td>45</td>
<td>1939</td>
<td>Salesman for company; customer service department</td>
<td>4 years high school; one course in banking at University of Illinois; one course at Crane Junior College</td>
</tr>
<tr>
<td>37</td>
<td>1940</td>
<td>Stenographer; statistical clerk; engineering records clerk</td>
<td>4 years high school; secretarial training at Bryant &amp; Stratton College; company course in essentials of electricity.</td>
</tr>
<tr>
<td>34</td>
<td>1941</td>
<td>Office boy; addressograph operator; IBM accounting machines.</td>
<td>4 years high school; company course in college algebra and basic accounting.</td>
</tr>
<tr>
<td>Age</td>
<td>Year started with company</td>
<td>Background in company</td>
<td>Education</td>
</tr>
<tr>
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<td>-------------------------</td>
<td>----------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>52</td>
<td>1923</td>
<td>Revenue accounting department; primarily in clerical work; six years of IBM equipment.</td>
<td>2 years high school; company courses in operation and theory of IBM equipment.</td>
</tr>
<tr>
<td>28</td>
<td>1947</td>
<td>Office boy; addressograph operation; IBM equipment; extensive board wiring experience.</td>
<td>4 years high school; a course in introduction to high speed electronic data processing machines equipment at Northwestern University.</td>
</tr>
<tr>
<td>50</td>
<td>1926</td>
<td>Cable splicer; plant accounting; cost analysis work; no machine experience.</td>
<td>4 years high school; company courses in underground system, station and sub-station electrical equipment.</td>
</tr>
<tr>
<td>47</td>
<td>1928</td>
<td>Revenue accounting department; machine and board wiring experience.</td>
<td>4 years high school; basic wiring course conducted by IBM; company courses in IBM.</td>
</tr>
<tr>
<td>39</td>
<td>1936</td>
<td>Office boy; commercial department.</td>
<td>4 years high school; 4 courses in accounting at Northwestern University.</td>
</tr>
<tr>
<td>35</td>
<td>1941</td>
<td>Payroll accounting; general accounting; IBM equipment experience; statistical department.</td>
<td>4 years high school; 10 courses in accounting at DePaul University.</td>
</tr>
<tr>
<td>35</td>
<td>1941</td>
<td>Auditing department; commercial department; no machine experience</td>
<td>4 years high school; courses in Business Law at Walton School of Commerce</td>
</tr>
<tr>
<td>27</td>
<td>1948</td>
<td>General accounting department; IBM machine experience</td>
<td>4 years high school; courses in accounting, economics and marketing at Northwestern University.</td>
</tr>
</tbody>
</table>
APPENDIX IV

COMPUTER COMMITTEE

MEMORANDUM OF MEETING DATED MAY 18, 1954

Present: Messrs. Barnes, Chairman
Kammer
Robertson
Andrews
Peters, Secretary

1. Outline of responsibilities

The Computer Committee comprising those above plus Russell Simpson of the Industrial Relations Department, who was added on May 20, 1954 is responsible for all matters having to do with the computer. Under the direction of this committee, responsibility for the installation of the computer follows:

Reporting to Mr. Kammer:

Mr. Andrews, technical development of procedures, including programming.


2. Programming organisation


Messrs. Peterson - Midland Revenue Accounting Department
Lacey - Midland Revenue Accounting Department
Bauer - Service and Meter Department
Holland - Budget Department
Southworth - Rates and Economic Research Department

They will attend the IBM Programming School at Poughkeepsie, New York for two weeks starting May 24, 1954.

A sixth addition to the Andrews' staff will be made by promotion from the bargaining unit. It was posted in the Revenue Accounting Department on May 11, 1954 through May 22, 1954.
3. **Participation by IBM people**

   Mr. William Bradshaw of IBM will assist Mr. Andrews in the programming work starting May 20, 1964 and will determine the exact number of additional people required.

4. **Participation by Arthur Andersen and Company**

   Determination to be made on their participation.

5. **Participation by representatives of Quaker Gas Light and Coke Company**

   Some discussions held on assignment of their people to Mr. Andrews.

6. **Additional Space for machine procedures department**

   Space in Marquette Building, the seventh floor will be available by July 1, 1964, as soon as it is vacated by the audit staff.

7. **Midwest Electric Company building problem in connection with the computer installation**

   a) Power supply  
   b) Air conditioning

   The IBM Corporation has an installation manual which will provide complete data on proper installation.

8. **Personnel problems**

   Study of personnel problems by Mr. Kammer and Mr. Peters, placing present personnel in the computer set up. It was suggested that luncheon meetings be held with management personnel of the two, Lakewood and Midland Revenue Accounting Department at which Mr. Cartwright would tell the story of the computer and provide an opportunity for questions and discussions.

9. **Auxiliary punched card equipment**

   Mr. Andrews' staff is engaged in a study of requirements for auxiliary punched cards equipment so that orders can be placed.

10. **Separate functions for computer cost**

    An estimate by Mr. Barnes for Mr. Cartwright of number of hours of additional overtime to be required in the next year for the project.
APPENDIX V

SUMMARIES OF MINUTES OF NEGOTIATING COMMITTEES

The employees of the Midland Revenue Accounting Department are organized for collective bargaining purposes and are members of the Local 1472, International Brotherhood of Electrical Workers. (AFL-CIO)

Beginning on July 8, 1966, the union and the company met twenty-two times to discuss and negotiate solutions to problems which arose during the installation of the 702 computer.

Those present for the union were:

Messrs. Sanford - Chief steward, commercial department and former president of Local 1472
Gaylord - Secretary of the Executive Board and former president of Local 1472
Ubert - Chief steward, general accounting
Walters - Chief steward, Midland Revenue Accounting
Bremner - Chief steward, Midland Revenue Accounting
Morrison - President, Local 1472
Keller - Vice-president, Local 1472
Littel - International Representative, IBEW, (AFL-CIO), Chicago, Illinois
Franks - International Representative, IBEW, (AFL-CIO), Washington, D. C.

Those present for the company were:

Messrs. Brandt - Director of employee relations
Arnett - Supervisor of salary and wage administration
Lesters - Senior personnel analyst
Kammer - Revenue accountant and assistant comptroller
Peters - Assistant revenue accountant
Simpson - Assistant to the director of employee relations
Billings - Assistant to the Revenue Accountant, clerical division

The author's summaries of the minutes of the meetings follow.
July 8, 1956

Discussion of possible agreement between company and union that surplus employees from Revenue Accounting Department would be placed in vacant jobs in other departments.

Under the 1948 memo such placements were alternated with promotions in the department in which the vacancy occurred.

The IBM 702 would be in operation approximately twenty hours per day - five days per week.

August 19, 1956

Mr. Sanford commented on the company's proposal with respect to changes in job classifications in the Revenue Accounting Department. He pointed out that the computer did not affect the industrial billing work. He then requested that the job specifications and classifications covering industrial billing not be changed at this time.

Mr. Brandt pointed out that previously the union requested the company to present proposed changes in job classifications well in advance of the time the change in duties will actually occur.

Mr. Walters stated that until the method of operation for the new job classifications has become better understood by the union, he would prefer no changes in job specifications covering industrial billing. One factor in opposition to including industrial billing in the job specifications covering the computer operations is that the employees believe this fusion will result in eliminating sizable amounts of overtime. The new classifications provide for a great deal of flexibility whereas the present specifications are much more specialized. Although there is now some shifting of employees to meet peak work loads, it is believed there will be a great deal more of inter-change of employees under the proposed job specifications because they are broader in scope. He also stated that the new job specifications contained in one specification duties which were previously a part of several specifications. He continued that many employees objected to having to learn duties which they did not previously have to perform. They feel that this broadening of job specifications which will require them to learn new duties is worth more than the ten cents per hour increase proposed by the company.

Mr. Bremmer stated that the new job specifications include in one job both clerical and machine operating duties. He questioned whether employees whose previous experience has been limited to clerical activities, would be by-
passed for promotions to higher classifications on the basis that they have no previous machine operating experience.

Both Mr. Simpson and Mr. Brandt pointed out that it will be necessary to train employees on a broader basis than has been true in the past. However, except in particular occasions where special skills are required, such as typing, employees will not be by-passed because of lack of specific experience in clerical or machine operations provided they have the inherent ability to do the work involved. Qualified employees will not be discriminated against.

Mr. Sanford stated that the line of demarcation between management and bargaining unit computer jobs is an important one to the union. He stated that the union regards the degree of supervision exercised by an employee as being the determining factor.

Mr. Simpson points out that supervision of employees is not the only criterion in determining whether a job should be on the management payroll. Some jobs have no supervisory aspects but are management because of their technical or administrative aspects.

Mr. Sanford stated that some duties in connection with the operation of the computer are not covered by the proposed job specifications. He questioned whether these duties would be performed by management employees.

Mr. Kammer stated that because of the close relationship between the work of the console supervisor and the work of a programmer it is planned to rotate these assignments so that an employee who has spent part of his time on programming would then spend a part of his time as the console supervisor. These two activities would come under one management classification. He emphasized the importance of employees having both the programming and console supervising experience in order to locate and rectify sources of trouble.

Mr. Sanford stated that the union is reluctant to see a non-supervisory job of such high quality taken out of the bargaining unit.

Mr. Kammer pointed out that this employee will have supervision of the console room and the employees operating the IBM auxiliary equipment.

Mr. Keller stated that the union is afraid that if a vacancy occurs in the programming staff it will be filled by someone from the procedures department, thus cutting off promotions of revenue accounts bargaining unit employees.

Mr. Walters requested that an assistant console operator job be established in the bargaining unit which would promote directly to the management job classification of console supervisor.
Mr. Brandt questioned whether a proper line of demarcation could be drawn between the proposed assistant console operator and the management console supervisor even if the company were to agree to such a proposal.

Mr. Sanford questioned what aspect of operating the console makes management believe the job belongs outside the bargaining unit.

Mr. Arnett stated that this employee would have supervision of the employees in the console room.

Mr. Sanford suggested that the supervisory aspects of the job be separated from the duties of operating the console itself.

Mr. Walters stated that the union has no objection to this work being performed by management employees at the time of the initial installation. It is primarily concerned about the situation five years hence. The union wants to be certain that the bargaining unit employees will be getting training so that they will be prepared for vacancies which occur in the future.

August 26, 1955

There will be two console supervisors on duty for each shift. One will actually be operating the console and the other will be roving around the control room supervising the employees on duty.

August 29, 1955

Mr. Peters stated that in previous discussions he had informed the union that the revenue accounts work will require two shift operations in the computer room. Near the end of the installation period the printing operation may require more than two shifts. The work would be scheduled on a Monday to Friday basis except for certain cash posting operations, but that the number of employees required would be small.

Mr. Sanford stated that some employees may be by-passed for promotion because they had no experience on some of the different work activities included in the job specifications. He questioned whether promotions would go to employees of lesser seniority who happened to have broader experience.

Messrs. Peters and Simpson said that employees would not normally be by-passed on this basis. If the employee is doing a good job in his present job every effort would be made to train him for the new work.
Mr. Morrison stated that the union fails to understand the reason for the broadening of job specifications.

Mr. Peters explained the proposed organization of work in the Revenue Accounting Department and pointed out that gaining experience in the different phases of this work would help to make employees jobs more interesting and give them a more complete picture of the work of the entire department which would be helpful to them as they promote up the line.

Mr. Morrison questioned whether the computer will be used solely on revenue accounting work.

Mr. Peters stated that the IBM 702 computer will be used solely on revenue accounting work but the IBM 705 will handle other activities.

Mr. Morrison questioned the effect of the change from the IBM 702 to the IBM 705 upon the job specifications submitted by the company.

Mr. Kammer stated that the job specifications which have been given to the union cover the IBM 702. Some changes may be necessary when the IBM 705 is received but he thought they would be minor.

Mr. Sanford stated that the union is not happy with the job specifications proposed by the company because they are too broad. However, if the prices were attractive enough it might change their feeling with regard to them.

August 31, 1956

Mr. Walters stated that he believed the rotation from one phase of work to another, as provided in the specifications, might not be too bad provided there were some fixed schedule of rotation so that employees would know when they are to be rotated.

Mr. Simpson pointed out that at a previous meeting the union had urged that some job classification be established within the bargaining unit which would help to provide training so that bargaining unit employees would be better prepared for console operating. He stated that after reviewing this request, the company was still of the opinion that the console supervisor required experience as a programmer in order to be able to detect and correct difficulties in a minimum of time. He stated that with the plans for installing an IBM 705, still further programmers were needed and the company planned to send three management employees to the IBM school for programmers which starts on September 16. Another session of that school will begin in either October or November.
In order to give bargaining unit employees a better opportunity to qualify for this work which may eventually lead to console supervising, the company is willing to establish some kind of a Junior Programmer job classification within the bargaining unit. Work of this classification would consist of assisting the programmers and the line of demarcation between the management programmer and the bargaining unit Junior Programmer would be flexible. He stated that at times employees in the Junior Programmer classification would be doing the same work as the management programmer and vice versa.

Furthermore, the need for employees in this classification might fluctuate and vacancies in the Junior Programmer job may not always be filled and vacancies in the management programmer classification may not always be filled from the bargaining unit Junior Programmer. If this classification is acceptable to the union, the company would plan to select several employees for training in the IBM school starting in either October or November. The classification would be considered an entrance job classification. The transfer file in the employment division would be reviewed for possible applicants. In the selection for the next IBM school, attention would be given to the bargaining unit employees of the Revenue Accounting Department. Employees who are selected for the training in the IBM school would retain their present job classification while in training. If they finish the IBM school they will be classified as Junior Programmer, retro-active to the start of the IBM school.

Mr. Brandt suggested that if the idea of the Junior Programmer is agreed to, the employees could be selected for this job sometime during September even though a final agreement may not be reached on wages for the job.

Mr. Morrison said that the union is impressed with the proposal but it must be discussed further.

September 2, 1956

Mr. Morrison stated that the job specifications submitted to the union are so broad that the union cannot visualize what activities are being included in these jobs. This makes it difficult to evaluate the jobs in question.

Mr. Lester disagreed and said that while the specifications do not contain as much detail as before, they are concise and clearly identify the duties described.

Mr. Kammer pointed out that on the initial assignment the company was proposing to assign employees with machine experience to machine jobs, while employees with clerical experience would be assigned to clerical jobs. After the initial assignments are completed and in operation there will be interchanges between machine and clerical operations.
Mr. Sanford questioned management's plans with respect to the use of unassigned employees.

Mr. Kammer stated that every attempt will be made to get them permanently placed on other activities. This will take time and in the meanwhile, many of them can be used to supplement the regular force while training is being given in phases of the work with which the employees had no previous experience. He stated that because these employees will be available and because there is greater need for the training initially than will be true later on, a considerable number of employees will be used temporarily in this manner.

Mr. Sanford questioned when unassigned employees of the Revenue Accounting Department will be available for placement elsewhere.

Mr. Kammer stated that under present schedules a surplus will develop in March or April of 1956. As the outover to the computer progresses additional employees will be assigned to this activity and a smaller number will be needed on the former work of billing. The entire personnel needed for the computer will not be assigned to this work until the Public Service accounts are taken over sometime in 1956.

Mr. Simpson pointed out that during the conversion period, some revenue accounts employees will be working on present methods of billing, some will be working on the new methods, and some will be assigned to conversion activities. Because the conversion will take a long period of time and because of turnover due to retirements, the assignment tentatively prepared by the company will be subject to change.

Copies of the memo regarding surplus employees were made available at this meeting.

September 8, 1956

Mr. Bremner stated that the union has reviewed the proposed memorandum relative to the unassigned employees and are quite concerned over the fact that item 4 provides that no time step increases will be given if an employee is at or above the maximum of his new job classification. He urged that where employees are placed in a lower classification because they are no longer needed on their former job that they be allowed to receive increases up to their former classification.

Mr. Simpson pointed out that under the memorandum an employee rate of pay is not reduced even though he is placed in a lower job. He said that it would seem reasonable not to grant future increases which would raise the employees rate even farther above the maximum of his new job and also above the rates paid to other employees doing the same work.
Mr. Bremner stated that under the proposed memorandum, employees may be assigned or transferred to lower job classifications but the memo established no limits as to how far employees may be assigned below their present job. Under certain circumstances employees who refuse a lower job will be subject to lay off. He said it would be unreasonable to expect an older employee in a high job classification to accept transfer to a junior clerk job. Such action would place him in a group of younger, short service employees whose morale would also suffer.

Mr. Simpson pointed out that in the past, surplus employees have been limited to transfer to jobs which have pay schedules reasonably close to their former rate of pay.

Mr. Sanford suggested that a limitation be put in the memo to the effect that placement would not be more than two labor grades below the employees' former job. He also questioned how long the company believed it would take to absorb the unassigned employees of the Revenue Accounting Department.

Mr. Kammer thought it would take several years.

Mr. Simpson pointed out that during a one year period in 1953-1954, forty surplus revenue accounts employees were absorbed. He stated that if an agreement can be reached on some method of placing these unassigned employees in other departments, such as is proposed in the memo relative to unassigned employees, it would be possible to place the unassigned employees much faster than in the previous surplus period.

Mr. Morrison said that the picture of placing the unassigned employees was not a good one. He said that the union is quite concerned as to what happens to the employees who are not needed under the computer system and is anxious to prevent a pool situation under which employees may be without a regular job for two or three years. He questioned whether the company would consider slotting the surplus employees into other departments at the time the surplus occurs. In this way it would be easier to provide useful work to keep the employees busy and would be possible to absorb the surplus faster than would be true if the surplus remains concentrated in the Revenue Accounting Department. He suggested that a quota be established for each department of the number of employees they will take from the Revenue Accounting Department. These employees would be taken over by the new department as soon as a surplus develops. That would bring some problems since turnover which occurs after these employees transfer to the new department would be used to find regular jobs for the transferred employees.

Mr. Ubert indicated that this blocking of promotions might be a disturbing factor in the adding department and suggested that possibly every other vacancy that occurs in the adding department be filled by promotion and that only half of the turnover be used to absorb the surplus employees.
Mr. Sanford suggested that some kind of quota system be established on an executive group basis under which each executive group would take a per cent of the surplus equal to the per cent that their clerical employees is to the total clerical bargaining unit. Such a system need not be adhered to rigidly as there might be areas in which a surplus might be developing and that it might not be wise to add to the burden of these areas.

Mr. Simpson stated that if he understood Mr. Morrison's proposal it would result in unassigned employees being transferred to other departments even though no vacancy exists but that when vacancies do occur they will be used to absorb the surplus employees and to reduce the force to the work requirement of the new department. He questioned whether under this proposal the union would agree that the transfer of these employees to the new department would not serve as a basis for urging a permanent increase in the force of that department.

Mr. Morrison agreed that this was not to be used to justify an increase in the force. The suggestion was not officially approved by the union and was tentative. If the union and the company accepted the plan, the employees transferred to the other departments would start in the new departments with zero seniority.

Mr. Simpson said that the proposal had some merit and that the company would like to take the proposals under advisement.

Mr. Sanford questioned whether the company would consider granting more favorable terms with respect to employees going on the service annuity payroll.

Mr. Simpson says it may be possible for long service employees to retire even though they are not sixty years of age.

Mr. Brandt adds that it would be without more favorable financial conditions. It would not be possible to have one set of discount factors for surplus employees without having a demand for similar provisions with respect to all employees.

Mr. Sanford questioned whether the company would be willing to grant separation allowances to employees in this area.

Mr. Brandt said that the top management is fearful that separation allowances encourage employees to leave against their own best interests and an employee who is having financial difficulty might resign in order to collect a separation allowance which would help him out of his immediate problems. In a few months, however, the employee would discover that the long range effect on him is bad.

The company would explore this matter further.
The union wants the console operator in the bargaining unit. It previously wanted an avenue through which bargaining unit employees could enter console supervising work. The company studied the matter and proposed the establishment of a bargaining unit job which would involve assisting the programmers and which would give the bargaining unit employees who qualify a real opportunity to enter into programming work.

Mr. Morrison says putting bargaining unit employees on console would provide jobs for some revenue account employees and would result in a smaller number of surplus.

Mr. Simpson pointed out that the console supervisory job will require about six people and that the company has provided approximately the same number of jobs for bargaining unit people by promoting one employee to programmer and by proposing the establishment of a bargaining unit job for five people which would involve assisting the programmer.

Mr. Morrison says there is merit to the company proposal, and he requested the company to take time to study the union request to put programmers and the console operator into the bargaining unit.

The union is bothered by the thought of shift work. The workers regard themselves as day workers on a Monday to Friday basis. It now appears that things are going the opposite way.

Mr. Kammer stated an estimate of between twenty and thirty employees would be engaged in programming. This would include five bargaining unit employees who will assist the management programmers and will include employees who will rotate between programmer work and console supervising work.

What skill or ability will be sought in selecting applicants for the proposed bargaining unit job of assisting management employees in programming activities?

a) Demonstrated aptitudes for logical reasoning
b) Knowledge of company operations in general and accounting operations in particular
c) Ability to convey ideas
d) Aptitude for numerical analysis
e) Scholastic background
The union stated that after seeing the console in operation, it was convinced that the work could be performed by a bargaining unit employee.

The company says the whole concept of jobs in the company is that there is a level of operation not compatible with being in the bargaining unit.

In the console room, it was announced, the console supervisor is the only supervisor.

September 28, 1955

Mr. Morrison stated that the first thing to do is reach an agreement with respect to the computer operator and programmer. The decision will have a bearing on the prices which the union believes appropriate for other jobs. As regards the company proposals with respect to jobs he says the jobs are too broad, and include too wide a range of duties. There is no point in talking about prices for the jobs until the duties to be included in jobs are agreed upon.

The union does not want to discuss anything before an agreement is reached on programming and console operating in bargaining unit. It will not discuss the selection of people to the computer.

The company wanted to begin operating on November 1, 1955 and it will use management employees if it must.

October 6, 1955

Mr. Simpson points out that the decision to obtain an electronic computer was made in April 1954, and that the union was informed of this decision and the matter was discussed at the union-management meeting of the Revenue Accounting Department held on April 28, 1954. As further information became available it was discussed on almost a monthly basis. It was also discussed by Mr. Barnes in a meeting with union representatives of the general accounting area.

The union says it has little information about programming.

Mr. Morrison says that the day after the union representatives were given a view of the computer the union retained the services of a labor relations expert on automation. He wants to know into what other areas the computer will extend.
Mr. Littel, the International representative, wants to know the duties of the five bargaining unit employees who would be sent to the IBM school. This would provide the avenue the union wanted, into the programmer job so that the bargaining unit employees have assurance they will receive consideration and training for management programming work.

The union wants employees called "programmer" and not "junior programmer".

The company explains that the management programmer will decide what department will be reviewed and what procedures will be revised.

The union says it doesn't claim any activity which involves policy. It questioned whether the company would agree that the five bargaining unit employees sent to IBM school will be called "programmers" when they complete this training and that they will remain in the bargaining unit.

Mr. Brandt says the full fledged programmer must be a management man. The console operator must be in management also.

Mr. Littel says the company and the union are farther apart on the programmer and console operators jobs.

Mr. Littel, when asked if arbitration should be used, answers no. He expressed the view that there are two levels of programmers. One level determines policies and the union has no claim on this but it does claim the rest of the programming operations. He says the union agrees that negotiations on changes in procedures is management work. The union requests that coding be done by bargaining unit employees.

The company view is that the bulk of programming work is management level and that the function to be performed by the bargaining unit job would be in the nature of working with and assisting the programmer.

Mr. Littel emphasized the importance, to both the company and the union, of taking back to the union members an attractive package.

The question remains of how much work should be in the bargaining unit and how much in management programming.

Mr. Kammer points out that seventeen promotions resulted with revenue accounts employees going into programming work; seventy-eight employees would go to higher job classifications; eighty will have no change in job level and forty will go to lower jobs but will retain their present rate of pay.
As far as shift work is concerned, with the IBM 702, the Midland billing will not require more than two shifts. As more activities of revenue accounts are added to computer there may be a need for a third shift. There may be off standard hours on cash posting and possibly on electronic accounting machines, affecting twenty employees. When the entire system, including Public Service, is converted there will be no shift work in the clerical end but eleven employees in electronic accounting machines and the computer room will work on the second shift with nine employees on the third shift. Visoned shifts on a rotating basis so that no employee would be permanently assigned to the second or the third shift.

The employees' wishes would determine whether the shifts would rotate or would be fixed.

October 7, 1955

The copies of revised job specifications for the following were given to the union:

Accounting Clerk I (Industrial Records Reporting)
Accounting Clerk I (Industrial Records Billing)
Accounting Clerk II (Industrial Records) Clerical
Accounting Clerk III (Industrial Records) Clerical

These job specifications are the ones the company had previously indicated were being revised.

October 10, 1955

Discuss the selection of people for training so that actual billing may begin on November 1, 1955.

Mr. Kammer says the supervisors have already been given training; the next step is to select the employees.

The company had prepared a tentative list of names of employees to be given initial training. It was based on relative seniority and the kind of work they had been performing. It would be glad to review these selections with the union. The employees being selected for training would be assigned
to actual operations under the new procedures. The second group of employees must be selected to handle the work of converting accounts from the old to the new procedures. This work would be done by employees, near the bottom of the seniority list, not likely to have a permanent assignment when the conversion is completed.

Mr. Kammer says that if the bargaining unit employees are sent to the IBM school in Chicago, they must have the necessary qualifications and these selections would not be based on seniority. He says that if a programmer junior grade is agreed upon, any employee selected from the Revenue Accounting Department for this work, should be replaced by working overtime in order to lessen the surplus problem.

October 11, 1955

The union asked whether the company had priced the jobs under the proposal by a point system or by the job ranking method.

The company says the job ranking method was used.

The union states that broadening of jobs as was proposed by the company, should automatically result in an increase in price.

Mr. Littel stated that the union assumes that the company is gaining something from the installation of the computer. If this were not true, the computer would not be installed. The union should gain also.

Mr. Simpson stated that the approach of "splitting the melon" is not a good basis for setting prices.

The union agrees; however, it hopes to get a share of the savings from the computer when general negotiations take place in the Spring.

As a practical matter, the union contended it has to get increased prices on some of these jobs.

October 12, 1955

The chief stewards had a few questions with respect to the tentative selection of employees for training.

Mr. Littel stated that the company is accomplishing two things by its job proposals. It is adding new duties and is broadening the job specifi-
cations which cover existing duties. He stated that the company is paying for one of these two changes but not the other.

Mr. Brandt stated that the only way to price jobs is to compare what is paid in this company with what is paid in other companies for similar work.

The union states that it cannot get away from the belief that automation should have a favorable effect on job rates.

Mr. Brandt says that this was not necessarily true and that automation might result in the same, higher or lower jobs.

The union states that apparently the company's position is that job contents, rather than automation should determine job prices.

Mr. Brandt agrees that duties performed should be the major factor in determining prices.

The union asks whether the department could operate the computer without broadened job specifications.

The company answers, "Yes". It emphasized the importance of the psychological effect which occurs when employees are kept on one job constantly and tend to lose interest. By broadening the jobs, employees have greater interest in what they are doing and tend to produce more.

The union says that it appears that broadened job specifications are being used as a means of getting greater production for the same pay scale and at the same time lowering the amount of overtime work.

October 13, 1955

Both the union and the company had tentative suggestions as to the disposal of unassigned employees.

The union believes that there are more problems under the union proposal than under the company proposal and it suggests consideration be centered on the company proposal. It says that the major difference between the company and the union is one of price.

The company points out that if top jobs in the Revenue Accounting Department were to be raised above the proposal it would create problems in other departments.
The union answers that the company is not willing to face the situation. It continues that when more responsibilities are added through broadening of job specifications a higher price should be paid. It is not right to ask a person to do more work and not get more money.

The company stated that originally the IBM 705 was to be delivered around May 1956 and that the Public Service accounts would then be brought in and placed on the computer. This would mean that many revenue accounts employees would be unassigned soon after. After studying this the company decided to delay the IBM 705 until January 1, 1957, but to bring half of the Public Service accounts from Lakewood during July 1956. These accounts would be billed by present equipment and procedures.

The hope was expressed that the employees now working on Public Service accounts would not be brought into Midland with their work.

This would mean that at about the time when the Midland accounts are converted to the IBM 702 a considerable number of the resulting unassigned employees could be placed on the work brought in from Lakewood and could continue on this work until it is converted to the IBM 705 during the early part of 1957. If this procedure is followed there would be approximately thirty unassigned employees in July 1956 and another twenty or twenty-five in the early part of 1957. It would be hoped that the first group of unassigned employees would be absorbed by the time the second group becomes available. In view of the fact that the number to be absorbed at any time is materially decreased and the period during which they will become available is extended into 1957 this move should greatly facilitate the handling of problems relating to unassigned employees. Furthermore, the bringing in a part of the Public Service accounts will enable the resulting excess in the Lakewood area to be absorbed on a gradual basis.

The union says that this materially lessens the impact of the surplus which results from the installation of the computer.

The union asks whether the company would agree to separation allowances and bonuses for early retirement as a means of reducing the number of unassigned employees.

The company says it will give consideration to those long service employees who wish to retire at their own option prior to age sixty but that the pension would be based on the present formula. There may be dangers of bribing people into early retirement by offering a bonus. This money would soon be spent and the employees may find that the retirement was to their disadvantage.
The company stated that it is willing to set up a bargaining unit job of Programmer-Processor which would have a $2.93 maximum. There would be six employees with this classification assigned to the control room. There will be a management supervisor in the control room and the management employees would do the console operating while setting up and debugging programs. The bargaining unit employees would operate the console during regular routine operations. This job would be listed as an entrance job and while some of the employees in this classification might come from the Revenue Accounting Department there might be selections from other areas. The job would not be part of the promotional series. The six jobs would be filled from within the company even though it is an entrance job. The six employees selected will be sent to the IBM school in Chicago and will be given training on some phases of programming. Afterwards, they will be trained on the console. Under the company's present plans, a total of approximately twelve bargaining unit employees in the Programmer-Processor job will be required. These employees would rotate from the programming to the console assignments.

October 18, 1955

Mr. Sanford questioned why the company selected $2.93 as the top level for the jobs in the Revenue Accounting Department.

Mr. Brandt stated that essentially prices are determined by negotiation between the company and the union. He pointed out that there is no agreement with the union relative to the use of any particular method of pricing such as point rating or job ranking. In setting prices, the staff looked at other jobs in the company that involve comparable work or appeared to have the same level of complexity or responsibility. Comparisons were made with similar jobs in the general accounting department and $2.93 is the highest major level of principal clerks.

Mr. Sanford suggested a new level of $3.12 be established.

The company answers that it doesn't want to break the existing price levels in the company.

Mr. Brandt pointed out two kinds of job broadening (1) the vertical broadening in which the duties of a lower job are combined with a higher job, usually at a higher price and (2) the horizontal joining together of jobs at the same price. This latter one is the group on which most of the discussions have centered. He suggested the possibility of not combining these jobs but that the company believes that the best interests of the employees are served.
with broadened job specifications. He continued that if the union proposal were to be approved, the average pay for the employees would be almost twenty cents per hour greater than at present. This is a much larger increase than the change in duties would justify. The company will consider less job combining.

October 19, 1956

The company emphasized that although it has narrowed some of the jobs, it is not agreeing that broadening job specifications automatically results in higher prices. It must be clear that the company does not accept such a principle. Broadening may result in higher prices in some cases, but it depends on facts of the case.

October 20, 1956

The union requested that the titles of Programmer and Console Operator be adopted and that the rate for these jobs be one step above any existing maximum. There would be no objection to complete flexibility between these classifications including interchanging of employees but would like the two titles.

The company said it would agree on the title of Console Operator. It believed that the bargaining unit employees on programming would not be a real programmer but would be one who would process programs after they had been determined. The company would not want to agree on a title that would give the employees an idea that they had jurisdiction over all programming work.

Mr. Frank, the International Representative, objected to using the word "processor" in the job title. He stated that it implies that the bargaining unit employee does not set the program.

The company's view is that the management man will decide the program and the bargaining unit man will process the various steps necessary to make the programs effective. The console operator must have had four or five months training on programming before he can be trained on console operating.

Mr. Brandt stated that it is not necessary for the initial people to have experience in all phases of a job as a condition of advancement and that the statement on this subject, previously written out by the union, appears to be a basis on which an agreement would be reached. He said the company was
agreeing to a live-out increase of six cents for the account station clerks but not merely on the basis that they lost their work. Rather, this particular group consists of long service employees who have been hard hit on several occasions and if something special is to be done because of automation, it should be done for this group. This would be a live-out increase for present incumbents only.

The company recognizes the importance the union attaches to the titles of Programmer and Console Operator. It does not believe the title of Programmer is a good one because it may give some employees the idea that they ought to be doing the full programming job.

Because of the importance attached to this title by the union, the company is willing to go along with this title. However, it is important that the company have a free hand in selecting employees for both the programmer and the console operator jobs. These jobs will be in separate departments but the console operator will normally come from the programmer. The company is proposing a scheduled maximum of $2.93 for the programmer and $3.15 for the console operator which is a new high for any Midwest Electric bargaining agreement.

The union expressed surprise that the programmer rate will be less than $3.06. It is willing to agree that management have a fairly free hand in selections for these jobs.

The employees selected for the programmer would have no change in title or rate of pay until they have satisfactorily completed the IBM school at which time, the payroll change would be retroactive to the date they entered the school.

STATEMENT WITH RESPECT TO SELECTION OF EMPLOYEES FOR PROMOTION IN THE REVENUE ACCOUNTING DEPARTMENT

"Initial or present incumbents will not be required, as a condition of advancement, to learn all phases of the new broadened job specification.

However, it is understood that upon advancement to a new classification the employee may be required to rotate or learn all phases of a new job."
October 21, 1955

If a worker doesn't make the grade in training for programming work he will return to his former job. During the training period his replacement is upgraded rather than promoted until after the original employee has successfully completed his two months of training. Then the replacement could be promoted.

As regards unassigned employees, the company proposal is better than that of the union. Employees would be slotted into vacancies in other departments on a basis which would alternate with promotions in those departments.

The union would like the company to give due consideration to the seniority of employees in placing unassigned employees.

The company points out that placement of unassigned employees in other departments involves problems and it would be better to have action on an individual case basis than have rigid rules which would limit the flexibility. It was pointed out that the vacancy which may be open might be one which would require training, skills or experience which the senior employee might not possess to as great a degree as some employee farther down the list. Since these placements will be in other departments where the management would normally prefer to promote their own employees who have some experience on their type of work, it is necessary to recommend unassigned employees who will be acceptable to the employing department.

The union suggests it would be desirable to give the senior employee an interview for the vacancy, even though a junior employee might be selected. The stewards in the other areas are committed to the idea of bringing in unassigned revenue accounts employees and will cooperate on this matter.

Mr. Morrison, stated that a provision in the memo relative to unassigned employees states that time step increases will not be given if the employees' salary is at or over the maximum of his new classification. The union requests that this provision be eliminated so that such employees would continue to be eligible for time-step increases to the maximum of their present job classification.

The company is willing to agree to the union proposal. It pointed out that some employees outside the Revenue Accounting Department will be selected for training for the programmer and console operator jobs. It suggested the possibility of mutually agreeing that the resulting vacancies be filled from the Revenue Accounting Department as a means of absorbing the surplus.
The union is opposed to this. It states that with the change in the time-step increases and the limitation on placement at two pay levels below the employees present job, the union is in complete agreement with the company's proposed memorandum relative to unassigned employees. A price for the programmer and console operator of at least $3.06 was suggested.

The company is willing to agree to a scheduled maximum of $3.06 for both these jobs. There will be separate titles and separate job classifications for these two jobs, but they will interchange so much that they will in many respects operate as though there were only one job. The company will examine the employee transfer file for candidates for training in the IBM school. Those employees not on file can place their names on the file.

The company will permit long service employees who will not be replaced to retire prior to age sixty at actuarially determined amount based on the present pension formula.

The union agrees to cooperate in placing unassigned employees so that such employees do not refuse reasonable transfers on the basis that they would lose overtime. It agrees with the entire computer program and would get approval from the local membership.

Mr. Littel and Mr. Franks, the International representatives, expressed appreciation for the manner in which the negotiations were carried on.

February 10, 1956

Mr. Kammer stated that on November 25, 1955 the company had given the union a tentative seniority list showing the order in which employees would be ranked in the new job classifications after the expected revenue account changes are completed for the whole system. This list had been prepared after discussions by the company and the union and in general reflected the points on which there was general agreement. It was agreed that:

In all cases in which it is anticipated that employees will ultimately be classified in a higher revenue account job when the current changes are completed, the employee will immediately appear on the seniority list with the job title which he may finally get. In such cases the employee will be given a seniority date of January 1, 1956. In some cases these employees will have been working under the new classification prior to January 1, 1956 and may be officially classified under the new titles prior to that date. In other cases they may not be officially classified under the new
titles until some time in 1957. In either case their seniority date shall be January 1, 1956. This action is being taken in order that the mere fact that a particular phase of work is converted to the computer before some other phase would not result in placing some employees out of their proper seniority position. This could easily happen unless an arbitrary seniority date were selected; because it was agreed that in the initial conversion, employees would normally go with their work. In spite of the fact that some employees will have a January 1, 1956 seniority date, they will not be officially classified under their new title or paid the new rate until they are actually assigned to the new duties.

April 20, 1966

Mr. Morrison requested an explanation of the manner in which the proposed general increase would be applied to employees of the Revenue Accounting Department.

Mr. Simpson stated that the general increase would apply to all employees in a given job classification based on the scheduled maximum for that classification. In the case of Revenue Accounting Department employees where some employees are classified under the new job classification relating to the computer, and others are still classified under previously existing job titles, the increase would be applied on a basis of the employees present official job classification. For seniority purposes, all employees have been given new titles but that this has not changed the official records and only those employees who have been officially classified under the new title would be eligible for increases based on the scheduled maximum of the new classifications. It was pointed out that in most cases the increase which would be applicable to Revenue Accounting Department employees is the same whether or not the employee is classified under the new or old title. In a few cases in which promotions are involved, the employees who are now working on the activities and have been promoted, will receive a larger general increase than those who have not yet begun to perform the new duties and have not therefore, been promoted as yet. Certain employees have been designated for new classifications under the computer with the understanding that their promotions would not take effect until they actually begin to work under their new classifications. In order that employees would not lose their proper seniority due to certain operations converting to the computer in
advance to others an arbitrary seniority date of January 1, 1956 has been agreed upon for certain employees. For those employees who are listed on the seniority list in a job classification which is higher than their present official classifications, the company is willing to state that when they do promote to the classification shown on the seniority list they will be placed on the same time-step of the higher schedule as they would have been placed if they had been promoted prior to April 1, 1956.

It was thought that somewhat more than eighty people would be needed in computer activities when all Midland accounts are converted. This does not include the industrial records division which was not affected.
MEMORANDUM RELATIVE TO UNASSIGNED EMPLOYEES
REPRESENTED BY LOCAL 1472

If the company and the union mutually agree that the provisions of Section 16 of Article III of the Collective Bargaining Agreement are not to be followed with respect to employees no longer needed in a promotional series, the following procedure shall be applicable:

1. Employees required in the reduced, or revised operations will retain their job classifications or be classified in new job classifications within the several promotional series affected for which they are qualified and which have maximum rates of pay as comparable to their old classifications as possible.

2. In placing employees in accordance with Paragraph 1, ability and seniority, in keeping with Collective Bargaining Agreement shall be respected.

3. Employees transferred in accordance with this Memorandum to lower job classifications will retain their current rate of pay even though this rate may be in excess of the maximum of the new classification, and will be eligible for time-step increases on the same basis as if they had remained in their current job classification.

4. Employees who are no longer needed in their job classification and who are not placed on regular activities, will be considered to be "unassigned" employees. Such employees will retain their current rate of pay and will receive any time-step increases for which they are otherwise eligible. They will also be retained on the payroll of their current department until transferred to a regular job in their own or some other department. The Union will be advised in each case before an employee is to be classified as unassigned.

5. An unassigned employee will retain his current rate of pay when transferred to a regular job having an equal or lower scheduled maximum. However, if an unassigned employee, who is lowest on the seniority list of the job classification in question, refuses to accept a transfer to an equal or lower job classification either in his own or in another department, he shall be subject to layoff, provided the new job is not more than two pay levels (based on Revenue Accounts pattern) below his current job classification. If laid off under these circumstances, such an employee would have no further recall rights. This provision would not apply to assignments not involving a change in payroll status.
6. Qualified unassigned employees shall be placed in vacancies in other departments at the discretion of management on the following basis:

a) In each case, placement of an unassigned employee shall alternate with promotion of a bargaining unit employee in that promotional series. The first vacancy shall be filled by promotion in the promotional series affected.

b) The Union shall be advised in each case before a placement is made of an unassigned employee.

c) Seniority of an employee placed in other than his own department under the provisions of Section 6-a above, shall not be transferred with such employee at the date of placement or subsequent thereto.

d) Placement of unassigned employees in other than their own department shall only be made in job classifications having equal or lower maximums or in entrance job classifications, and shall be made without reduction in the individual's rate of pay.

7. Vacancies in job classifications in the employee's former department will be filled in accordance with the provisions of Section 24 of Article III by eligible employees who were, in accordance with the provisions of this memorandum, demoted, transferred to other department, or retained as unassigned employees. For purposes of recall, or for subsequent determination of seniority in their old department, employees who, in accordance with this memorandum, have transferred to other jobs, either in their own or another department, will be considered to have the same seniority order with respect to one another as existed prior to their becoming unassigned. If in accordance with the provisions of this memorandum, an employee who is placed in a job classification which is lower than his previous classification refuses a higher job classification, he shall have his salary reduced to the maximum of the job classification in which he is working and he loses further recall rights.

8. The employees affected by this memorandum will be subject to any general company directive or policy which does not stem from any change covered by this memorandum.

9. In those cases in which the terms of this memorandum are in conflict with the provisions of the Collective Bargaining Agreement, the provisions of this memorandum shall govern and the action taken shall not be subject to grievance based on the terms of the Collective Bargaining Agreement.

This memorandum is applicable only to employees affected by the changes in the Revenue Accounting Department covered by the Company's letter to the Union dated October 31, 1955.

APPENDIX VII

ORGANIZATION OF DATA TRANSMISSION
APPENDIX VIII

DATA CONVERSION, TAPE TO CARD

MAGNETIC TAPE

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TAPE UNIT

CARD PUNCH

MEM. No.

Fields

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APPENDIX IX

DATA CONVERSION, CARD TO TAPE

………MAGNETIC TAPE………

CARD READER

Mem. Addr.

Mem. Pos.

Field

TAPE UNIT

………MAGNETIC TAPE………

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APPENDIX X

COMPANY JOB SPECIFICATIONS IN COMPUTER AREA

The Company job specifications for the employees directly involved in the computer operation follow:

PROGRAMMER

Revenue Accounting Department

Duties:

Under semi-direct supervision, to assist in analyzing accounting and clerical operations, adapting procedures to machine methods, and testing completed programs; as assigned to operate the computer console and assign work to and work with employees in the computer room; and to perform related work as assigned. Typical examples of the duties are:

1. To assist in analyzing existing operations in an assigned area of accounting or other clerical work in order to determine the procedures being followed and the form, content and purpose of the records maintained or reports prepared; and to work with others in preparing written and graphic reports outlining such information.

2. To assist in adapting accounting or clerical procedures to machine methods, involving such work as:
   a. Detailing, usually in flow chart form, the step by step routines to be machine performed;
b. Anticipating, suggesting, and making provisions for machine choices, comparisons and variations;

c. Converting machine instructions into computer language through the application of codes and symbols.

3. To suggest the simplification, revision or elimination of records and reports where appropriate.

4. To assist in testing completed programs on electric accounting machine and computer equipment, making corrections in card and tape data; and to recommend instruction revisions to eliminate errors and minimize computer time.

5. As assigned, to operate the computer console for scheduled operations; and to instruct and train, check the work of, and work with employees in the computer room.

Qualifications:

1. Education equivalent to graduation from high school, supplemented by training in computer theory.

2. Usually, nine years of company experience.

Immediate supervisor:

Supervisor of the unit to which assigned.

January 1956
CONSOLE OPERATOR

Duties:

Under general supervision, to operate the computer console; to assign work to, check the work of, and to work with employees in the Electronic Equipment Section; as assigned, to assist in procedures analysis and programming work; and to perform related work as assigned. Typical examples of the duties are:

1. To operate the computer console for normal scheduled operations and in accordance with tested and approved programs, correcting program steps in error by reference to program entry listings and flow charts, and suggesting changes in programs and operating procedures where appropriate.

2. To assign work to, instruct and train, and to work with employees engaged in attending and operating computer auxiliary equipment; assembling listings for distribution and performing sorting, filing and typing work.

3. To observe the flow of work relative to prescribed schedules, reviewing work to be completed, determining on the basis of urgency which work is to be given preference, notifying the supervisor when it appears that deviations from schedules will occur, seeing that completed work is forwarded promptly, and keeping a record of uncompleted work as required.

4. To check the accuracy of the work of other employees, verifying the accuracy of machine set-ups and operations, and reviewing
statements and reports for correctness.

5. To answer inquiries; to check with other divisions and departments in order to determine causes for delays in work; and to clear up discrepancies in records received.

6. To be responsible for the removal and replacement of tape reels in and out of the file room, and the maintenance of adequate supplies and forms.

7. As assigned, to assist in analyzing accounting and clerical operations and in preparing programs for machine application.

Qualifications:

1. Education equivalent to graduation from high school, supplemented by training in computer theory.

2. Usually, ten years of company experience, usually at least one year of which shall have been in programming work.

Immediate Supervisor

Supervisor of the unit to which assigned.

January 1956

PROGRAMMING PROJECTS CLERK

Duties:

Under semi-direct supervision, to draw computer system charts, layouts, and forms; to maintain programming files; to contact other departments concerning work to be performed; and to perform related work as assigned.

Typical examples of the duties are:
1. To prepare computer system work flow charts, layouts, exhibits, and other work forms in accordance with general instructions or rough sketches, making recommendations for changes and improvements when appropriate.

2. To maintain files of records relating to programming projects in progress and completed, indexing, assembling and filing master program sheets, tabulating cards, and related records; and to assemble and distribute project manuals and new or revised materials.

3. To contact other departments concerning work performed for the programming staff, transmitting staff instructions as to tabulating card arrangements required, machine listings wanted, form printing, and similar work needed; to follow up for its completion; and to check completed work for compliance with instructions and possible discrepancies or machine errors.

Qualifications:

1. Education equivalent to graduation from high school, supplemented by training in drafting and lettering.

2. Usually, four years of company experience.

Immediate supervisor:

Supervisor.
APPENDIX XI

COMPANY JOB SPECIFICATIONS BEFORE AND AFTER CONVERSION

SENIOR REVENUE ACCOUNTING CLERK
(Arrears review and inquiries)

Revenue Accounting Department
Revenue Billing Division

Duties:

Under semi-direct supervision, to determine the accuracy of accounts receivable charges and credit allowances for final and special accounts prior to billing; to answer inquiries relative to customer billing and metering information; to prepare customers' irregular bills for mailing; and to perform related work as assigned. Typical examples of the duties are:

1. To determine the accuracy of accounts receivable charges and credit allowances for final and special accounts prior to billing, involving such work as:
   a. Matching payment and credit cards with billing cards when they off-set the amount due and plugging code punches for allowed bill adjustments;
   b. Reviewing accounts for coding of net and gross charges in accordance with established discount allowance procedure and for such conditions as total billing, no reading, readings held, and accounts past due;
   c. Reviewing all installment accounts to determine the amount of charges to be included in the final bill.
2. To answer inquiries relative to customer billing and metering information, involving locating billing cards and interpreting data relative to the status of the customer's bill and meter history.

3. To prepare customers' irregular bills for mailing, involving applying the proper stamp to indicate no-reading or held accounts, voiding the bill stubs unless they contain a debit charge, checking unusually large credit balances with source records for accuracy, and typing credit balances on the bills as required.

4. To operate key punching and reproducing machines in making required corrections in or transcribing billing cycle coding to accounts receivable or billing cards.

Qualifications:

1. Education equivalent to graduation from high school.

2. Usually, two years experience in the department.

Immediate supervisor

Section supervisor (Billing operations).

August 1948

JUNIOR REVENUE ACCOUNTING CLERK
(After billing)

Revenue Accounting Department
Revenue Billing Division

Duties:

Under semi-direct supervision, to select accounts requiring special handling prior to billing; to transcribe dates and gross charges on electric
service bills; and to perform related work as assigned. Typical examples of the duties are:

1. To select accounts requiring special handling prior to billing, involving such work as:
   a. Removing regular from the irregular accounts using a collating machine;
   b. Performing sorting operations to segregate the various type of irregular accounts and to place them into sequence order for disposition by others.

2. To transcribe due dates and gross charges on electric service bills, involving wiring plugboards for proper calendar dates, making necessary mechanical adjustments and machine tests to insure proper setup and operation.

Qualifications:

1. Education equivalent to graduation from high school.
2. Usually, three months' experience in the department.

Immediate supervisor:

Section supervisor (Billing operations).

September 1948

JUNIOR REVENUE ACCOUNTING CLERK  
(Billing)

Revenue Accounting Department  
Revenue Billing Division

Duties:

Under semi-direct supervision, to print data on electric service bills; to review completed bills for appearance and completeness; and to perform related work as assigned. Typical examples of the duties are:

1. To print data on electric service bills, involving such work as:
a. Selecting bills and related cards by unit order, inserting in billing machine, operating machine and observing for proper operation;

b. Making billing machine tests, reviewing for proper performance, and re-setting control switches;

c. Retaining machines totals when card jams or miscomparisons occur and noting the account charges to be added or deducted from such totals for balancing purposes.

2. To review completed electric service bills for completeness and appearance of printed data; and to forward accounts requiring such corrections as applying or changing code punches or preparing additional bills for overflow accounts.

3. To notify the supervisor of improper machine operation during bill printing.

Qualifications:

1. Education equivalent to graduation from high school.

2. Usually three months experience in the department.

Immediate supervisor:

Section supervisor (Billing operations).

December 1948
ACCOUNTING MACHINE CLERK, COMPTROLLER'S DEPARTMENTS
(Bill corrections)

Revenue Accounting Department
Revenue Billing Division

Duties:

Under semi-direct supervision, to correct improperly prepared electric service bills; to print billing data and meter history and mailing address information on tabulating cards, departmental records, and electric service bills; to print data on electric service bills for overflow accounts; and to perform related work as assigned. Typical examples of the duties are:

1. To correct improperly prepared electric service bills, involving such work as:
   a. Reviewing related billing cards for missing or incorrectly applied codes and comparing punchings in bill stubs with data punched in the related cards;
   b. Preparing customers' bills upon completion of the necessary card corrections;
   c. Operating reproducing and tabulating machines by inserting the proper plugboards and making necessary machine adjustments.

2. To print billing data and meter history and mailing address information on utility cards, customer collection records, and final and special electric service bills, involving operating billing machines by inserting the required plugboards for the various types of printing operations, and making the necessary machine adjustments and tests; and to review the printed data for accuracy.

3. To print data on electric service bills for overflow accounts, involving manually selecting such accounts and processing for printing and mailing.

4. To operate a reproducer machine in preparing decks of bills for test purposes; and to operate keypunch machines in preparing or correcting tabulating cards or bill stubs.
Qualifications:

1. Education equivalent to graduation from high school.
2. Usually one year's experience in the department.

Immediate supervisor:

Section supervisor (Billing operations)

September 1948

ACCOUNTING MACHINE CLERK, COMPTROLLER'S DEPARTMENT
(After proof)

Revenue Accounting Department
Revenue Billing Division

Duties:

Under semi-direct supervision, to merge meter history cards with charge cards prior to bill preparation; to transcribe billing data to bill stubs; to interpret punched data on tabulating cards; to prepare folio number listings of city boundary line accounts; and to perform related work as assigned. Typical examples of the duties are:

1. To merge meter history cards with current, final and special, merchandise, and arrear charges for bill preparation, involving such work as:
   a. Collating the tabulating cards in order to arrange them in proper sequence;
   b. Determining the cause of and correcting such errors as incorrect coding, missing or misfiled cards and those not in proper sequence order;
   c. Operating a collating machine, involving making the required adjustments and plugboard insertions.

2. To transcribe billing data from commercial, residential, merchandise, and arrear cards to customer bill stubs, involving such work as:
a. Grouping the accounts for proper arrangement of reading and utility cards, combining all rates in sequence order by balancing unit, and collating current, merchandise and arrear accounts for checking the accuracy of sequence order;

b. Referring to source records and removing or punching discount allowance codings in current accounts when necessary;

c. Summary-punching billing data in the stubs by balancing unit and sighting through certain punched fields to check the accuracy of transcribed data;

d. Operating sorting, collating, and summary-punching machines, involving making the required adjustments and plugboard insertions for the various operations, and making tests to insure the accuracy of the machine adjustments;

3. To interpret punched data on tabulating cards, involving operating an alphabetical interpreting machine in printing the dates, meter reading information, and charges on utility cards for all types of accounts, and visually checking the machine operations for the accuracy of interpreted information.

4. To prepare folio number listings of city boundary line accounts by selecting such accounts from memoranda and placing the utility cards in the tabulating machine; and to forward the listings to the section supervisor.

Qualifications:

1. Education equivalent to graduation from high school.

2. Usually, one year's experience in the department.

Immediate supervisor:

Section supervisor (Billing operations)
GENERAL CLERK II
(Accounting machines)

Revenue Accounting Department
After Conversion

Duties:

To process data on electric accounting machines requiring individual operations which are outlined by established procedures or in accordance with specific instructions; to set up machines and make minor wiring changes; on special jobs, to work with accounting machine clerks of higher classification; and to perform related work as assigned. Typical examples of the duties are:

1. To prepare customer bill stubs, punching billing data in the stubs and sighting through punched fields to check the accuracy of transcribed data.

2. To print electric service data on customer bills, selecting bills and related tabulating cards, transcribing information, reviewing bills for completeness and appearance, and correcting improperly prepared bills.

3. To test and observe the accuracy of machine operations and completed work.

Qualifications:

1. Education equivalent to graduation from high school.

2. Usually, two years of company experience.

Immediate supervisor:

Supervisor of the unit to which assigned.

December 28, 1956
APPENDIX XII

COMPANY JOB SPECIFICATION OF WORK ELIMINATED

DIRECTLY BY COMPUTER

ACCOUNT STATION CLERK

Revenue Accounting Department
Revenue Records Division

Duties:

Under semi-direct supervision, to maintain ledger card records pertaining to customers' electric service, and miscellaneous charges and credits and meter history information; to check orders and statements for conformance with established billing procedures and prepare correction advices as required; to answer inquiries relating to the status of customers' accounts receivable; to assign reference numbers to customers' accounts; and to perform related work as assigned. Typical examples of the duties are:

1. To maintain ledger card records pertaining to customers' electric service and miscellaneous charges and credits and meter history information, involving such work as:

a. Filing cards in numerical order and in their proper sequence to reflect the status of customers' accounts, in accordance with established procedures;

b. Coding cards in accordance with discount allowance and credit procedures from information shown on orders, advices, tabulating cards, and irregular condition tickets to indicate such conditions as partial payments made on installment accounts, bill adjustments made, discounts cancelled and special discounts allowed, rate changes and meter exchanges; and making notations on the cards or correcting billing information when adjustments or bill inquiries are made;

c. Periodically reviewing card records for such purposes as disposing of debit and credit balances, determining if arrear charges or credits should be added to customers' bills or collection statements, and checking the accuracy of fixed code punches;
d. Removing cards from file when necessary, and locating meter history and utility cards which are missing from file by tracing cards that are being corrected, having corrections completed, and returning cards to file.

2. To check orders and statements for conformance with established billing procedures; verify their completeness and accuracy, and prepare correction notices as required, involving such work as:
   a. Reviewing orders for such data as proper readings and billing dates to be established, obvious billing errors and recent customer complaints; reviewing adjustments for consistency with related meter history information;
   b. Recording such billing information to collection statements as final, partial or full payments made, and balances due; and reconciling collection statements and other listings with ledger records;
   c. Preparing inspection tickets, adjustments, and duplicate collection statements when billing data is not consistent with file records; and recording on memoranda or orders those accounts requiring check readings.

3. To answer inquiries related to the status of customers' accounts receivable and information shown on meter history cards by preparing or transcribing required data to forms, checking source records when necessary, and determining readings or kilowatt-hour differences as required.

4. To assign reference numbers to customers' accounts; and to record on history cards, meter orders, and forms.

5. As required, to operate a key punch machine for coding and making corrections on tabulating cards.

Qualifications:

1. Education equivalent to graduation from high school.

2. Usually, two and one-half years of experience in the department.

Immediate supervisor:

Section supervisor (Account stations).

November 1950
## APPENDIX XIII

### EXHIBIT B, CLERICAL BARGAINING UNIT LINES OF PROMOTION AND DEMOTION

**COLLECTIVE BARGAINING AGREEMENT 1954-1956**

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<td>2. Industrial Rate Reviewer</td>
<td>A-17</td>
<td>A-2; A-12; A-13; B-3</td>
<td>A-2; A-12; A-13; B-3</td>
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<tr>
<td>3. Rate Application Clerk</td>
<td>A-17</td>
<td>A-2; A-12; A-13; B-3</td>
<td>A-2; A-12; A-13; B-3</td>
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<td>4. Power Contract Clerk</td>
<td>A-11; A-12; A-13; A-17; A-19</td>
<td>A-1; A-19; A-11; A-12; A-13; A-19; A-11; A-12; A-13; A-19</td>
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<td>5. Industrial Bill Computing Clerk</td>
<td>A-11; A-12; A-13; A-17; A-19</td>
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<td>6. Electrical Energy Tax Clerk</td>
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<td>7. Accounts Control Clerk</td>
<td>A-11; A-14; A-15; A-18; A-20</td>
<td>A-4; A-5; A-6; A-7; A-8</td>
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<td>8. Records Review Clerk</td>
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<td>9. Merchandise Accounts Analysis Clerk</td>
<td>A-14; A-15; A-16; A-18; A-20</td>
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<td>10. Meter Records Analysis Clerk</td>
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<td>11. Bookkeeper</td>
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<td>12. Bill Record Clerk</td>
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<td>13. Ledger Entry Clerk</td>
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<td>14. Customer Deposit Clerk</td>
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<td>15. Accounts Balance and Review Clerk</td>
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<td>Revenue Accounting Department</td>
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<tr>
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<td>Comes from</td>
<td>Promotes to</td>
<td>Demotes to</td>
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<td>17. Junior Revenue Accounts Analysis Clerk (Rate and Order Review)</td>
<td>A-22;A-23;B-5</td>
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<td>A-22;A-23;B-5</td>
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<td>18. Junior Revenue Accounts Analysis Clerk (Meter Records)</td>
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<td>A-10;A-13</td>
<td>A-22;A-23;B-5</td>
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<td>20. Work Assignment Clerk, Printometer Records</td>
<td>A-21</td>
<td>A-13</td>
<td>A-21</td>
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<td>22. Account Station Clerk</td>
<td>A-23</td>
<td>A-16;A-17;A-18</td>
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<td>(File Room)</td>
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<td>(Merchandise Billing Records)</td>
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<td>(Records Correction)</td>
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<td>24. Accounts Clerk</td>
<td>**</td>
<td>A-19;A-21</td>
<td>A-26</td>
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<td>25. Revenue Accounts Clerk (Receipts Control)</td>
<td>A-28;A-29;A-31;A-32;A-33;A-35;A-36</td>
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<td>26. Revenue Accounts Clerk (Demand Computing)</td>
<td>A-28;A-30;A-34</td>
<td>A-19;A-21</td>
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<td>27. Senior Typist</td>
<td>A-28</td>
<td>A-23</td>
<td>A-28</td>
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<td>28. Typist**</td>
<td>A-31;A-32;A-33;A-34;A-35;A-36</td>
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<td>29. Junior Revenue Accounts Clerk (Reference Numbers)</td>
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<td>30. Junior Revenue Accounts Clerk (Output Records)</td>
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<td>A-26</td>
<td>Layoff</td>
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## APPENDIX XIII (continued)

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<td>32. Key Punch Clerk</td>
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<td>33. Office Clerk</td>
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<td>(Revenue Accountant's Office)</td>
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<td>(Printometer Entries)</td>
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<td>35. Junior Office Clerk</td>
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<tr>
<td>(Industrial Records)</td>
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<td>(Sorting and Filing)</td>
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<td>36. Junior Typist</td>
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### Promotional Series B

1. Revenue Summary Analysis Clerk  
   Promotes to A-2  
   Demotes to B-3
2. Billing Operations Analysis Clerk  
   Promotes to A-5; B-1; B-2  
   Demotes to B-4
3. Revenue Statistics Clerk  
   Promotes to B-3  
   Demotes to B-5
4. Junior Revenue Accounts Analysis Clerk  
   (Current Revenue Balancing)  
   (Revenue Proof)  
   Promotes to A-17; A-18; B-4  
   Demotes to B-6
5. Senior Accounting Machine Clerk  
   (After Balancing)  
   (Commercial Accounts)  
   (Finals and Specials)  
   Promotes to A-17; A-18; B-4  
   Demotes to B-6
6. Accounting Machine Clerk  
   (After Proof)  
   (Bill Corrections)  
   (Mark Sensing and Residential Breakdown)  
   (Receipts and Card Printing)  
   Promotes to B-5  
   Demotes to B-7
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<td>7. Junior Revenue Accounts Clerk</td>
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<td>(After Billing)</td>
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<td>(Billing)</td>
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* Entrance job classification

** Limited to present incumbents only

*** Requires typing experience
## APPENDIX XIV

### EXHIBIT B, CLERICAL BARGAINING UNIT

**LINES OF PROMOTION AND DEMOTION**

**COLLECTIVE BARGAINING AGREEMENT 1956-1959**

<table>
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<th>Promotes to</th>
<th>Demotes to</th>
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<tr>
<td>2. Accounting clerk I</td>
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<td>A-3</td>
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<tr>
<td>3. Accounting clerk II</td>
<td>A-4; A-5</td>
<td>A-2</td>
<td>A-4; A-5</td>
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<td>5. Accounting clerk III</td>
<td>A-6; A-7</td>
<td>A-3</td>
<td>A-6; A-7</td>
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<tr>
<td>6. Account station clerk</td>
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<tr>
<td>7. General clerk I</td>
<td>A-8</td>
<td>A-5</td>
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<td>9. General clerk III</td>
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<td>11. Clerk II</td>
<td>A-12</td>
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<td>12. Clerk III</td>
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<tr>
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<td>Programmer</td>
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</tr>
<tr>
<td>Programming Projects Clerk</td>
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<td></td>
<td>Layoff</td>
</tr>
</tbody>
</table>

* Denotes Entrance Job Classification

** Limited to present incumbents only

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ARTICLE III SENIORITY, PROMOTIONS, TRANSFERS, LAYOFFS, REEMPLOYMENT, SECTIONS 8, 13, 14, 24.
COLLECTIVE BARGAINING AGREEMENT BETWEEN
MIDWEST ELECTRIC COMPANY AND
INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS
AND LOCAL UNION 1472, 1954-1956

8. In cases of promotion to higher job classifications within the bargaining unit, the factors to be considered shall be ability and seniority. Where the ability of the employees under consideration is substantially equal, the employee highest on the seniority list will be the one promoted. In case of promotion, if the employee who is highest on the seniority list is not selected, he shall be informed by the Company of the reason why he was not promoted. The Union will be furnished the names of employees not promoted in accordance with seniority. Eligibility for promotion will be in accordance with the attached Exhibit B, except as hereinafter provided.

13. If posting of notice of a vacant position is required under the provisions of Section 7 of Article III, the Company shall post a notice on the bulletin boards in the department affected, for a period of ten calendar days, excluding Sundays and holidays, announcing the position open. Employees desiring to be considered should make written application setting forth their qualifications. Employees who do not make application within the period of posting of the notice shall have no grievance.

14. If selection of an employee is to be made in accordance with the provisions of Article III, Section 7, Paragraph f, then the Company may select any employee, or hire someone to fill such job after notifying the Union.

24. (a) Eligible employees or former employees who have, because of lack of work, been demoted, transferred, or laid off, shall be recalled in accordance with the provisions of this Section before a vacancy is filled by the promotion, transfer, or hiring of an employee who is not eligible for recall. Employees or former employees shall be eligible for recall in accordance with the provisions of this Section, if, because of lack of work, they were:

1. Demoted or transferred within the department; or
2. Laid off, or transferred from one department to another, within the immediately preceding two-year period.
24. (b) If the vacancy to be filled is in an entrance job classification, employees or former employees who are eligible for recall and have seniority in that promotional series shall, if they meet the job requirements, be offered the job in the order of their service. If the vacancy is not filled in this manner, eligible employees or former employees who have seniority in any job classification within the department, shall, if they meet the job requirements, be offered the job in the order of their service except that no employee presently on the payroll of the department in which the vacancy occurs will be offered a recall to an entrance job classification in his present department, unless such offer is to a promotional series from which he has been removed because of lack of work.

(c) If the vacancy to be filled is in other than an entrance job classification, employees or former employees who are eligible for recall shall, if they meet the job requirements, be offered the job in the order of their seniority, provided:

1. It is a job classification from which they have been laid off, transferred, or demoted, because of lack of work, or

2. It is a job classification within their former promotional series, which is not higher than the job classification in that series that they held prior to demotion, transfer, or layoff, because of lack of work, or

3. It is a job classification, or a lower classification within the same promotional series, in which they still retain seniority, although not one from which they were directly laid off, transferred, or demoted, because of lack of work.

(d) If an employee is to be offered a vacancy in accordance with the provisions of this Section, a notification shall be sent to him at the latest mailing address supplied the Company, or given him personally, and a copy of the notification shall be sent the Union. If the employee wishes to accept the job offered, he shall so notify the Company within six calendar days, excluding Sundays and holidays, after such notification was mailed or given to him and shall report for work within twelve calendar days, excluding Sundays and holidays, of the date the notice was mailed or given to him.

(e) A laid off employee, reemployed in accordance with the provisions of this Section, shall be credited with the service which he had accumulated as of the date of his layoff.

(f) The seniority of employees recalled shall be determined in accordance with the rules governing the computation of seniority.
24. (g) An employe returned to his former job classification in accordance with the provisions of this Section shall be paid the rate of pay he formerly received in that job classification, or if there has been a change in rate of pay schedule, the rate which corresponds to his former rate of pay, taking such change into consideration.

(h) If an employe does not accept a job offered in accordance with the provisions of this Section, he has no further recall rights to subsequent vacancies in that job classification or in any job classification outside his present promotional series.

(i) Nothing in this Section shall prevent the hiring of new employees or the use of present employees to fill the job temporarily until the laid off, transferred, or demoted employe can be obtained.
IBM 705 REVENUE ACCOUNTING SYSTEM

CHART AS OF JANUARY 8, 1958
This is the IBM 702, the star attraction of IBM's new Data Processing Center at its New York City headquarters. The 702 was designed to process masses of business and industrial information such as is encountered in payroll production, inventory control, and all areas of accounting. In addition to the 702, the new center contains a complete lineup of high-speed digital computers and data processing equipment, including the IBM 650 and 701. The new center is the first of several to be opened at IBM offices in major cities. This fact, and the fact that IBM has already installed or has on order nearly 1,000 electronic data processing machines -- all 650-size, or larger -- points up the wide acceptance of the "giant brain." The equipment shown above (left to right): arithmetical and logical unit, eight magnetic tape units and power supply, console (foreground), card punch, printer, and card reader. Several units of the 702 are not shown including the magnetic drum memory, auxiliary magnetic tape units, and control and electrostatic storage facilities.
APPROVAL SHEET

The thesis submitted by Arthur Anthony Malinowski has been read and approved by three members of the faculty of the Institute of Social and Industrial Relations.

The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval with reference to content, form, and mechanical accuracy.

The thesis is therefore accepted in partial fulfillment of the requirements for the Degree of Master of Social and Industrial Relations.

January 30, 1958
Date

Signature of Adviser