

SYSTEMS ANALYSIS OF THE SYSTEM EMPLOYED TO IMPLEMENT
AND CONTROL THE FINANCIAL OPERATIONS OF THE
INDUSTRIAL ENGINEERING DEPARTMENT

by

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A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

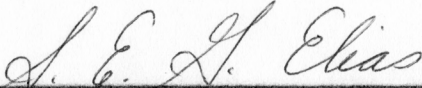
MASTER OF SCIENCE

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INTRODUCTION

This report is concerned with the system presently used to implement and control the financial operations of the Industrial Engineering Department.

The system's operative personnel consists of one bookkeeper. The bookkeeper has three main areas of responsibility, bookkeeping, accounting and record processing.

Invoices, requests and money flow into this system from sources in and outside the university. By applying a method of bookkeeping, accounting or record processing, these inputs are transformed into useful information and material.

Outputs occur because of the operations performed on the inputs. These outputs in the form of purchase requests, invoices and travel requests are mailed, taken or sent to the different departments in the university and to outside sources.

The present system, in the author's opinion, is inefficient in many respects. The paper flow and the filing procedures are too time consuming. The bookkeeper is presently required to carry paper work to different areas for signature and disposition. These and other problem areas will be studied in this report.

HYPOTHESIS

The objective of this report is to study the present system used to implement and control the financial operations of the Industrial Engineering Department, with the purpose of improving the system's ability to perform its intended function more economically. In developing a system that is more economical, the author will employ a work simplification approach.

Through work simplification all unnecessary steps, waste in time, energy, and material can be eliminated, thus getting the most production with the least amount of effort and confusion.

This report will also serve in an informative capacity to the head of the department and could assist in a smoother operation of this system if turnover is necessary within this system's operative personnel.

The operations performed by the bookkeeper of the Industrial Engineering Department will form the boundaries for this report. A boundary in the system's sense restricts the scope of a problem in a size commensurate with the cost or time available for solution and the amount of detail necessary to understand the process.¹

The approach that will be taken in this report will consist of two parts.

First, the author will study the present system with respect to the inputs to the system, services performed by the system, outputs of the system and feedbacks within the system. Then, flow diagrams for the system will be developed.

Second, the author will analyze the system with respect to the inputs, services performed, outputs and feedbacks. The elements of the system will be analyzed from the standpoint, are the operations necessary, why are they done this way, can they be combined and can they be simplified? Then the author will recommend changes in the present system that will make the system more economical and more efficient.

To enable the reader to better understand the study, the author will describe five of the instruments used to facilitate the accounting operations

¹Stanford L. Optner, Systems Analysis, 1960, p. 21.

and the record keeping process.

The five instruments are, The Statement of Transactions and Balances, Purchase Ledger, Charge Ledger, Cash Book and Current Purchase Order Invoice Book.

The statement of transactions and balances is a form prepared by the comptroller's office showing all expenditures for a department for the previous month.

The purchase ledger is used for recording the money spent for goods and services by the department. The current balance of the department's funds is maintained by deducting the daily purchases from the department's yearly allotment.

The charge ledger is used for the purpose of keeping a record of the department's accounts receivable.

The cash book is used for keeping a record of all the department's receipts.

The current purchase order invoice book is a record of all the purchase order invoice's that are currently in process in the system (See Figs. 1 - 5, Appendix A).

STUDY OF THE PRESENT SYSTEM

The total system is composed of several elements. The system can be studied as a unit by studying each of its elements.

The elements that will be taken into consideration are

1. Employment and payroll.
2. Money received for goods and services.
3. Goods purchased by the department.

4. Staff travel.

5. Miscellaneous duties.

Employment and Payroll

Upon request that a student be added to the payroll, the bookkeeper prepares a Student Employment Report (Fig. 6, Appendix B) in duplicate and an Employees' Withholding Exemption Certificate (Fig. 7, Appendix B) in triplicate. A copy of each is filed and the remaining copies are sent to the comptroller. The comptroller prepares IBM cards (Fig. 8, Appendix B) that will be used in preparing the individual's check and sends them back to the bookkeeper of the Industrial Engineering Department.

Upon receipt of the IBM cards they are filed until the monthly time sheets (Fig. 9, Appendix B) arrive from the section of the Industrial Engineering Department, in which the student has been working. From these time sheets the bookkeeper fills out the IBM cards and the payroll check sheet (Fig. 10, Appendix B). The IBM cards and the payroll check sheet is sent to the department head for signature. The IBM cards and a copy of the payroll check sheet is sent to the comptroller. The total amount from the payroll check sheet is entered in the purchase ledger and the remaining copy of the payroll check sheet is then filed.

The comptroller prepares and sends the checks to the bookkeeper, who then distributes them to the respective students.

When the statement of transactions and balances is received the bookkeeper compares this with the payroll check sheet and the purchase ledger, and then the payroll check sheet is filed.

Money Received for Goods and Services

In this element there are basically two different areas.

- A. Money received for jobs done by the Industrial Engineering Department.
- B. Cash received for goods sold.

When the Industrial Engineering Department receives a request under plan A, the bookkeeper prepares a copy of a job sheet (Fig. 11, Appendix B), a job order card (Fig. 12, Appendix B) in duplicate and assigns a job order number to the job. This number follows the job throughout the remaining paper work and serves as a description of the job. The job order card is sent to the section that will be responsible for doing the job. When the job is completed a charge ticket will be prepared in duplicate by the person responsible for doing the job, showing the expenses (material, labor) that was required for the job. This charge ticket and the requesting department's inter-departmental requisition (Fig. 13, Appendix B) will be sent back to the bookkeeper. The bookkeeper will record the expenses on the job sheet and total the expenses for the entire job.

The job order card and a copy of the charge ticket is filed and an entry showing the expense of the job is entered in the charge ledger. The bookkeeper then prepares an invoice (Fig. 14, Appendix B) in duplicate. A copy of this invoice and the inter-departmental requisition is sent to the ordering department. The remaining copy of the invoice is filed.

Upon receipt of the blue and white copies of the purchase order invoice (Fig. 15, Appendix B) from the ordering department, the bookkeeper compares it with the invoice on file and gets the department head's approval. The blue copy of the purchase order invoice is filed with the invoice and the

white copy of the purchase order invoice is sent to the comptroller.

When the department receives the check for the job and the pink copy of the purchase order invoice from the comptroller, the bookkeeper destroys the blue and pink copies of the purchase order invoice. The bookkeeper endorses the check and prepares the official receipt (Fig. 16, Appendix B) in triplicate. Here the bookkeeper makes a credit entry in the charge ledger and an entry in the cash book.

At this point the bookkeeper prepares a deposit slip in duplicate and takes the check, a copy of the deposit slip and the official receipt to the cashier. The cashier keeps the check, official receipt, and stamps the deposit slip. The bookkeeper then prepares a running account of the deposits and files the deposit slip.

In case of plan B, the bookkeeper upon receipt of the cash for goods sold and the sales ticket from an outside department, marks the ticket paid and returns it to the person, who brought the cash in or mails it to the sender.

The bookkeeper then follows the same procedure as followed in the case of plan A, starting with the preparation of the official receipt.

Goods to be Purchased

The regulations of the university classifies the goods to be purchased into four categories.

- A. Purchases of scientific research supplies over \$200.00 and all other purchases over \$25.00, except goods on contract and inter-departmental purchases.

- B. Purchases from the physical plant, press, photographic services and postal center.
- C. Purchases of scientific supplies up to \$200.00, goods on contract and purchases up to \$25.00, except direct (in person) purchases.
- D. Direct purchases less than \$25.00 or on campus any amount except for the physical plant, press, photographic services and postal center.

When the department receives a request for goods to be purchased under plan A, the bookkeeper prepares a purchase requisition (Fig. 17, Appendix B) in triplicate and gets the department head's signature. After the department head signs the purchase requisition, the bookkeeper files a copy in the current purchase order invoice book. The remaining copies go to the Dean of Engineering or the Director of the Engineering Experiment Station, whichever is appropriate. The Dean of Engineering receives all the requests except those concerning research projects and these go to the Director of the Engineering Experiment Station.

When the bookkeeper receives the purchase order voucher (Fig. 18, Appendix B) from the comptroller, the bookkeeper records the amount of the purchase in the purchase ledger. Then the bookkeeper files the purchase order voucher in the current purchase order invoice book.

When the department receives the invoice from the supplier, the bookkeeper compares it with the purchase order voucher. The bookkeeper sends the purchase order voucher to the person receiving the goods, for his approval. Then it is returned to the bookkeeper who gets the department head's signature. After the department head signs it, the bookkeeper files a copy in the current purchase order invoice book. The remaining copies

go to the comptroller.

When the department receives the statement of transactions and balances from the comptroller, the bookkeeper compares it with the purchase requisition and files the purchase requisition.

In plan B, upon receiving the request for goods, the bookkeeper prepares an inter-departmental requisition in duplicate, a copy is filed and the other is carried to the supplier.

When the bookkeeper receives the invoice from the supplier, a transfer check (Fig. 19, Appendix B) is prepared in duplicate. The transfer checks are sent to the department head for signature, then the bookkeeper attaches the suppliers invoice to the transfer check and sends it to the supplier. The amount from the transfer check is entered in the purchase ledger. A copy of the transfer check, inter-departmental requisition and invoice are filed.

Upon receipt of the statement of transactions and balances from the comptroller, the bookkeeper compares it to the transfer check, inter-departmental requisition and invoice, and files them.

When the Industrial Engineering Department receives a request for goods to be purchased under plan C, the bookkeeper prepares a letter order (Fig. 20, Appendix B) in triplicate ordering the goods. This is submitted to the department head for approval, then a copy is filed and the other copy is given to the person ordering. The remaining copy is sent to the supplier. When the bookkeeper receives the invoice from the supplier, an inquiry is made to see if a purchase order invoice has been prepared. If so, the invoice is held until the monthly statement of transactions and balances is received from the comptroller. If not, the bookkeeper sends the invoice to the person

ordering and the department head for approval.

The bookkeeper prepares a purchase order invoice of six (6) copies and attaches the supplier's invoice. It is then sent to the person receiving the goods and to the department head for signature. The bookkeeper files a copy of each in the current purchase order invoice book and records the amount in the purchase ledger. The remaining copies are sent to the Dean of Engineering or the Director of the Engineering Experiment Station.

When the department receives the statement of transactions and balances from the comptroller, the bookkeeper compares it with the purchase order invoice and files the purchase order invoice.

In plan D, upon receiving the request for goods, the bookkeeper prepares an inter-departmental requisition in duplicate. A copy is filed and the remaining copy is taken to the supplier. Upon receipt of the invoice from the supplier, the bookkeeper follows the same procedure as in the case of plan C.

Staff Travel

The regulations of the university require that a different procedure be used for the different types of travel. They are divided into the following categories:

- A. Out-of-state (Plane, Train, Bus).
- B. Out-of-state (Private Car).
- C. In State (State-owned Car).
- D. In State (Private Car).

When the bookkeeper receives a request for travel under plan A, a request is prepared for out-of-state travel (Fig. 21, Appendix B) of seven (7)

copies. This is sent to the department head for approval. Then a copy is filed in the current purchase order invoice book. The remaining copies are sent to the Dean of Engineering or Director of the Engineering Experiment Station, whichever is appropriate.

Upon receipt of the out-of-state travel request with the request number on it from the comptroller, the request number is a number assigned by the comptroller for this trip, the bookkeeper destroys the copy of the out-of-state travel request now on file and files the copy with the request number on it. At this point the bookkeeper prepares a purchase order invoice and gets the department head's signature. After the invoice is signed, a copy is filed in the current purchase order invoice book. The remaining copies are hand carried to the Dean of Engineering or Director of the Experiment Station.

After the purchase order invoice is signed by either the Dean of Engineering or the Director of the Engineering Experiment Station, the bookkeeper then sends or takes two (2) copies to the ticket agency concerned and purchases the tickets. The remaining copies go to the comptroller.

When the bookkeeper receives the trip expense, from the person who made the trip, a general expense travel voucher (Fig. 22, Appendix B) of four (4) copies is prepared. They are sent to the person who made the trip and the department head for signature. A copy is then filed in the current purchase order invoice book. The remaining copies go to the Dean of Engineering or the Director of the Engineering Experiment Station. The bookkeeper then records the amount from the purchase order invoice in the purchase ledger.

The comptroller sends the check covering the expenses incurred on the trip, to the bookkeeper, who gives it to the person concerned. When the bookkeeper receives the statement of transactions and balances, they are compared with the purchase ledger.

When a request for travel under plan B is received by the bookkeeper, the same procedure as in the case of plan A is followed. This procedure is followed until the paper work reaches the point where the purchase order invoice is prepared. Instead of preparing a purchase order invoice, the bookkeeper informs the person taking the trip that the trip has been approved.

When the bookkeeper receives the person's travel expenses upon his return, a general expense travel voucher and a private car travel voucher (Fig. 23, Appendix B) of three (3) copies is prepared. From this point on, the procedure is the same as in plan A.

Upon request for travel under plan C, the bookkeeper prepares an inter-departmental requisition in duplicate, one copy is filed and the other one is given to the person wanting the car. The person hand carries the copy to the physical plant and picks up the car. Upon receipt of the expenses incurred on the trip by the individual, the bookkeeper proceeds the same as in the case of plan A. The only exception is if the person has car expense other than gas. In this case the bookkeeper prepares a state-owned-car travel voucher (Fig. 24, Appendix B) of three (3) copies and then follows the same procedure as in plan A.

When the bookkeeper receives a request for travel under plan D, the same procedure as was followed in the case of plan B is followed, starting with the travel expenses.

Miscellaneous Duties

This element includes some of the duties of the bookkeeper that are performed only once a month or only on occasions.

1. Record of Expenditures.
2. Key requests.
3. Library books and material requisition.
4. Telephone and telegraph expenditures.

Record of Expenditures. After comparing the statement of transactions and balances with the purchase ledger the bookkeeper divides the spending into the following four classes.

1. Contractural Services.
2. Commodities.
3. Capital Outlay.
4. Salaries.

The amounts spent for each of the above are plotted on a graph that has a line on it representing the budgeted amount of money for the year, for the particular fund concerned. By plotting these values on this graph the bookkeeper can tell the present situation of the particular fund.

Also the bookkeeper has a graph showing the total amount of money budgeted for the year and by plotting the total expenditures on this graph the overall situation for the year can be determined.

Key Requests. When the bookkeeper receives a request for a door key, a key permit (Fig. 25, Appendix B) is prepared and the bookkeeper gets the signature of the department head. The request is then given to the person who made the request.

Library Books and Material Requisition. Upon request the bookkeeper

prepares a library request card (Fig. 26, Appendix B) and gets the department head's signature. The bookkeeper takes the card to the library and picks up the material or the books.

Telephone and Telegraph Expenditures. When the bookkeeper receives the statement of transactions and balances, the amount spent for telephone and telegraph is recorded in the purchase ledger.

ANALYSIS OF THE PRESENT SYSTEM

This system is composed of several elements, each having a different purpose. For this reason the author, to eliminate confusion and misunderstanding, will include the analysis of an element and the recommended changes for that element in the same section.

To simplify the discussion involved, once the author recommends a change be made to an operation in an element, the same recommendation will apply to similar operations in different elements.

In analyzing the present system the author has isolated the following areas of each element in which inefficiencies are prevalent. A description of each of these areas and the recommendation will be presented.

Employment and Payroll

Upon request that a new employee be added to the payroll, the bookkeeper prepares a student employment report and an employees' withholding exemption certificate. A copy of each is filed and the remaining copies are sent to the comptroller. The comptroller prepares IBM cards that will be used in preparing the individual's check and sends them back to the bookkeeper of the Industrial Engineering Department.

Upon receipt of the IBM cards they are filed until the monthly time sheets arrive from the section of the Industrial Engineering Department in which the student has been working.

From these time sheets the bookkeeper prepares a payroll check sheet and attaches this to the IBM cards, that were received from the comptroller. These are sent to the department head for approval and then to the comptroller. The comptroller prepares the checks and sends them to the bookkeeper who distributes them to the students.

When the statement of transactions and balances is received the bookkeeper compares it with the payroll check sheet, purchase ledger, and then the payroll check sheet is filed (Fig. 28, Appendix C).

Recommendations. The author feels it is unnecessary to send both the IBM cards and the payroll check sheet to the department head. The IBM cards contain the same information as the payroll check sheet. This would eliminate the need for the bookkeeper to attach the payroll check sheet to the IBM cards and would also eliminate the need for the department head to take time to look at each IBM card. This would mean a saving in time for the bookkeeper and the department head.

The payroll checks should not be sent to the bookkeeper. There are only a few checks each month and these should be mailed directly to the students concerned. The average cost to the department would be about thirty (30) cents a month and the bookkeeper cannot sort and distribute these checks each month for less than this amount.

Comparison of the payroll check sheet with the statement of transactions and balances is not necessary unless a mistake has been made in the total pay and this can be checked by comparing the purchase ledger with the statement of transactions and balances.

Money Received for Goods and Services

When the Industrial Engineering Department receives a request to do a job for another department, the bookkeeper prepares a copy of a job sheet and a job order card in duplicate. This job order card is sent to the section doing the job. The expenses for the job are sent as they occur to the bookkeeper, who enters them on the job sheet.

The department that is having the job done, upon receipt of the invoice from the Industrial Engineering Department, prepares and sends a blue and white copy of a purchase order invoice to the Industrial Engineering Department. The bookkeeper then compares these with the copy of the invoice that was sent to the ordering department. The bookkeeper files the blue copy and gets the department head's signature on the white copy.

This copy is sent to the comptroller and the comptroller prepares a check and sends it to the bookkeeper. At this time the bookkeeper destroys the blue copy of the purchase order invoice.

When the Industrial Engineering Department receives a check or cash for goods sold or services performed, the bookkeeper carries the check or cash to the cashier's office (Fig. 29, Appendix C).

Recommendations. The preparation and use of the job order cards is a waste of time, in that they do not serve any useful purpose. They were originally meant to serve as a record of, in process work. Instead of preparing a job order card the bookkeeper should prepare the job sheet in duplicate and let the second copy of the job sheet serve the function of the job order card.

The person responsible for the job could enter the expenses as they were incurred on the sheet. When the job is completed this form along with

a charge ticket could be sent to the bookkeeper.

This change would save the expense of the job order cards, plus the time in typing the job order card and would save the bookkeeper the time required to prepare a running account of the expenses as they occur.

When the bookkeeper receives the blue and white copy of the purchase order invoice, the blue copy should be destroyed at this time. A notation could be made on the industrial Engineering Departments invoice, indicating that the purchase order invoice had been received and had been sent to the comptroller.

This would save time for the bookkeeper because she now has to file the blue copy and later destroy it.

The author suggests in the case of cash, the department utilize one of the girls presently employed for part time work in the office to carry the cash to the cashier. If the money is in the form of checks, these could be mailed to the cashier. This would eliminate the need for the bookkeeper to carry the money to the cashier.

Goods to be Purchased

When the department receives a request for goods to be purchased from an outside or local supplier in which the total expense is more than \$25.00, the bookkeeper prepares a purchase requisition which is signed by the department head. Then the purchase requisition is sent to the Dean of Engineering or the Director of the Engineering Experiment Station.

When the department receives an invoice from the physical plant, press, photographic services or postal center for goods purchased, the bookkeeper prepares a transfer check in duplicate. This form transfers the money from

the above departments fund to the Industrial Engineering Departments fund.

Then when the statement of transactions and balances is received from the comptroller, the bookkeeper compares it with the transfer check, inter-departmental requisition and the invoice.

In the case of goods purchased from outside supplier in which the total expense is less than \$25.00, or if for scientific or contractual services up to \$200.00. And in the case of goods purchased locally less than \$25.00 or on campus any amount except the physical plant, press, photographic services and the postal center, the bookkeeper upon receipt of the invoice compares the letter order or the inter-departmental requisition, whichever case may be, with the invoice and then sends the invoice to the person ordering and the department head for approval. Then a purchase order invoice is prepared. This purchase order invoice is sent to the person ordering and the department head for signature (Figs. 30-32, Appendix C).

Recommendations. It is the author's opinion that when expenditures occur involving the Industrial Engineering Department funds the department head should be allowed to control these expenditures. This would eliminate the necessity of sending the expenditure forms to the Dean of Engineering, thus increasing the efficiency of this operation.

The transfer checks are presently typed one at a time, the author feels that these two copies could be prepared at the same time by using carbon paper. This would mean a saving in the bookkeeper's time.

Also when the bookkeeper receives the statement of transactions and balances, comparing it to the transfer check would be sufficient; it is unnecessary to compare it to the inter-departmental requisition and the invoice. This would save the bookkeeper time involved in getting the

inter-departmental requisition and the invoice out of the file and comparing them to the statement of transactions and balances and then refiling them. This would mean a savings in time for the bookkeeper and money for the department.

The author suggests that when the invoice is received the bookkeeper should compare it with the letter order or inter-departmental requisition, if they are the same then the bookkeeper does not need to send the invoice to the person ordering or the department head. The bookkeeper can, at this point, prepare the purchase order requisition. It should be sent directly to the department head, instead of sending it to the person ordering. The person ordering has already approved the purchase. This would mean a savings in time for the bookkeeper and money for the department.

Staff Travel

After returning on an out-of-state business trip (Plane, Train, Bus), the person who made the trip gives the bookkeeper his trip expense. The bookkeeper prepares a general expense travel voucher and returns it to the person who made the trip for signature. The person concerned then returns this form to the bookkeeper who gets the department head's signature (Fig. 33, Appendix C).

Recommendations. The author suggests that a mailbox be placed close to the department head's work space. Then when forms are given to person's for signature, they could sign the forms and place them in the department head's mailbox when applicable. This would eliminate the need of the person's signing forms to return them to the bookkeeper. The bookkeeper could get the forms after signature by the department head and continue the operation.

This would mean a savings in time of the bookkeeper and money for the department.

Miscellaneous Duties

Door Key. When the bookkeeper receives a request for a door key, a key permit is prepared and the bookkeeper gets the signature of the person requesting the key and the signature of the department head. The request is then given to the person who made the request to enable him to get the key from the key custodian.

Recommendations. After the person picks up his key from the key custodian, the key permit should be returned to the bookkeeper. This way the bookkeeper could maintain a record of all keys issued to the personnel of the Industrial Engineering Department.

SUMMARY AND CONCLUSIONS

This report represents a comprehensive study and analysis of the service system employed to implement and control the financial operations of the Industrial Engineering Department.

This report can serve the Industrial Engineering Department in several ways. One, with the changes proposed by the author, a saving of several dollars in material and labor will be realized. Two, it can serve as a system description to the department head. Three, it can be used as a guide to the person responsible for performing the operations involved in the system. Four, in case of turnover within the system of the operative personnel, this report will allow a smoother transition and less delay in getting the system back into operation.

The area in this system that would have shown the greatest improvement, had it not been for the rules of the university, was the area of forms. Most of the forms used by this system are in use by the entire university. These forms in many cases require more information than is necessary for the operation of this system. Also the bookkeeper is required in many cases to prepare more copies of the forms, than are necessary for the operation of this system.

The savings in time of the bookkeeper that would be realized by the use of the proposed system, can be used for other areas of activity within the Industrial Engineering Department.

ACKNOWLEDGMENTS

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The author wishes to express his appreciation for the helpful suggestions contributed by Dr. George F. Schrader, Department Head, Professor Jacob J. Smaltz, Industrial Engineering Department, Kansas State University.

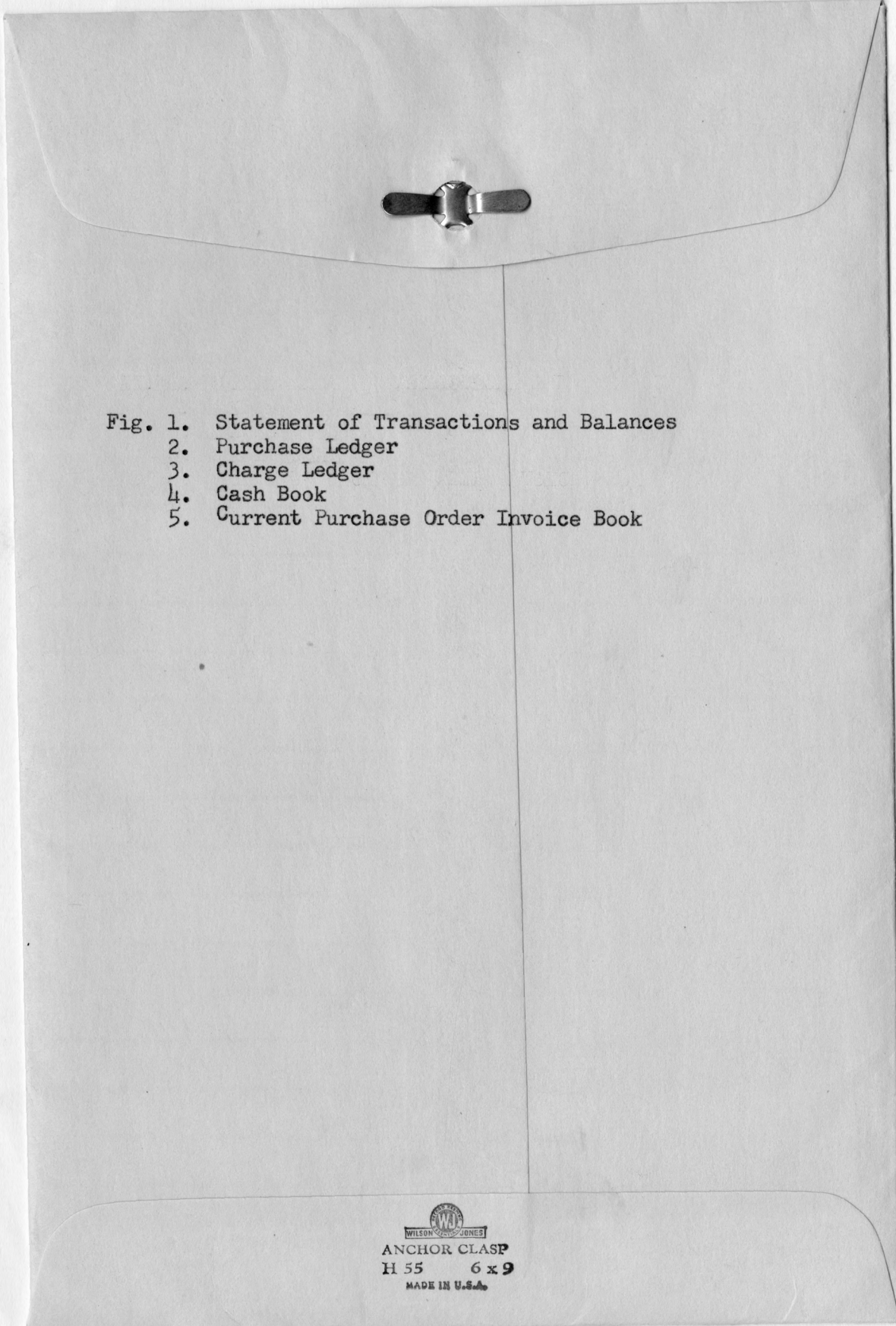
The author is grateful to Mrs. Doris Smith, Head Bookkeeper, Industrial Engineering Department, Kansas State University, for her help in the preparation of this report.


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APPENDIX A

- 
- Fig. 1. Statement of Transactions and Balances
2. Purchase Ledger
3. Charge Ledger
4. Cash Book
5. Current Purchase Order Invoice Book


ANCHOR CLASP
H 55 6 x 9
MADE IN U.S.A.

**KANSAS STATE UNIVERSITY
STATEMENT OF TRANSACTIONS AND BALANCES**

PAGE NO.

MO.	DAY	YR.

FUND	KSU ACCOUNT NO.			DATE			PURCHASE REQUISITION	P.O. I NUMBER	ENCUMBRANCE NUMBER	VOUCHER NUMBER	TR. CODE	X	DESCRIPTION OF VENDOR	SOURCE OR OBJECT CODE	APPROPRIATION ALLOTMENT OR RECEIPTS	PAYMENTS	UNEXPENDED BALANCE	ORDERS	UNENCUMBERED BALANCE	
	ACT.	FUN.	DEPT.	PROJECT	MO.	DAY														Y.

PURCHASE LEDGER

FORM 20-4 U.S.A.

	DATE	DESCRIPTION	DATE O.K.	COST	CREDITS	BALANCE	
1							1
2							2
3							3
4							4
5							5
6							6
7							7
8							8
9							9
10							10
11							11
12							12
13							13
14							14
15							15
16							16
17							17
18							18
19							19
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31							31
32							32
33							33
34							34
35							35
36							36



NAME

ADDRESS

BUSINESS

INDIVIDUAL

TERMS

CREDIT LIMIT

RATING

DATE

ITEMS

FOL.

✓

DEBITS

CREDITS

BALANCE

ACCT. NO. _____

SHEET NO. _____



14-055


CHARGE LEDGER


F.O.I. List

INDUSTRIAL ENGINEERING DEPARTMENT

Date	Order No.	Vendor	Amount

APPENDIX B

- 
- Fig. 6. Student Employment Report
7. Employee Withholding Exemption Certificate
8. IBM card
9. Monthly Time Sheet
10. Payroll Check Sheet
11. Job Sheet
12. Job Order Card
13. Inter-Departmental Requisition
14. Invoice
15. Purchase Order Invoice
16. Official Receipt
17. Purchase Requisition
18. Purchase Order Voucher
19. Transfer Check
20. Letter Order
21. Out-of-State Travel Request with request number on it
22. General Expense Travel Voucher
23. Private Car Travel Voucher
24. State owned car Travel Voucher
25. Key Permit
26. Library Card



ANCHOR CLASP
H 55 6 x 9
MADE IN U.S.A.

Student Employment Report

TO: Comptroller's Office

_____ has been employed as a student as follows:

_____ Last Name First

Department of _____

Social Security Number _____

At the rate of _____ per _____

Number of exemptions _____

(Attach a signed W-4 (withholding tax statement) and loyalty affidavit, if one is not already filed in the Comptroller's Office.)

Payable from:

Fund Name _____ Fund No. _____

Account Name _____ K.S.U. Account No. _____

Project, if any _____ (Two SER forms are required if one student is to be paid from two sources)

Reminder: Students reported to the Comptroller's Office later than the 20th of the month are to be included on the following month's payroll.

EMPLOYEES' WITHHOLDING EXEMPTION CERTIFICATE

- 1. White—Acct. & Reports
- 2. Yellow—Department
- 3. Green—Comptroller, K.S.U.

(Used in lieu of Federal Form W-4)

KANSAS STATE UNIVERSITY
MANHATTAN, KANSAS

- Check one
- Unclassified
 - Classified
 - Student

E _____

Name _____
(Print full name)

Social Security No. _____

Address _____
(Print home address)

(City) (State)

Dept. _____
IMPORTANT—PLEASE COMPLETE

I Claim the Following Exemptions for Federal Withholding Tax Purposes:

Self (if claimed, write figure 1)

Husband or wife (if claimed, write figure 1)

Exemptions for AGE and BLINDNESS:

If you and/or your spouse will be 65 or over during the year, write the number

If you and/or your spouse are blind, write the number

Dependents (write number)

Total

I certify that the number of withholding exemptions claimed above does not exceed the number to which I am entitled.

Date _____

Signature _____

HOURS	GROSS	MTNCE	FICA	W/H TAX	NET
-------	-------	-------	------	---------	-----

51 142 1480 DEMAND, JOHN W IV 095 01 41399404090000 1

SOCIAL SECURITY NUMBER NAME FIRST HRLY RATE EXEMP FUND A A/C DEPT PROJECT MO

Fill in daily hours - converting fractions to tenths. Verify the information for the employee whose name is printed at the top. If you wish to change any information, such as rate, dept., fund or project, please change it with ink. Total hours on space provided.

2.
TOTAL HOURS

Return this card attached to a time sheet to the Comptroller's Office before 5:00 p.m. on the 26th of each month, or by noon of the next working day when the 26th is a Saturday, Sunday, or holiday.

DO NOT BEND, STAPLE OR TEAR THIS CARD.

	DA.	HRS.	DA.	HRS.	DA.	HRS.	DA.	HRS.
0								
1								
2								
3								
4								
5								
6								
7								
8								
9								

KANSAS STATE UNIVERSITY

STUDENT PAYROLL SOURCE

S. S. NO.	EMPLOYEES NAME	RATE	HOURS	EX.	GROSS	MTNCE	FICA	W/H TAX	NET	FUND	A	A/C	DEPT	PROJECT	PR	MO
1 2 3 4 5 6 7 8 9	10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27	28 29 30	31 32 33 34	35 36	37 38 39 40 41 42	43 44 45 46	47 48 49 50	55 56 57 58	59 60 61 62 63	64 65 66 67 68 69	70 71	72 73 74	75 76 77 78	79 80		

KANSAS STATE UNIVERSITY
PAYROLL CHECK SHEET
 (Student Payroll and Branch Stations Only)

Fund Name			Fund No.	Account Name			KSU Account No.	Month				
Names (in alphabetical order)			Classification	Rate	Time	T. C.	Gross Amount	Maint.	FICA	Retirement	Wh/Tax	Net Amount
Last	First	Initial										
			1.	\$			\$	\$	\$	\$	\$	\$
			2.									
			3.									
			4.									
			5.									
			6.									
			7.									
			8.									
			9.									
			10.									
			11.									

I certify that the above amounts were contracted for the University under authority of law, are correct and unpaid, and are due the named employees as salaries or wages for services performed. The "Student Employees" were regularly enrolled in and attending resident daytime courses at Kansas State University primarily for the purpose of pursuing a standard course of study during the month shown above, except during June, July, or August, in which case they were so enrolled during the preceding spring semester or current summer session. F.I.C.A. has been deducted from all "Student Employees" not enrolled during the month shown above. Gross amounts and employer's F.I.C.A. and retirement matching are approved for payment from this account.

Monthly Totals....

\$	\$	\$	\$	\$	\$
----	----	----	----	----	----

Due in Comptroller's Office before 5:00 p.m. on the 26th of each month or by noon of the next working day when the 26th is a Saturday, Sunday, or holiday.

Signed: _____
 Dean, Director, Department Head, or Superintendent

Directions, _____

Charge to _____

Ordered by _____

Issued by _____

Quotation,	Cost	Charge
Material,		
Labor,		
Total,		

Date Ordered _____

To Be Done _____

Completed _____

Req. No. _____

Date	MATERIAL		Price	Amount
	ITEMS			
Total,				

Date	MATERIAL		Price	Amount
	ITEMS			
Total,				

JOB NO.

Department of Industrial Engineering and Industrial Arts
School of Engineering, K.S.C.

SHEET NO.

FORM 31

LABOR

Date	NAME	KIND OF WORK	Machine Used	Hours	RATE		Cost	Charge
					Machine	Man		
Totals,								

Industrial Engineering and Industrial Arts
School of Engineering and Architecture, K.S.C.

ORDER CARD

Charge all time and material
to the number of the job.

Mark date, sign, and return
card not later than day fol-
lowing completion of job.

Order No. Issued to..... Issued by.....

Date..... To be done.....

Directions.....

.....

.....

.....

.....

.....

.....

Completed..... Foreman.....

KANSAS STATE UNIVERSITY

Req. No. 19.....

INTER-DEPARTMENTAL REQUISITION

ToDept.

.....

.....

.....

.....

.....Head of Dept.

Charge toAccount

When wanted Estimated cost, \$.....

Paid 19..... Actual cost, \$.....

7-62

INVOICE
 KANSAS STATE UNIVERSITY
 Manhattan, Kansas

Department of _____

Sold To:

Date _____

Number _____

Date	Quantity	Description	Unit Price	Amount

K. S. U. PURCHASE ORDER—VENDOR'S INVOICE
 KANSAS STATE UNIVERSITY, MANHATTAN, KANSAS

WARRANT No. _____

P. O. I. N° 26252

FUND NAME _____ ACCOUNT NAME _____

1. White—Acct. & Reports Div.
2. Blue—Vendor
3. Green—Comptroller K. S. U.
4. Yellow—Purchasing Division
5. Pink—Remittance
6. White—Department Files

DATE	FUND	F	AGENCY	ACCOUNT	E. A. NUMBER	VOUCHER No.	ACT.	OBJECT	AMOUNT
		3	367						
TERMS		K. S. U. ACCOUNT No.			F. O. B.	CONTRACT No.			

Complete Item A or B as Appropriate

A This is Confirmation of items received.

B This is an order, to be shipped to:

VENDOR'S NAME AND ADDRESS

CONTROLLER'S USE

DATE AND INVOICE NO.	QUANTITY	UNIT	DESCRIPTION OF MATERIAL OR SERVICE	UNIT PRICE	AMOUNT
			Total of This Order.....		\$ _____

USE CONTINUATION SHEET IF MORE SPACE IS NEEDED

1. I certify that unencumbered funds are available to cover this order: Approved:

Department Head or Superintendent

2. Approved for and by authority of the President.

Dean, Director, or Department Head

3. **Vendor's Certificate:** I certify that the materials or services listed hereon have been delivered or performed, that excise tax is excluded and that this original invoice is correct, just and remains unpaid. (Firm name must be identical to that shown as Vendor's name above.)

Firm Name _____ Date _____

By _____ Title _____

4. I certify the materials, supplies or services listed on this invoice have been inspected and received or performed in accordance with agreed specifications as to form, price, quantity and quality.

Date Receiving Employee

5. I certify that the above account is correct, was contracted under authority of law, is in accordance with such contract, is unpaid and is approved for payment.

Date Comptroller, K. S. U.

Notice to Vendor: After all goods are delivered, sign and send to Comptroller's Office, Anderson Hall, Kansas State University, Manhattan, Kansas, for payment. **Cash discounts** will be based on the date of your last invoice, date all goods are received, or the date this claim is received, **WHICHEVER IS LATER.**

KANSAS STATE UNIVERSITY
OFFICIAL RECEIPT

N^o 25402

Manhattan, Kansas, _____ 19____

Received from _____

_____ DOLLARS

in payment for _____

(explain in detail)

CASH \$ _____

CHECK \$ _____

M. O. \$ _____

RECEIPT CODE NO. _____

DUPLICATE

- 1. White—Purchasing Division
- 2. Pink—Comptroller's Office, K. S. U.
- 3. Yellow—Dept's File

PURCHASE DIV.
REFERENCE NO. _____

PURCHASE REQUISITION

STATE OF KANSAS
Department of Administration
Purchasing Division
KSU DA 100 (5-59-12M)

KANSAS STATE UNIVERSITY
MANHATTAN, KANSAS

P. R. N° 8076

FUND NAME _____

ACCOUNT NAME _____

DATE WANTED	DATE	FUND	F	AGENCY	ACCOUNT
			3	367	
GROUP NO.	K. S. U ACCOUNT NO.		F. O. B.		
			KANSAS STATE UNIVERSITY		

I hereby certify that there are sufficient unencumbered funds in the allotment or appropriation from which this request is to be paid; that the items listed are required for the function of this agency. Purchase of the items listed below and/or the encumbrance of necessary funds is requested.

Ordered and approved:

Director, Department Head or Superintendent

Approved for and by authority of the President:

Dean, Director, Business Manager or Comptroller

MAIL INVOICE TO:
COMPTROLLER'S OFFICE
ANDERSON HALL
Kansas State University
Manhattan, Kansas

SHIP TO:
Dept. _____
Building _____
KANSAS STATE UNIVERSITY
MANHATTAN, KANSAS

ITEM NO.	QUANTITY	UNIT	DESCRIPTION OF ARTICLE OR SERVICE	ESTIMATED	
				Unit Price	Amount
Total Estimated Cost				\$	\$
				\$	\$

SUGGESTED VENDORS (BRACKET RECOMMENDED VENDOR)

1.

2.

3.

USE CONTINUATION SHEETS IF MORE SPACE IS NEEDED

FOR USE OF PURCHASING DIVISION ONLY

DATE RECEIVED BY PURCH. DIV.	DATE RECEIVED BY BUYER	DATE RELEASED BY BUYER	DATE ORDERED WRITTEN	Advertised	Posted	Informal	OTHER
PURCHASE ORDER NOS.				APPROVED _____ AUTHORIZED SIGNATURE			

PURCHASE ORDER VOUCHER

Warrant No. _____

DA-101

DATE	FUND	F	AGENCY	ACCOUNT	PURCHASE ORDER VOUCHER	VOUCHER NO.	ACT.	OBJECT	AMOUNT
REQUISITION NO.	DELIVER		TERMS		F. O. B.	CONTRACT NO.			

MAIL INVOICE AND VOUCHER TO

SHIP TO

VENDOR'S NAME AND ADDRESS

LIQUIDATION No.

CONTROLLER'S USE

OBJECT	QUANTITY	UNIT	DESCRIPTION OF MATERIAL OR SERVICE	UNIT PRICE	AMOUNT
			Sheet of		
			Total This Order		\$ _____

USE CONTINUATION SHEET IF MORE SPACE IS NEEDED

1. I certify the material, supplies or services listed on this invoice have been inspected and received or performed in accordance with agreed specifications as to form, price, quantity and quality.

Signature _____

Date _____ Title _____

2. VENDOR'S CERTIFICATION: I certify that the materials or services listed hereon have been delivered or performed, that this original invoice is correct, just and remains unpaid.

FIRM NAME _____ DATE _____

BY _____ TITLE _____

3. Signed _____
 DIRECTOR - PURCHASING DIVISION

4. Approved as to Availability of Funds.

5. Approved _____

6. I certify that the above account is correct, was contracted under authority of law, is in accordance with such contract, is unpaid and is approved for payment.

TITLE _____

Signature _____

Date _____ Title _____

KANSAS STATE UNIVERSITY TRANSFER CHECK

(Used to pay Service Clearing Accounts only)

Date _____

Nº 3208

Transfer to the _____ Service Clearing Account \$ _____

Charge: Fund Name _____ Fund No. _____

K.S.U. Account Name _____ Account No. _____

NOTE—List each item with its respective object code and amount in this space, continuing on back of check if necessary.

(Signed) _____

Head of Department

(3-61-10M)

DESCRIPTION	OBJECT CODE	AMOUNT
		\$

CODE SUMMARY	
OBJECT CODE	CODE AMOUNT
	\$
Total	\$

Kansas State University

Manhattan, Kansas

Department of Industrial Engineering
Engineering Shops Building

July 6, 1962

DoAll Mountain States Company
2029 Holmes Street
Kansas City 8, Missouri

Gentlemen:

Please consider this letter an order and ship the following for our engineering laboratories:

100 ft. only 1/2" wide 12 pitch raker tooth metal cutting band
saw blade

In order to avoid a delay in delivery, please address package to:

George F. Schrader, Professor and Head
Industrial Engineering Department
Kansas State University
Manhattan, Kansas

Our purchasing regulations do not permit a letter order for over \$25.00 and if our cost of the above item, including packaging, transportation and/or insurance is over this amount, please advise us before shipment is made.

Submit an invoice promptly so that the issuance of a voucher authorizing payment will not be delayed. Any educational discount you care to extend will be appreciated.

Very truly yours,

George F. Schrader, Professor and Head
Department of Industrial Engineering

JJS:ds



100 YEARS OF SERVICE TO KANSAS, THE NATION AND THE WORLD

KANSAS STATE UNIVERSITY
MANHATTAN, KANSAS

REQUEST FOR OUT OF STATE TRAVEL

Request Number _____
Date _____
To be completed by President's Office

State Board of Regents
Topeka, Kansas

Gentlemen:

Permission is hereby requested for the official travel of _____ (Title)

(Name)

(Department)

to _____

for the purpose of **(provide detail)***

Dates of meeting, conference, project, or other (explain) _____

Maximum cost (include hotel, meals, travel fare, etc.) and limitations. _____

Travel requested from _____ (Date) to _____ (Date)

List all others from the University who will attend this meeting _____

Fund Name _____

Fund No. _____

Account Name _____

If a convention or organization meeting, is the **State Agency** a member of the organization? _____

If a professional meeting, is the person attending a dues-paying member? _____

Approval of this request has been given by the State Board of Regents.

Business Manager

Respectfully yours,

Department Head (Date)

Director or Second Dean, if any (Date)

Academic Dean (Date)

Dean of Academic Administration (Date)

Business Manager (Date)

(Submit original and three copies to the President's Office. Additional hold copies may be made as required by Deans and Department Heads)

* Additional information on back if needed

TRAVEL VOUCHER—GENERAL EXPENSE

No 6255

Fund Name _____ Account Name _____

DATE	FUND	F	AGENCY	ACCOUNT	E. A. NO.	VOUCHER NO.
		3	367			

K.S.U. ACCOUNT NO. →

ACT.	OBJECT	AMOUNT

Pay to _____ (Name) _____ (Position)

_____ (Official Headquarters) _____ (Legal Residence)

For the Period _____ through _____ Travel Request No. _____

Purpose of Travel: _____

CONTROLLER'S USE

Date	Time Lv. Station or Town	Time Ar. Station or Town	Town	Meals			Hotel		Total Subs. Exp.	Misc. Non-subs. Exp.		Total by Days
				Brkf.	Lun.	Din.	Name	Amt.		Explanation	Amt.	

Totals
 Approved: Amount Due per Private Car Mileage Voucher Attached—Code No. 251
 Amount Due per State-owned Car Expense Voucher Attached—Code No. 253
 Correct: Grand Total

1. Authorized and Approved:

 Director, Department Head or Superintendent

2. Approved for and by authority of the President:

 Dean, Director or Department Head

5. I do hereby certify that the travel and expense within was duly ordered, on official state business, under authority of law, and the amount therein claimed is correct and is unpaid.

 Date Comptroller, K.S.U.

3. Claimant's Certificate:
 I certify that the above claim is just, correct, and remains unpaid, and that the amount claimed therein is actually due according to law.

 Payee

TRAVEL VOUCHER—PRIVATELY OWNED CAR

State of Kansas
Department of Administration
Accounts and Reports Division
7-1-53
DA-123

Make of Car _____ Voucher No. _____ Body Type _____ Motor No. _____ License No. _____

Total number of miles charged to state during current fiscal year to and including this voucher: _____ miles

OTHER PASSENGERS

List below the date of trips and the names of all state employees accompanying driver on any trips charged on this voucher.

Date	NAMES OF OTHER PASSENGERS (STATE EMPLOYEES)		

INSTRUCTIONS

.Please submit all information called for on both sides of this voucher.
Failure to do so may delay payment.

Triplicate Reports. Original copy to be attached to owner’s expense voucher. Duplicate copy for agency files. Triplicate copy for owner.

Location of Travel. Account for mileage in detail, make separate entry in “From” and “To” columns for each town in which official stop is made.

Nature of Official Business and the name of at least one person or firm contacted must be given for each town in which official stop is made.

NAME _____
Last First Initial

Nº 3581

**KANSAS STATE COLLEGE
Key Deposit Card**

**Comptroller's
Card**

The above employee of the _____
Department has official authorization and has made a deposit for a college key as follows:

KEY TO: _____
(Building) (Room No., Outside door, other)

REFUNDED OR
COLLECTED

AUTHORIZATION FILED
DEPOSIT PAID

Deposit of . \$ _____

NAME _____
Last First Initial

Nº 3581

**KANSAS STATE COLLEGE
Key Deposit Card**

Key No. _____
**Custodian's
Authorization**

The above employee of the _____
Department has official authorization and has made a deposit for a college key as follows:

KEY TO: _____
(Building) (Room No., Outside door, other)

REFUNDED OR
COLLECTED

AUTHORIZATION FILED
DEPOSIT PAID

Deposit of . \$ _____

Refund of . _____ *

Due K.S.C. . _____ *

* Authorized _____ 19 _____

For Superintendent
of Physical Plant

NAME _____
Last First Initial

Nº 3581

**KANSAS STATE COLLEGE
Key Deposit Card**

**Depositor's
Copy**

The above employee of the _____
Department has official authorization and has made a deposit for a college key as follows:

KEY TO: _____
(Building) (Room No., Outside door, other)

Amount of Deposit \$ _____

AUTHORIZATION FILED
DEPOSIT PAID

NOTE: The Key obtained on this deposit is for the **personal** use of the holder only; it is not to be loaned to another, nor transferred to anyone. This deposit will be refunded only to the original depositor, on return of the key to the College custodian. Acceptance of the key creates an obligation to return it as soon as the need of it ceases and to protect its use. It is college property. See rules regarding use of college keys on reverse side.

Name _____

Employed in _____ Department

Needs key giving admission to _____
(Building) (Room No., Outside door, etc.)

For the following reasons: _____

I have read and understand the Rules concerning the use of college keys printed below.

_____ Date _____, 19____
(Individual requesting key)

Approved: 1. _____ 2. _____
(Head of Department) (Dean)

3. _____
For the President (Required for Building Master Keys **Only**)

All Signatures **MUST BE** Autographed by individual signing.

INSTRUCTIONS TO EMPLOYEE

Complete the above Key Permit and all three sections on the other side. Obtain the necessary approvals on the Key Permit. Present all three sections to the College cashier to make key deposit after which this middle section may be presented to the custodian to obtain the key.

**KANSAS STATE COLLEGE
MANHATTAN, KANSAS**

Rules Concerning Use of College Keys

A key is issued for the personal use of the holder only. It may not be transferred to another person under any circumstances, nor loaned to another. It may not be used to admit anyone not the holder of a similar key, except as noted below. **Duplication of any key is forbidden.**

Anyone entering or leaving a locked building must close and lock the door immediately after entering and immediately after leaving.

Opening windows in locked buildings should be avoided. If opening a window to prevent serious discomfort is necessary, the window must be closed and fastened on leaving.

In emergencies the holder of a key may accommodate another by going with him into a building, remaining with him while there, and taking him out on leaving.

One having an authorized key may admit with him one or more persons who will be working under his direction, but must take them out with him on leaving.

A key issued to the head of an office for the use of two or more occupants should be carried outside the office only temporarily, not longer than part of a day as a rule.

Department heads should determine that resigning employees (including faculty members) have returned all College keys before delivering final pay checks. Keys should be returned to the Physical Plant Department. Deposits for keys which have been returned will be refunded at the Cashier's Office upon presentation of fee card signed by the College custodian indicating that all keys have been returned.

Campus
Mail

Kansas State University
The Library
Manhattan, Kansas

Call Number

(Use carbon insert)

Author (last name first)

If you wish to be notified when book is
available, put name and department on
verso of 2nd card.

Rush

Title (followed by series note)

Date order rec'd

Date ordered

Place

Publisher

Date of pub.

Dealer

Edition

No. of vols.

No. of copies

List price

Estimate

Date rec'd

Secondhand dealer

Cat. no.

Item no.

Fund

Requested by:

L. C. card no.

Authorized by:

Call Number

Author (last name first)

Check if you wish book held for you.

Rush

Title (followed by series note)

Gen. Cat.

Orders Out

Rec'd File

BPR	Ref. Cat.
CBI	DB
LC	DBWV
PTLA/BIP	DBZ
PW	HJV
BM	JV
BNB	BIBLIO
Pub. Circ.	BN
Eng. Cat.	

Fund

Requested by:

L. C. card no.

Authorized by:

APPENDIX C

ABBREVIATIONS USED IN GRAPHS

SER	Student Employment Report
EWEC	Employee Withholding Exemption Certificate
PCS	Payroll Check Sheet
SOTAB	Statement of Transactions and Balances
JOC	Job Order Card
LDR	Inter-Departmental Requisition
POI	Purchase Order Invoice
POV	Purchase Order Voucher
OOS-TR	Out-of-State Travel Request
OOS-TRN	Out-of-State Travel Request with request number on it
GE-TV	General Expense Travel Voucher
PC-TV	Private Car Travel Voucher
SOC-TV	State Owned Car travel voucher

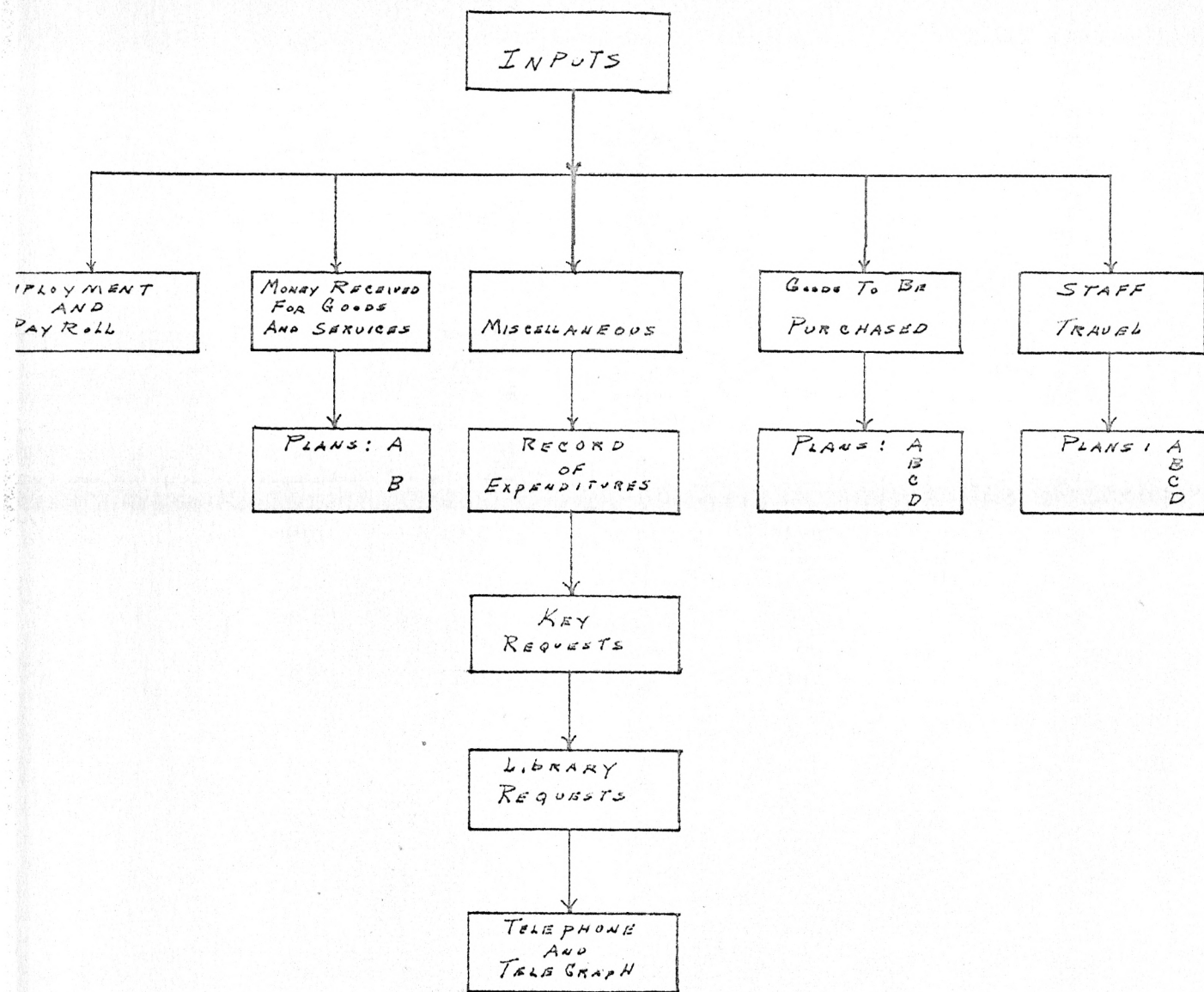


Fig. 27. Master Flow Diagram.

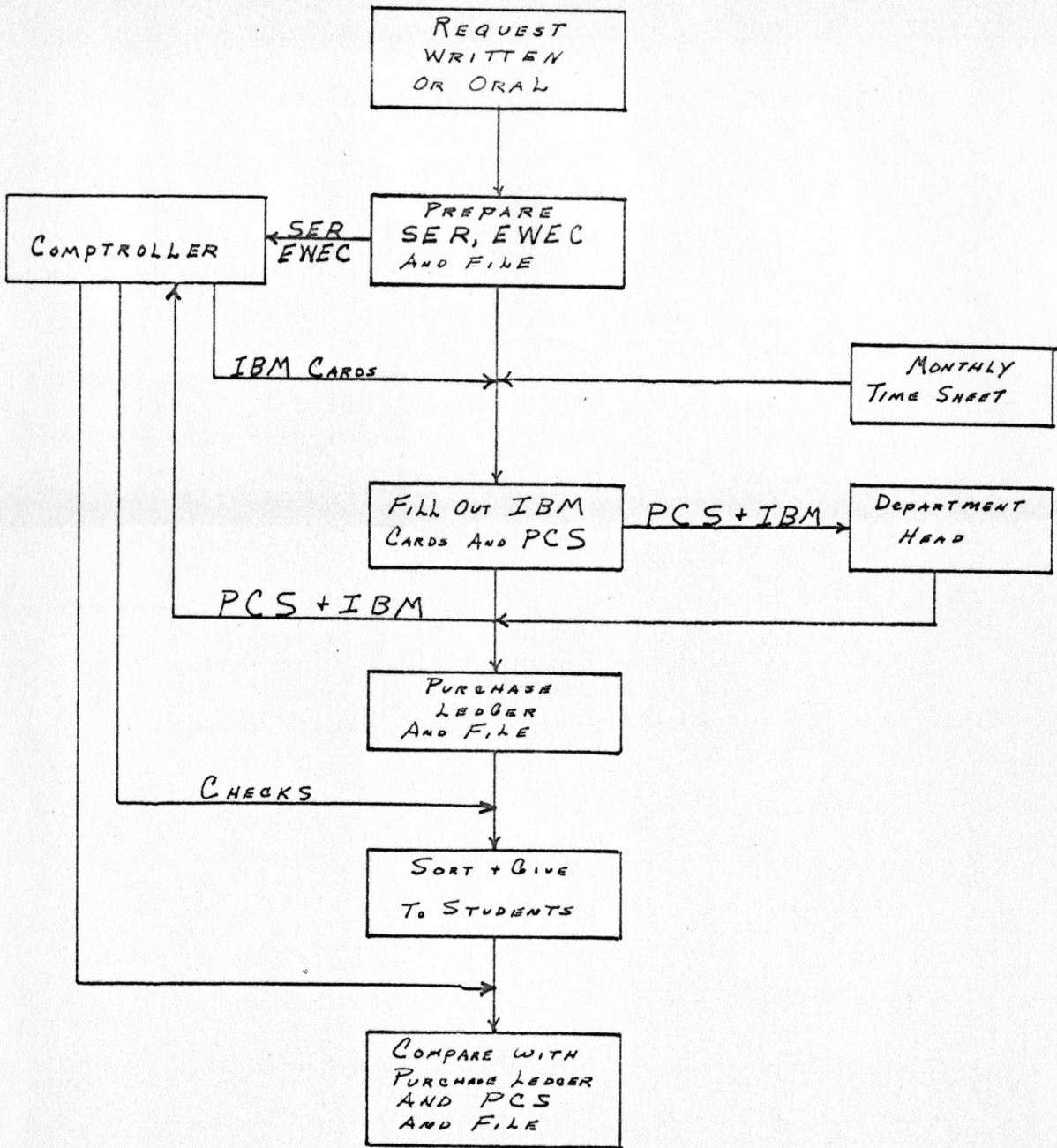


Fig. 28. Employment and Payroll.

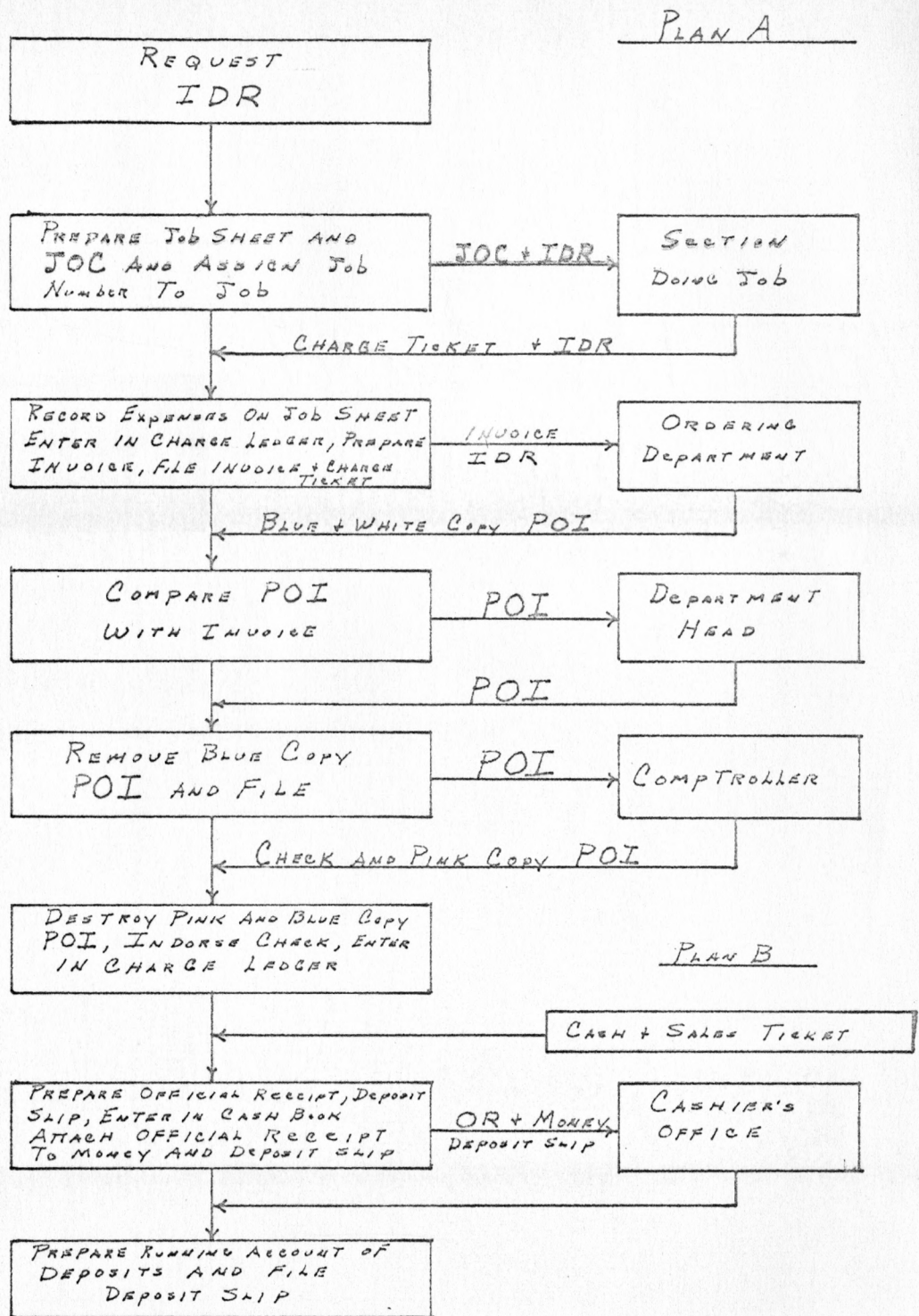


Fig. 29. Money received for goods and services, Plan A and B.

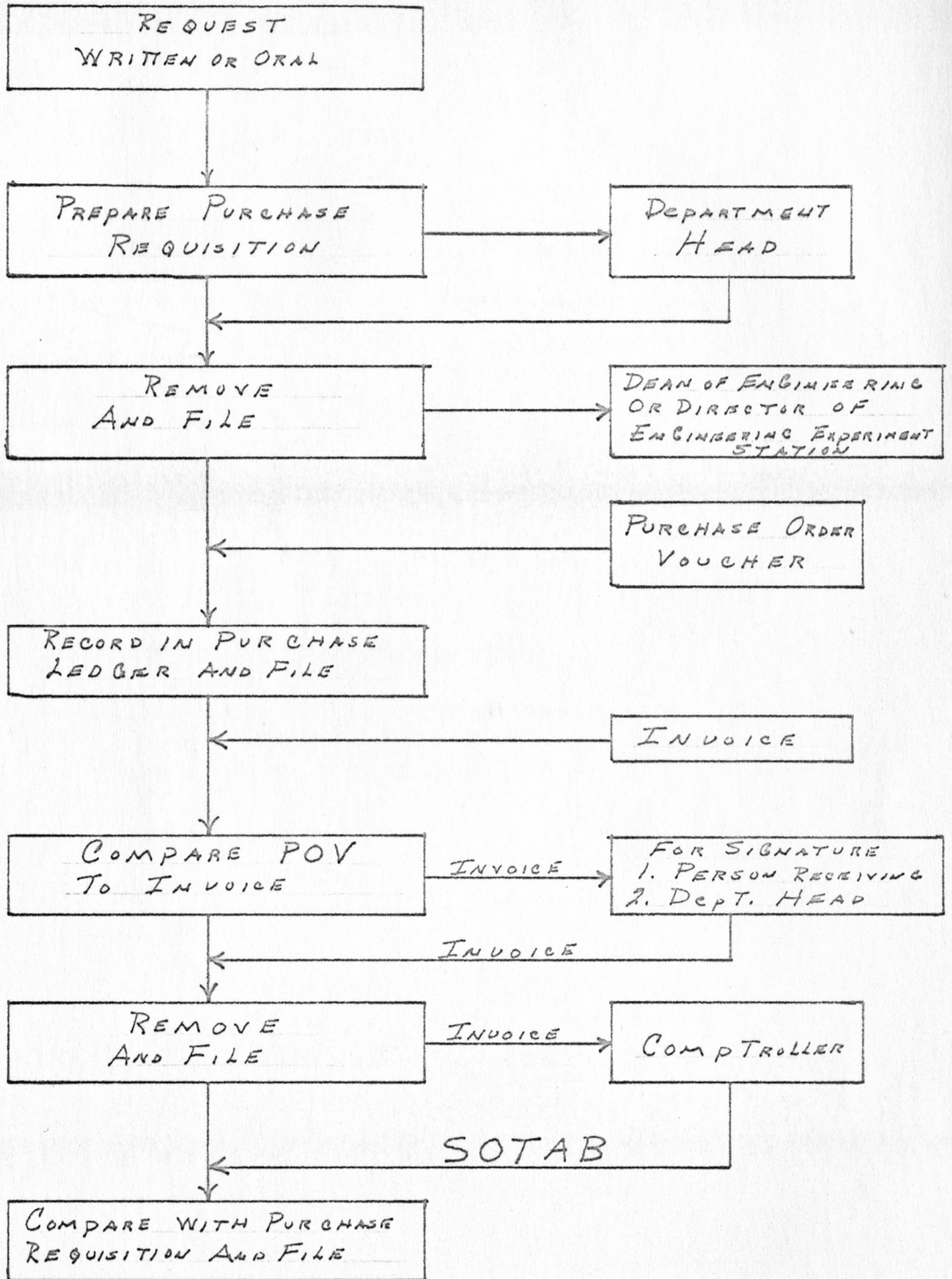


Fig. 30. Goods to be purchased, Plan A.

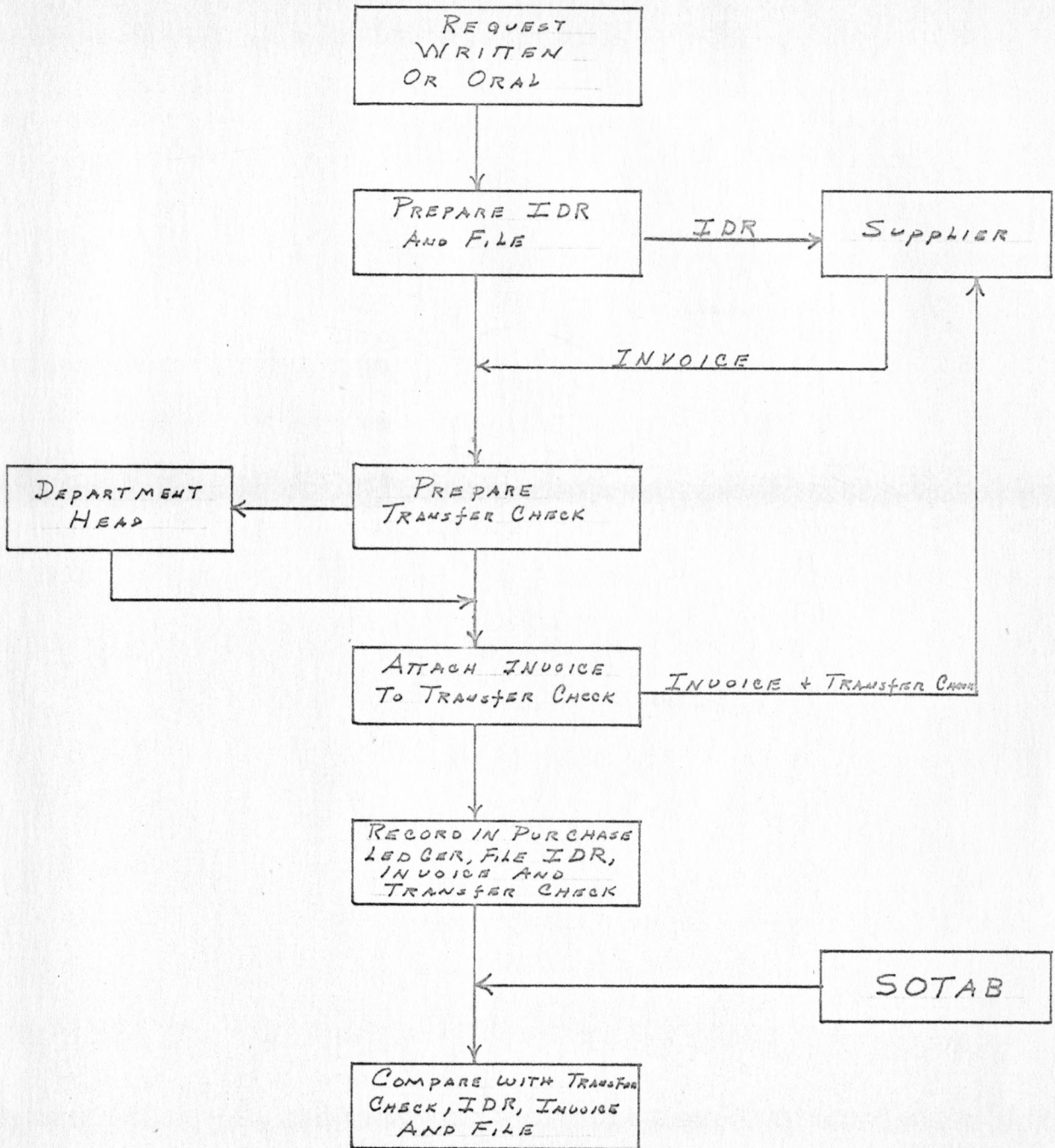


Fig. 31. Goods to be purchased, Plan B.

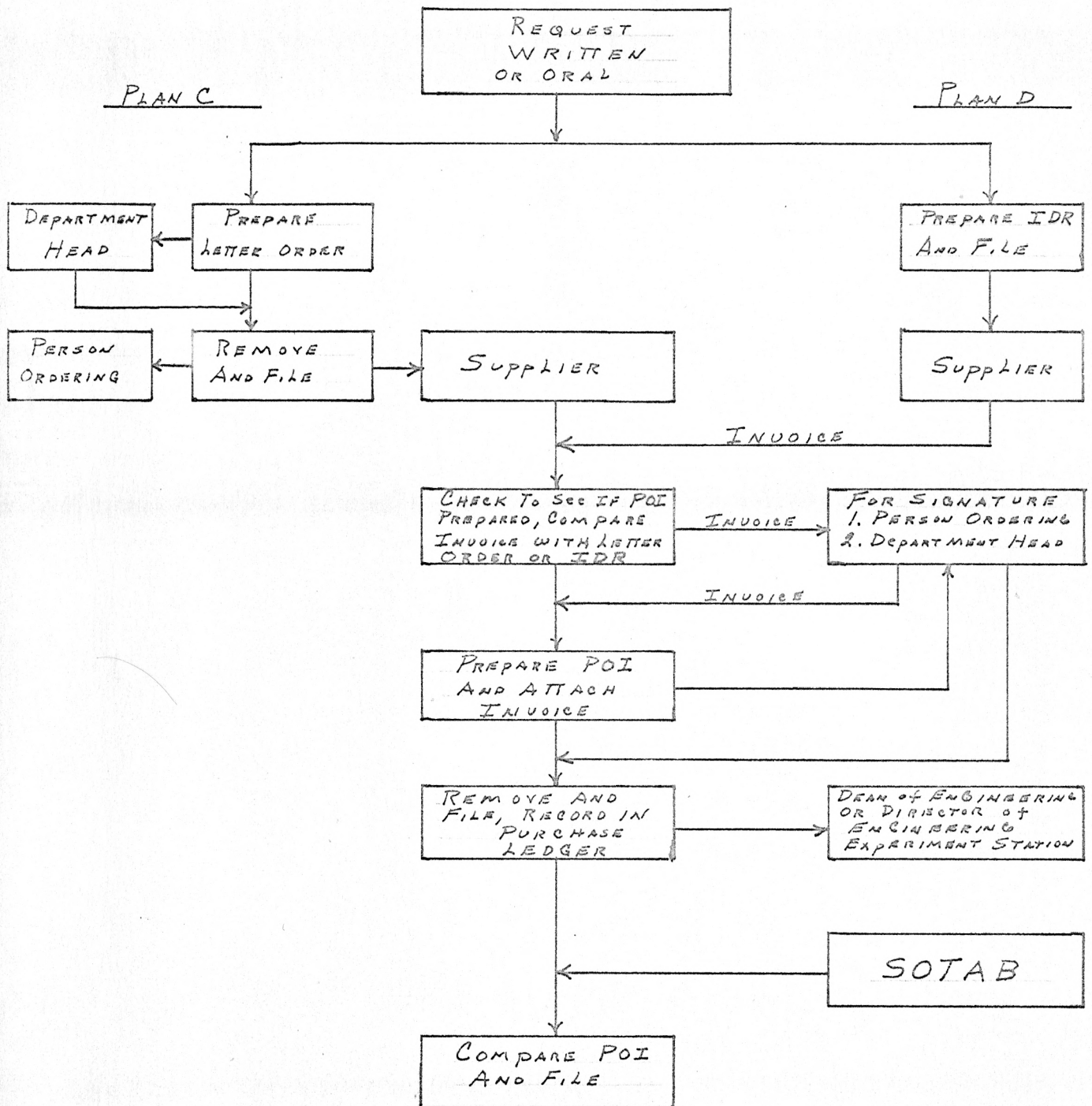


Fig. 32. Goods to be purchased, Plan C and D.

PLAN A + B

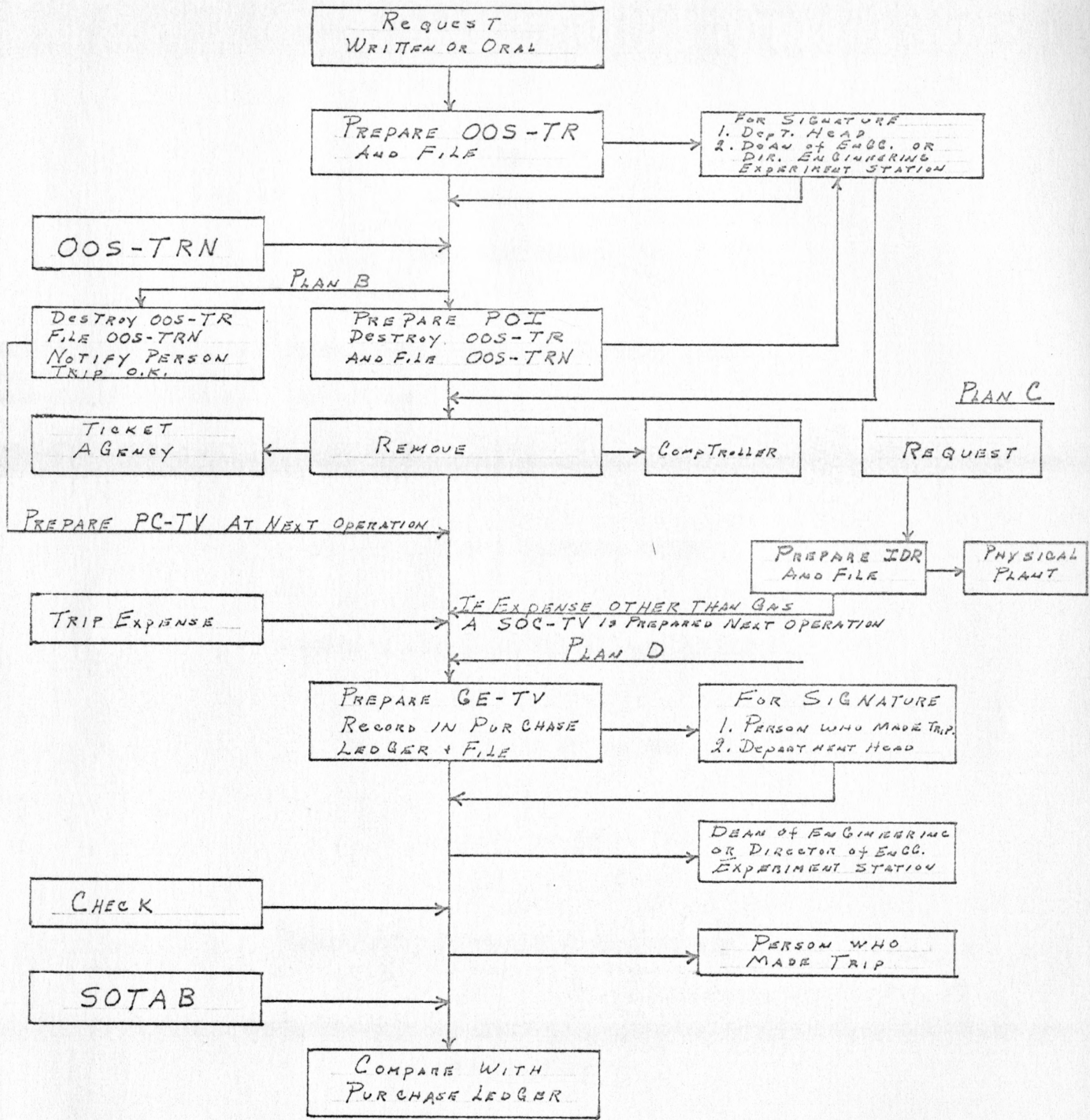


Fig. 33. Staff Travel, Plans A, B, C and D.

SYSTEMS ANALYSIS OF THE SYSTEM EMPLOYED TO IMPLEMENT
AND CONTROL THE FINANCIAL OPERATIONS OF THE
INDUSTRIAL ENGINEERING DEPARTMENT

by

GARY NEAL CROMER

B. S., Kansas State University, 1962

AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Industrial Engineering

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1963

The purpose of this report is to study the present system used to implement and control the financial operations of the Industrial Engineering Department, with the objective of improving the system's ability to perform its intended function more economically. In developing a system that is more economical, the author will employ a work simplification approach.

Through work simplification all unnecessary steps, waste in time, energy, and material can be eliminated, thus getting the most production with the least amount of effort and confusion.

The operations performed by the bookkeeper of the Industrial Engineering Department will form the boundaries for this study. A boundary in the system's sense restricts the scope of a problem in a size commensurate with the cost or time available for solution and the amount of detail necessary to understand the process.

The approach that will be taken in this report will consist of two parts.

First, the author will study the present system with respect to the inputs to the system, services performed by the system, outputs of the system and feedbacks within the system. Then, flow diagrams for the system will be developed.

Second, the author will analyze the system with respect to the inputs, services performed, outputs and feedbacks. The elements of the system will be analyzed from the standpoint, are the operations necessary, why are they done this way, can they be combined and can they be simplified? Then the author will recommend changes in the present system that will make the system more economical and more efficient.

The author upon completion of this study, has found the study beneficial, in that it can serve the Industrial Engineering Department in the following ways:

One, with the changes proposed by the author, a saving of several dollars in material and labor will be realized. Two, it can serve as a system description to the department head. Three, it can be used as a guide to the person responsible for performing the operations involved in the system. Four, in case of turnover within the system of the operative personnel, this report will allow a smoother transition and less delay in getting the system back into operation.

The area in this system that would have shown the greatest improvement, had it not been for the rules of the university, was the area of forms. Most of the forms used by this system are in use by the entire university. These forms in many cases require more information than is necessary for the operation of this system. Also the bookkeeper is required in many cases to prepare more copies of the forms than are necessary for the operation of this system.