M.I.T. FACULTY CLUB INFORMATION SYSTEM

by

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M.I.T. FACULTY CLUB

INFORMATION SYSTEM

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ABSTRACT

The existing information system at the M.I.T. Faculty Club has many problems which cause many difficulties to the Club Management and make it very costly to operate from the Institute's perspective. The current system has to be examined carefully before problems can be located and solutions can be found. Thus the purpose of this thesis is to identify the problems in the existing management information system of the Faculty Club and to study the feasibility and efficiency of various alternatives which may improve the financial and managerial operations of the Club, should they be implemented.

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CHAPTER I

INTRODUCTION

The information generated by the Faculty Club comes from sources such as:

1. invoices

2. guest checks

3. time cards

4. cash register tapes

5. payroll & budget printouts

6. anectodal

The current system presents many difficulties. Often, the information needed is simply not available (for example breakdown of revenues according to membership status). In cases where availability is not the question, the cost of searching is quite difficult to justify (i.e., going back to every guest check.) The information handling process is rather slow; partly because the process has to go through various stages, each handled by a different office of the Institute and partly because the current system is not flexible. A desirable solution should simplify the handling process, decrease costs and increase availability of information to Club Management.

The problems mentioned above have always existed at the Faculty Club. The reasons were not questioned systemmatically, mostly due to outside managers' lack of time. However, the situation has changed. The Faculty Club now requires nearly $500,000 annually from Institute funds. This constitutes a significant part of the Institute's deficit. The contribution from the Faculty Club operations to the

deficit needs to be reduced, since the size of the deficit raises questions about the Institute's long-term viability. The M.I.T. Planning Office and the Housing and Food Services Department have been working on a large-scale project to improve the operations of the Faculty Club and this thesis is a part of it; covering the issues concerning the Information Systems of the Club.

The work for this thesis is carried out in three steps. In Chapter II, the current system is documented on flow charts and evaluated by pointing out the weaknesses. Chapter III covers alternatives that can be adapted to solve the problems. Chapter V provides the reader with recommendations that can be implemented, considering short-term and long-term goals.

CHAPTER II

THE CURRENT SYSTEM

In this Chapter, the current system is documented and evaluated in five sections. Flowcharts are provided where possible. The cost of the system is estimated in many sections, either in terms of dollars or man hours, but there are some indirect costs which cannot be estimated quantitatively. The problems are explained in detail in each section and they will be summarized in the fourth chapter.

2.1 ACCOUNTS RECEIVABLE

Accounts receivable is the most important operation of the Faculty Club since problems encountered in this operation present more complexity than that of the other operations, while they have immediate effects on the service provided to the more than 2,400 active members of the Club.

One can get familiar with the Accounts Receivable System by following what happens after a customer fills out a guest check at the Club on day 1 to place his/her order. As summarized in Figure 1, this check gets collected either by the head waitress, or the cashier or the bartender by the end of day 1. (Please see figure 2 for the details) On day 2, they are turned in to the Faculty Club Accounting Office. There, they are grouped into the categories as shown in figure 3 and then processed before they get picked up to be delivered to the Accounts Receivable Office in Building E-19. The information on the guest checks are

keypunched on day 3, and entered into the central computer system to be stored on magnetic disks and returned to the Faculty Club Accounting Office to be kept in files for future reference on day 4. (Please see figures 4 and 5 for the details of the information kept) These steps are repeated throughout the year. In the meantime, weekly and monthly reports based on the accumulated data are generated at the Accounts Receivable Office and sent to the Faculty Club. The 15th of the month (this may vary upon different circumstances) is designated as the cutoff date for billing and monthly statements are prepared showing the transactions occurring from the 16th of the previous month to the 15th of the present. Approximately 2,400 members are billed monthly and the preparation of these statements usually takes about two days. If I denote the cut-off-date by c.o.d., then the statements are ready on c.o.d.+2. On c.o.d.+3, they are sent back to the Faculty Club Accounting Office where the statements are verified by the staff to find out the unusual and easy-to-catch errors; such as a transaction of a few hundred dollars for a party of two. Also some manual corrections are made at this stage upon receiving complaints; such as wrong charges. I will touch on this problem when I state the other problems of the current system. The statements then are taken to Graphic Arts, where they are put into envelopes and sent out to the customers. Members who give an Institute address receive their statements through interdepartmental mail. So, the statements are out in the mail on day c.o.d.+5; if we allow 2 days for the mailing process, on day c.o.d.+7, customers receive their statements. The cycle is completed by the customers sending their payments at the Cashier's Office.

As it can be seen from the explanation above and from the figures; the problem is one of decentralization. The Faculty Club depends on the services of

three other offices; The Accounts Receivable Office (E-19), Graphic Arts (N42), and the Cashier's Office (Building 10). All of these offices operate independently; being one of the many users, the Faculty Club is not in a position to control these services directly. Considerable time is lost for deliveries, since the offices are in different locations, spread out on the campus. The limited resources and the excess demand for the services provided by these offices create further delays, which get magnified by the time the cycle is completed. The time table given in the paragraph above is an ideal one, normally it takes about 12 days before the customers receive their monthly statements. So there is a 42 day gap until a customer gets billed for a transaction that occurs immediately following on the cut-off day. This very long delay constitutes one of the biggest problems of the Accounts Receivable system. It's a known fact that customers pay their bills much faster if they get billed more promptly. The monetary value of this delay can be shown by calculating the interest lost if the amount mentioned here were to be invested. The reduction of this delay will have a positive impact on the Institute's cash-flow.

Despite the fact that the billing process takes so long, it is not the biggest problem that Faculty Club Staff has to deal with. Account numbers which are not entered correctly on the guest checks cause the most time-consuming and costly problems. If the incorrectly entered account number happens to be the account number of another member, this other member who was not involved in the transaction gets charged. Such errors are discovered if the later customer realizes that he has been charged by mistake. Corrections of these errors are attempted by the F.C.A.O. staff after they become aware of the situation following telephone conversations with the complaining customers. If the incorrectly entered account

number does not belong to anyone, it is rejected from the system during the keypunching process over at the Accounts Receivable Office. In this case, such errors are reported to the F.C.A.O. in periods of 5 days. The corrections, if possible, are done manually by the F.C.A.O. staff. First, the guest checks of the day of the transaction in question are pulled out from the files. Then the signature on the guest check is checked. If the signature is legible, then the customer's account number can be found. Unfortunately, the signatures on the guest checks are not of use in most cases, they are scribbled and not legible. In this event, the staff will try to interpret the account number in as many ways as possible until one of their guesses hit the right account and the customer. Time spent for these corrections cost a lot in terms of staff-time, each correction takes about 20 to 30 minutes. If no account number is found, the transaction is written-off as a bad debt. Bad debts amount up to $4,000 annually. There is another source of error that should be mentioned here; some account numbers are entered incorrectly during the keypunching process but these occur less frequently. From February 16, 1983 to March 16, 1983 there were 9 cases belonging to this category, whereas there were 101 cases of the kind of errors caused by incorrectly entered account numbers by the customers. (This total of 110 errors were corrected, there is no data available on the number of cases which were written off as bad debts) According to the FY1982 figures, an average charge is about $3.50. If no corrections were made and all incorrect charges were lumped into bad debts, the money lost would be:

($3.50) x (110) x (12) = $4,620 annually.

Considering the annual bad debts, the monetary value of the total loss would be roughly:

$4,620 + $4,000 = $8,620 annually.

Even if this figure may not be considered very high, every effort should be made to keep the bad debts at a minimum for good business practices provided that the cost of making corrections can be justified. Currently, one member of the staff works on making the corrections only. The average cost of this, assuming 25% for benefits is:

$$\$10,000 + (\$10,000) \times (0.25) = \$12,500 \text{ annually.}$$

Adding $4,000 for bad debts, this figure goes up to:

$$\$12,500 + \$4,000 = \$16,500 \text{ annually.}$$

In other words, it is costing the Faculty Club twice as much to make corrections, if the cost of making corrections is compared to the cost of not attempting any corrections. As explained before, such errors in customer's accounts must be corrected. A solution, proposed and still strongly supported by the Faculty Club staff, was to issue credit-type I.D. cards to members, which would eliminate the problems. This proposal was rejected by the Advisory Board for various reasons, among them being: limiting access to those members who may not have their cards on certain occasions and ruining the "clubby" atmosphere. There are other alternatives, even though the Faculty Club Staff argue that the credit-card system is the best and the only solution. One issue, which is clear, is that the account number verification has to be done in real-time and it should involve minimum waitress time in order not to slow down the services. Such an alternative will be considered in the Recommendations Section.

Another inconvenience due to these errors, other than cost, is the delay associated with correcting them. The Accounts Receivable Office reports the errors in periods of 5 days. The corrections at the Faculty Club Accounting Office are made on the 6th day. Another day is needed to make the required changes in

the A/R office recording, resulting in a total of 7 days. The transaction then has to wait at least for another 42 days before it gets shown on a statement in some cases.

A similar problem occurs at another stage of the Accounts Receivable Cycle; errors at the Cashier's Office. Some customers do not include the upper portion of the monthly statement which bears the account number of the customer when they send in their payments, thus causing delays in the crediting process. Oftentimes, the staff at the Cashier's Office use wrong account numbers when they record the payments, thus some customers never get credited for payments they've made a long time ago. It is the decentralization of the system that causes the problems and makes it long and costly to make the corrections because all the errors have to be reported to the F.C.A.O. before they can be corrected.

At this point I will estimate the cost of the Accounts Receivable System, so that it can be used to compare with the alternatives to be proposed. In the current system, 2 staff members work on the Accounts Receivable System. One of them spends her full-time on correcting errors whereas the other person spends about half of her time on the Accounts Receivable operations. Over-time paid to these employees is not accounted for here, but employee benefits are calculated at 25%, which are going to be higher for the coming fiscal year. The cost of computer time and keypunching process could not be estimated since the Accounts Receivable Office does not keep such a breakdown of the cost of its services. The cost of the Graphic Arts services is about $600 monthly, which includes the cost of stamps, stuffing envelopes, and the stationery and envelopes used. Seventy percent of the monthly statements sent out are distributed through interdepartmental mail. So:

Salaries & benefits paid	$	21,875
Graphic Arts Services		7,200
Bad debts		4,000
Total annual cost	$	33,075

The last problem to be mentioned here is about the cash registers used at the Faculty Club. This problem has nothing to do with the cash-flow from the bar, what is to be said here does not hold true for the bar operations. The cash register used by the cashier is a very old one. It is of the type where metal plates with numbers on them pop up to display the amount registered. The maximum amount that can be displayed is $4.99 and it does not present a major problem because this cash register is used only for tobacco or candy sales. Such sales are always in small amounts but if they are above the limit, they are registered by ringing up more than once. On the other hand, when a cash payment is made for lunch or dinner, it is simply deposited in a box and the guest check for this transaction is stamped showing that it is paid in cash. As can be seen, the system is flexible for abusive practices. The manager has utmost confidence in the honesty of his employees who deal with the cash in the present, but he also expresses his concern in case of newly hired personnel following retirements or temporary fill-in's. Also, the cash registers available in the market can be used to provide very useful information for the managers; such as the number of portions of a certain item in the menu, or the amount of business within a given time period, etc. (Registers currently in use both at the cashier and in the bar are inadequate for meeting this need)
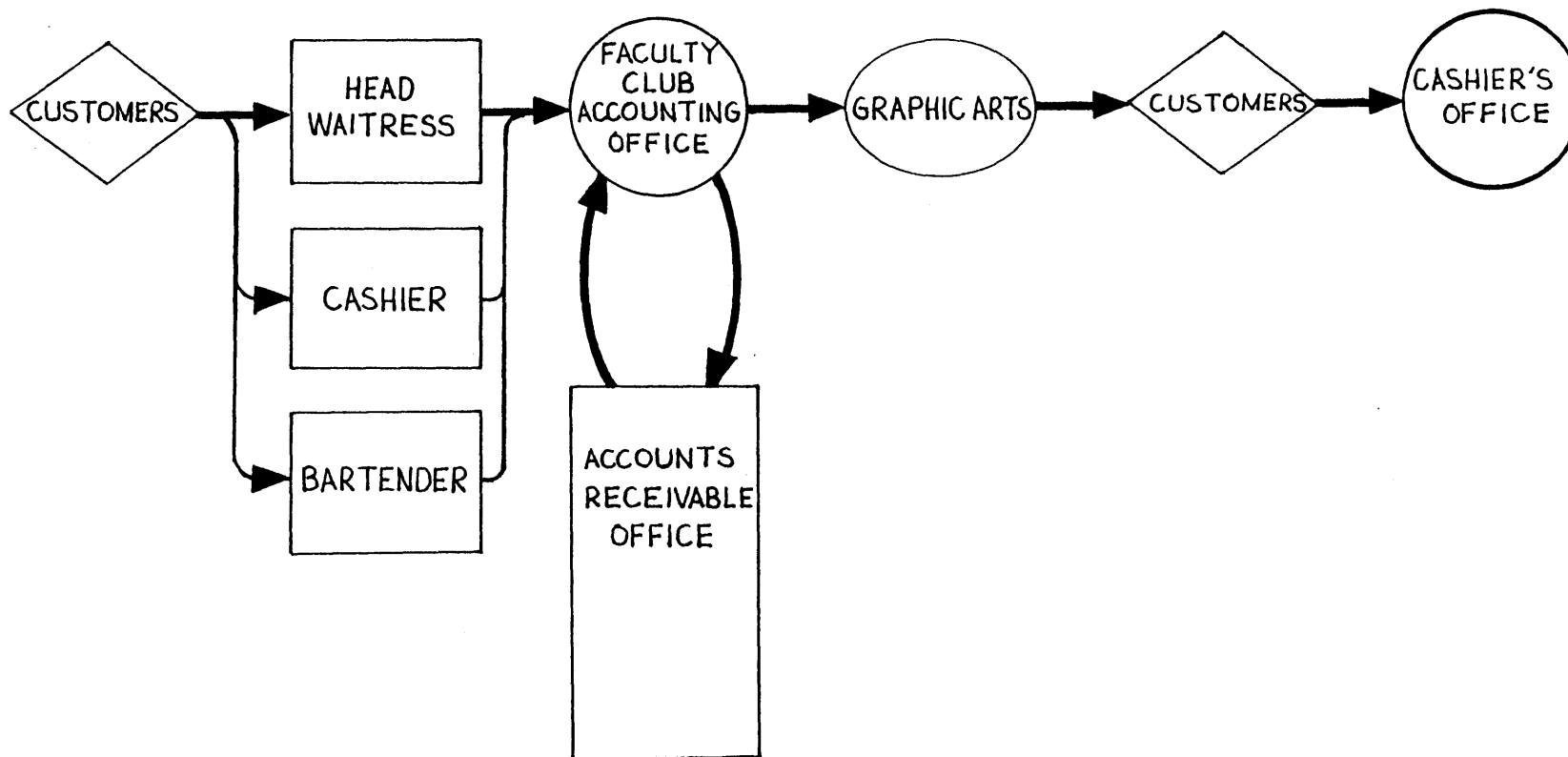
ACCOUNTS RECEIVABLE

Figure 1

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              ┌───────────────────────┐
              │      CUSTOMERS        │
              │  fill out guest checks│
              └───────────────────────┘
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CUSTOMERS fill out guest checks

THE BAR

The bartender keeps the cash from the cash business, as well as the guest-checks for cash or charge beverages only. Lunch & dinner business not separated if there is not enough time.

The cash is taken to be deposited at the Cashier's the following day

LUNCH Guest Checks

Cash checks go to the Cashier.

HEAD WAITRESS collects the charge checks, groups them into 2: Regular & Party

DINNER Guest Checks

All guest checks (charge & cash) go to the Cashier. They are grouped into 2: Cash & Charge, which in turn are divided into subgroups for easy processing.

The cashier returns the cash for the bar, calculating the total from the guest-checks which have both food & liquor

Guest-checks turned in at the Faculty Club Accounting Office the following day

Figure 2

A/R DATA

FROM GUEST CHECKS

TOBACCO

CIGARS
- Cash
- Charge

CIGARETTES
- Cash
- Charge

MISCELLANEOUS
(Candy, lifesavers)

CASH

LUNCH
- Regular
  - Food & Bev.
  - Food only
  - Bev. only
- Party
  - Food & Bev.
  - Food only
  - Bev. only

DINNER
- Regular
  - Food & Bev.
  - Food only
  - Bev. only
- Party
  - Food & Bev.
  - Food only
  - Bev. only

CHARGE

LUNCH
- Regular
  - Food & Bev.
  - Food only
  - Bev. only
- Party
  - Food & Bev.
  - Food only
  - Bev. only

DINNER
- Regular
  - Food & Bev.
  - Food only
  - Bev. only
- Party
  - Food & Bev.
  - Food only
  - Bev. only

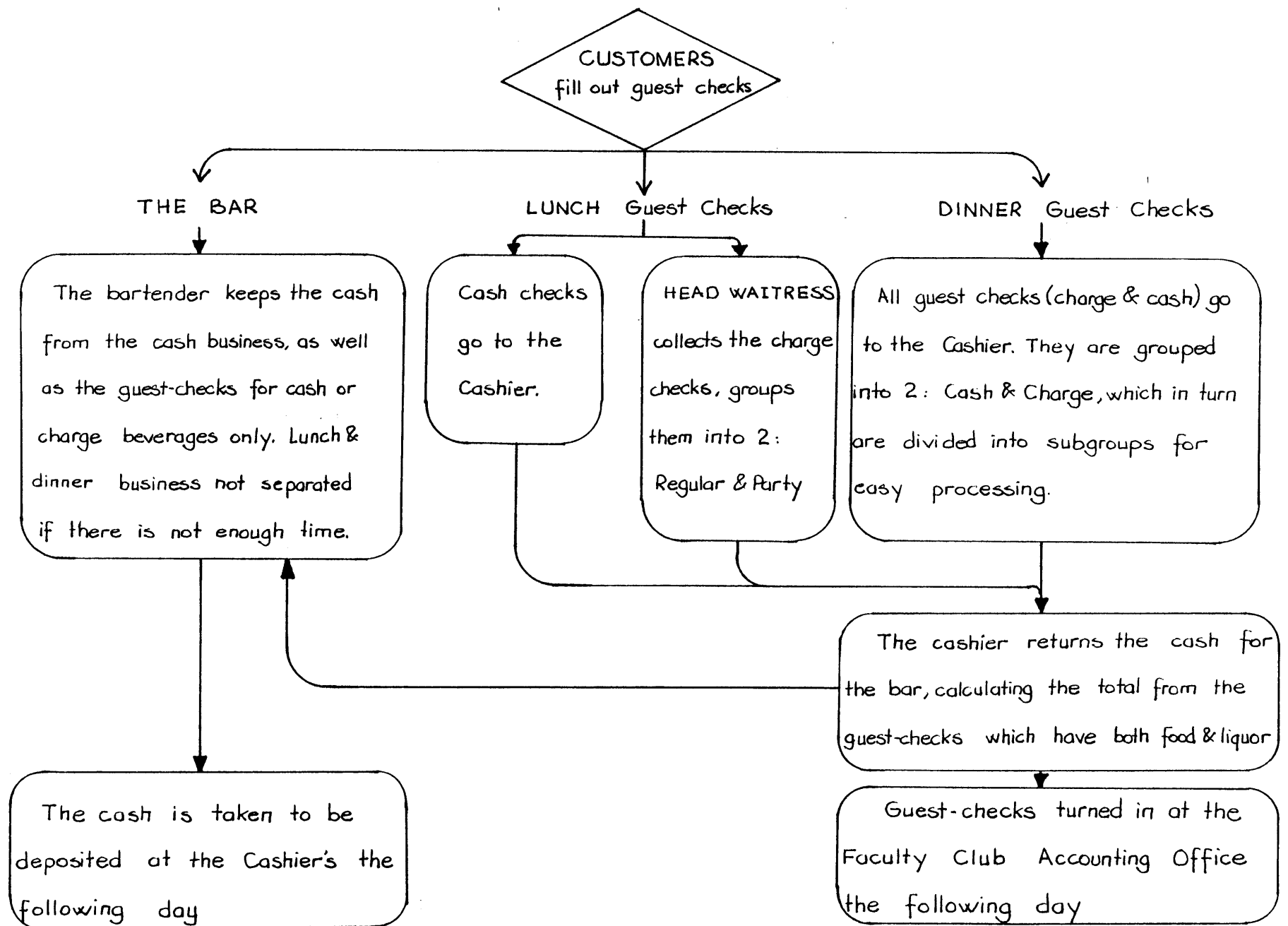To Accounts Receivable to be keypunched. Checks later returned to FCAO

SALES TAX CALCULATED

Figure 3

INFORMATION KEPT FOR FOOD CHARGES

Figure 4

INFORMATION KEPT FOR TOBACCO CHARGES

GUEST CHECKS

- Club Number
- Date
  - Personal
  - Business
  - Other
- Check Number
- Cigar Sales
- Cigarettes / Misc. Sales
- Sales Tax
- Total

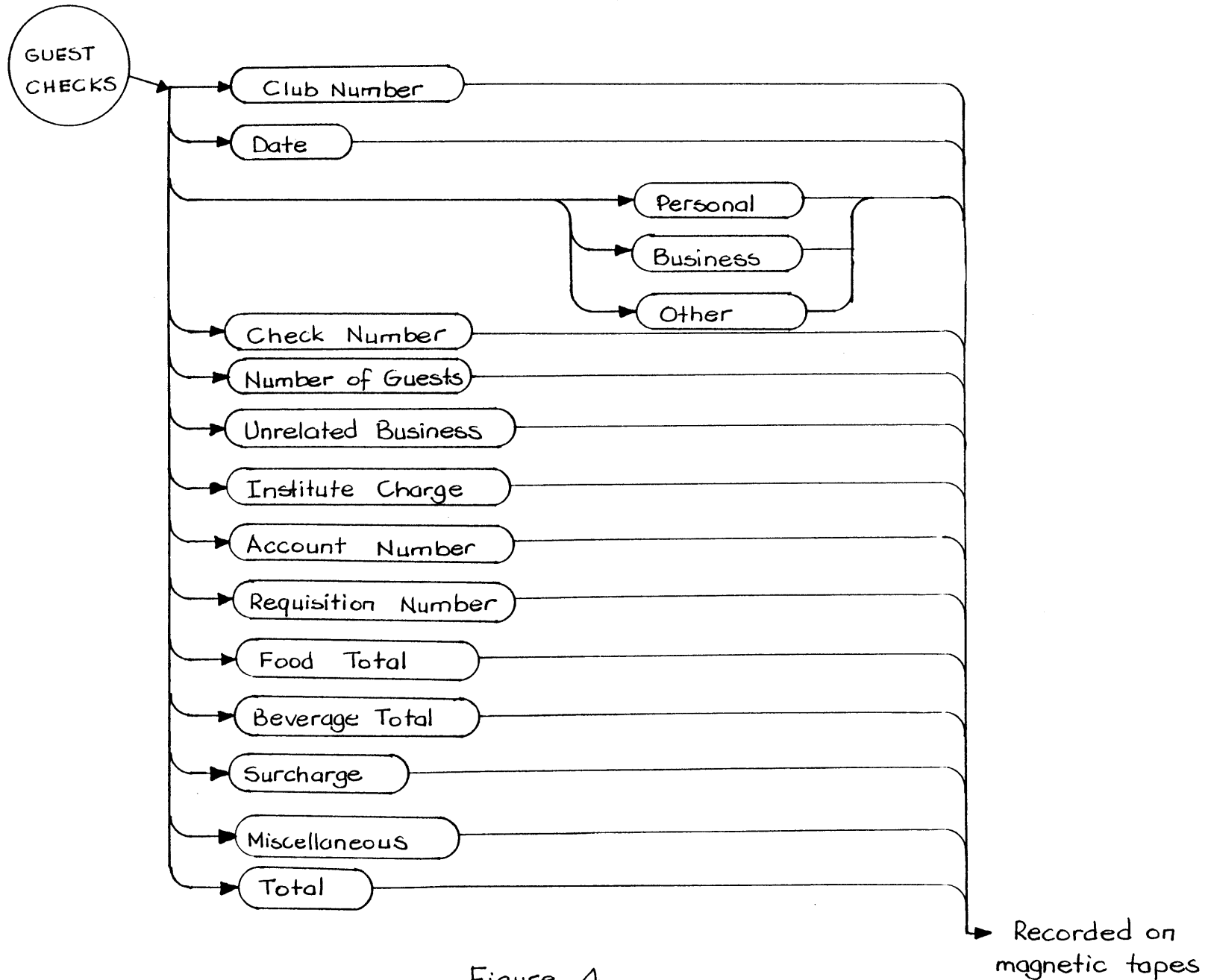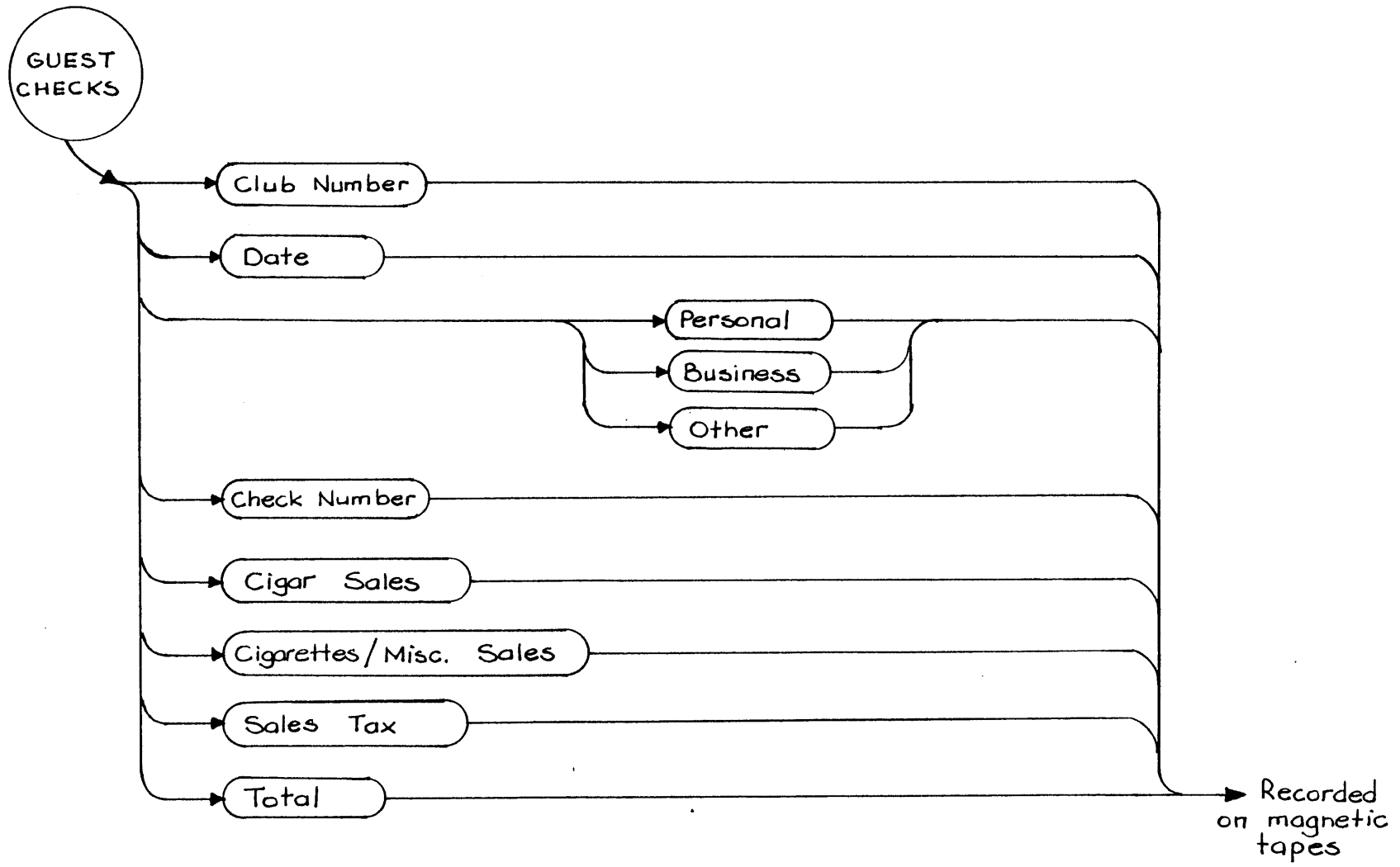Recorded on magnetic tapes

Figure 5

2.2 ACCOUNTS PAYABLE

The current Accounts Payable system involves the Institute's Accounts Payable Office as well as the Faculty Club Accounting Office. However, the Faculty Club Accounting Office has no direct control on the Accounts Payable system; once the Faculty Club makes its purchases and sends the invoices to the Accounts Payable Office, then it is the Accounts Payable Office's turn to process the payments in accordance with its own schedule, which often creates the problems to be mentioned later.

Figure 6 is a flowchart showing the information flow through the Inventory and Accounts Payable system. As it can be seen, the paths followed are uni-directional; once a stage is passed, there is no going back, which explains the minimal-control provided by the current system. Orders are placed by the Club management, depending on the inventory, to a number of vendors which deliver the goods to the Faculty Club with an "informal" (usually handwritten) invoice. The Faculty Club does not request payments from the Accounts Payable Office until it receives "formal" (typed or computer printed) invoices from the vendors, which are available after about a week following the actual delivery date. It should be noted that the legal delivery date is the date on the "formal" invoice. Upon receiving the "formal" invoices, the daily sales and purchases records are updated and the invoices are sent to the Accounts Payable Office. The Accounts Payable Office notifies the Faculty Club Accounting Office, after the payments are sent to the vendors.

The Accounts Payable Office handles the payments for all branches of the Institute which results in an unusual backlog of work. Despite the fact that the time needed to process the Faculty Club's payments is in the order of a few hours, it usually takes 2 to 3 weeks before payments are authorized for Faculty Club's invoices. This delay causes two problems. First is the frequency of deliveries. Massachusetts State law requires that invoices for delivery of alcoholic beverages be paid within 30 days or further deliveries cannot be made. Hence, deliveries cease if the payments are not made on time. The second problem is the potential savings available by making prompt payments. Most suppliers offer a 5% discount if payments are made within 10 days. Using FY 1982 figures of $86,498 for liquor costs, the potential savings is $4,325.

Unfortunately, the current Accounts Payable System cannot be changed. Payments must be authorized by the Accounts Payable Office, which means changing the way the Faculty Club handles its Accounts Payables requires to change the way the Accounts Payable Office operates. Please see section 3.3 on what changes might be available in the future which may improve the Accounts Payable Operations of the Faculty Club.
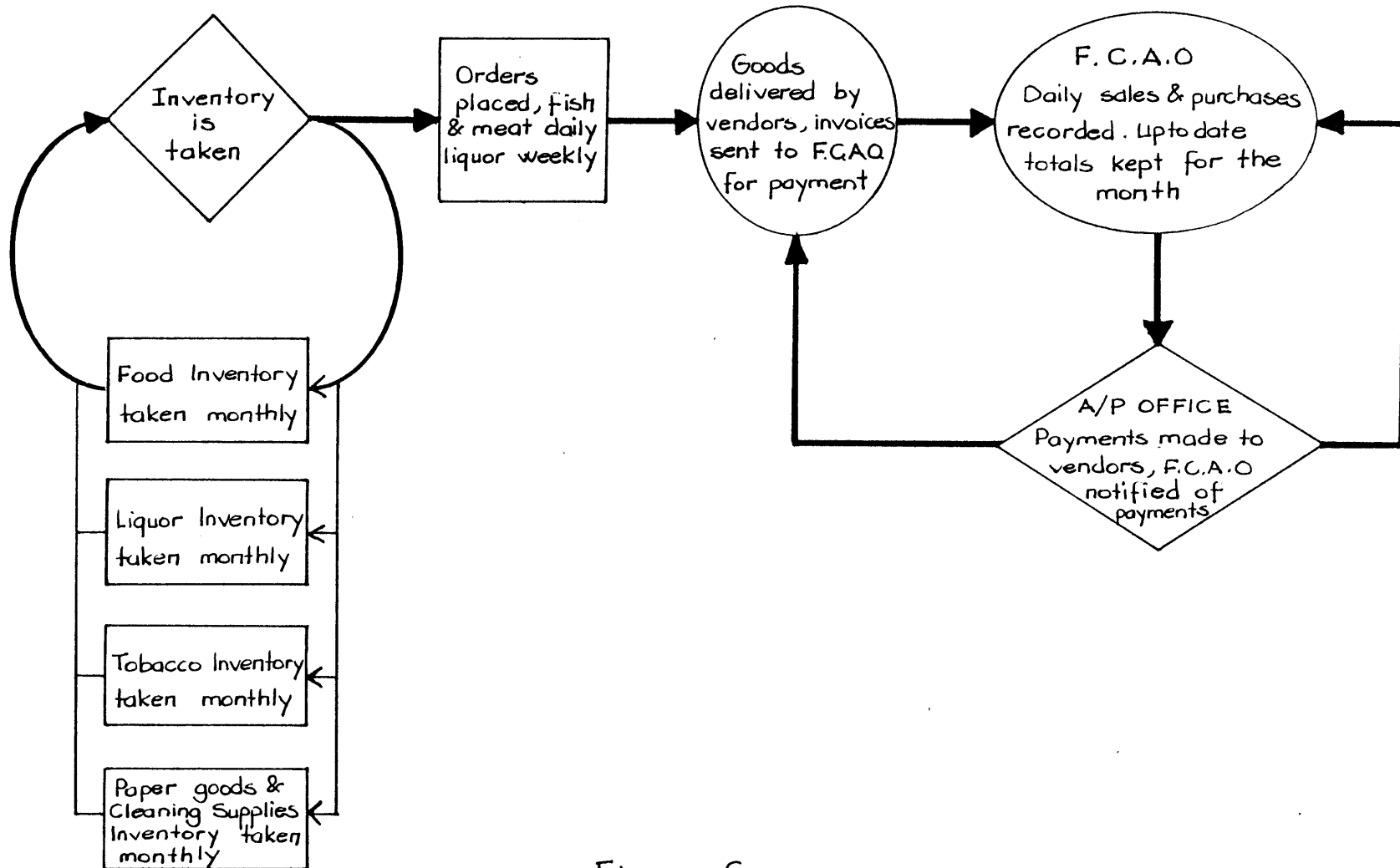
INVENTORY

Figure 6

2.3 PAYROLL

The Payroll System is managed primarily through the Comptroller's Office. The Club Management sends the time cards and/or the payroll forms to the Payroll Office, where they are processed. The information sent to be processed is in three categories; hourly-personnel, hourly-student and voucher. (Please see figure 7 for Payroll data information flow). Copies of the payroll forms used for the personnel and student on wages, are sent back to the Faculty Club every seek after they are processed. A report which shows the payments made on vouchers accompany these. Also, usually during the first week of the month, a report called Consolidated Salary Expense Analysis is sent to the Club. This report shows the weekly wage payments made to the employees on hourly wages or voucher, in addition to the monthly salaries paid to those on salaries. The Consolidated Salary Expense Analysis covers either 4 or 5 weeks, depending on the cut-off dates determined by the Payroll Office. However, these cut-off dates rarely coincide with the beginning or the ending days of the month, since they are based on full seven day weeks. The C.S.E.A. for the month of April, for example, covers the period from the 22nd of March to the 24th of April.

The period covered in the C.S.E.A.'s and amount of information available cause the following 2 problems. First, the Faculty Club staff needs information based on the calendar month to revise the budget and to prepare the monthly General Ledger Reports. Unfortunately, a breakdown of labor costs by month is not possible, because the C.S.E.A. shows weekly costs. For example, if the week contains the last 3 days of March and the first 4 days of April, there is no simple way of determining how many hours the employee got paid for those 4 days of

April. The only way around this is to go back to every time card for every employee and calculate the data manually. This process is extremely time-consuming; a previous trial to get the data in this way has taken a full day of the staff member who is in charge of the preparation of the monthly reports. With the recent personnel cuts and the extra responsibilities added to the work load of remaining personnel, even 8 hours a month is very expensive. So, the current practice is to estimate. As admitted by the staff, the estimates are always off. Thus, an accurate comparison of the actual and the proposed budget cannot be made, because the figures used in the monthly operating statements are not correct.

The second problem is the amount and kind of data available on the C.S.E.A.'s. The C.S.E.A.'s do not distinguish among the hours paid for regular-time or over-time, or sick-leave or extended sick leave, etc. Such information again is only obtainable from the individual time cards or payroll forms, which in this case will take days to get, so it's not usually done. The unavailability of this information makes the managerial decisions such as controlling over-time much more difficult. Also, the lack of such a regular breakdown of pay categories means the management can't make as accurate estimates for the next year's budget as it would prefer. Union rules complicate the problems. Here is a current situation taking place at the Faculty Club which can be used as an example of the inconveniences of the current Payroll System. For example, the head cook has been out on sick leave for nearly six months. Under the current regulations he is allowed 240 days on sick leave because union rules allow 12 sick leave days per year, if the employee has 20 years of service. Union rules also require shifting-up the other employees; that is, the assistant cook takes place of the head cook, the

salad person becomes the assistant cook and so on, all paid at the higher rate. Then the opening resulting from the head-cooks' sickness is filled by hiring a new pots & pans washer. If we suppose that there were 10 people on the payroll previously, now there are 11. One may say that there is nothing to be changed; the opening has to be filled and the cook has to be paid under sick leave, but since there is no data available on sick leave, there is no way to know how many sick days he was given before his last illness. What is important here is to obtain accurate data: other employees will get sick, new people will have to be hired temporarily or permanently but the costs of these must be accounted for when the new budget is planned. Actual budget spendings will be closer to the proposed spendings with better information. The C.S.E.A.'s are produced exactly in the same way for all the offices of the Institute and similar complaints have been made by the staff of these offices, which I learned during my conversations. The only solution in this case is to change the computer program that the Payroll Office uses, which is beyond the scope of this thesis. On the other hand, it is possible to keep track of such information even if it requires some staff time and duplication of data. By using a personal computer, extra time and staff costs can be minimized which will be discussed in the Alternatives and Recommendations sections.
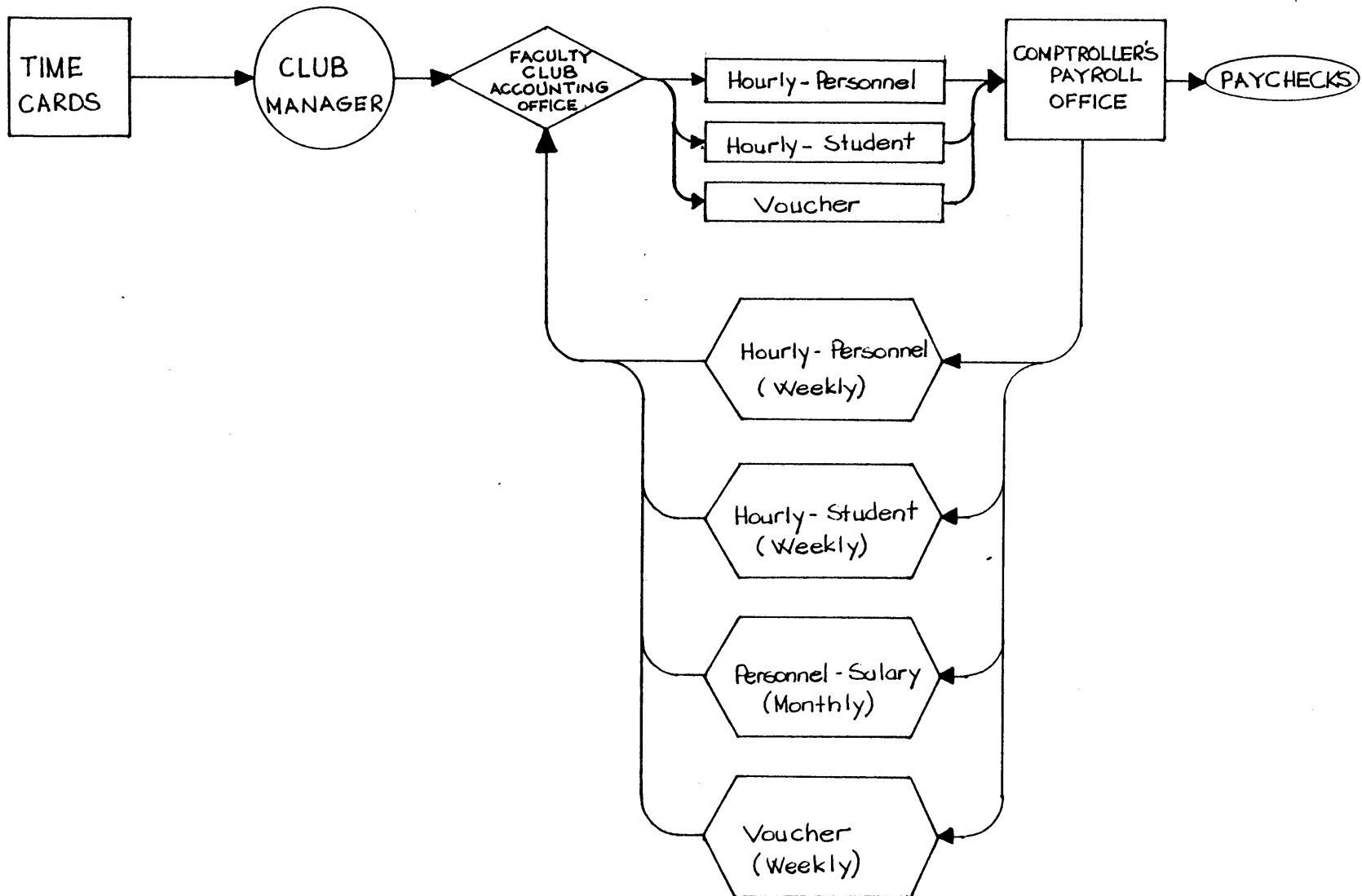
PAYROLL

Figure 7

2.4 INVENTORY

Under a new manager, the Faculty Club is in the process of changing its inventory system. The old inventory system is quite simple. Food, liquor and tobacco inventories are taken by hand at the end of each month; keeping track of beginning-of-the-month and end-of-the-month quantities. The only price information available in this system is the end-of-the-month price. Orders to vendors are placed daily for fish and meat, weekly for liquor and tobacco. However, standard quantities of these goods are ordered regardless of the existing inventory, since the system does not provide adequate information in a practical and speedy manner to help such decisions. The current system is similar to the old one in many ways; orders are still placed daily for fish and meat; weekly for liquor and tobaccco. Inventories are taken monthly still by hand. Other than the three categories mentioned above, the management has introduced a paper goods and cleaning supplies inventory; to be taken monthly, since these are frequently used items. The main difference introduced with the new system is the ability to keep track of daily prices and quantities purchases. Keeping daily prices helps the manager to observe the price changes of certain items. This price information is valuable to the management since it affects the food costs and/or food sales. If the price of an item changes, for example if the price of beef goes up, the management has two choices: it can either purchase less beef, thus decrease the amount of beef used in the portions served or reflect the price change as higher menu prices. The management usually chooses the first option because it costs less and it is less time consuming, if compared with what the other option would require. There are 14 regular luncheon and dinner menus that the Faculty Club uses. Based on a 5 working day week, the same menue is offered every third week.

There are also special party and banquet menus. If the price change in beef were to be taken into consideration, first the new prices for all the dishes that contained beef would be calculated manually, then the new menus would be typed up. Calculating the new prices and typing up the menus takes a lot of time (about 2 to 3 days), which explains the reason for changing the prices less frequently and using the first option more. The quantity information, which is made possible by the introduction of the new inventory system, gives the management a better idea of what the weekly purchases should be, so that a steady flow of goods into the inventory can be maintained. Although the new system is better than the old one, it has its own problems. Staff time spent on the new system has increased enormously, about 30 hours per month, compared to 4 to 6 hours per month previously. Invoices cannot be sent to the Accounts Payable Office to be processed before the prices and quantities are recorded in the inventory books. This emerges as another source of delay for paying the vendors, a problem discussed already in the Accounts Payable Section (Figure 6 shows the Inventory Data Flow). So, the new Inventory System provides more data compared to the old one, however staff time becomes an important issue in this case. It is also the cost of the new system, although very hard to measure directly, the wages paid for over-time is an increase in the costs. Automation is one possibility, which may speed the procedures with reasonable costs to the Faculty Club. This issue will be considered in section 3.2.

2.5 OPERATING STATEMENTS & BUDGETING

Preparing Operating Statements is a very time consuming and lengthy process under the current conditions. The importance of the data provided by the monthly prepared reports is often reduced by the time the management has access to them because it takes at least about a month to prepare them. (It is not very unusual when the delay is about 2 months)

Reports produced by the Comptroller's Accounting Office, called C.A.O.'s, are needed to produce the Operating Statements. The C.A.O.'s come out monthly, but the cut-off dates used for the C.A.O.'s do not coincide with the first and the last working days of the calendar month, the same problem discussed elsewhere in the Payroll Section. The C.A.O.s list the income and expenses of the Faculty Club in detail for the period covered. Besides the C.A.O.s, monthly reports called Statistical Reports and prepared by the Accounts Receivable Office, are needed. The Statistical Reports show the breakdown of revenues of the Faculty Club in the 12 categories, as shown in figure 3. (The cash transactions are not included). The Statistical Reports, in some cases, include more recent data which is not listed in the C.A.O.s due to different closing dates and this is the reason why they are both needed to start the preparation of the Operating Statements. The C.A.O.'s are made available to the Faculty Club Staff within the next 2 to 3 weeks following the cut-off date. The Statistical Reports are available about the same time, sometimes a day or two earlier. Once these reports are available, the staff member in charge of preparing the Operating Statements starts working on the Monthly Spread Sheet. Since neither the C.A.O.s nor the Statistical Reports cover the whole calendar month, a technique called "accruals" has to be used. An

example is the best way to understand this technique. Let's suppose that the C.A.O. and the Statistical Report are available to prepare the Operating Statement for the month of April. The information on these reports will cover some working days from March and some from April. Let's say that "M" represents the number of working days covered on the C.A.O. for the month of March, and "A" represents the number of working days covered on the C.A.O. for the month of April. The Operating System has to cover the whole month of April and let's suppose "T" represents the total number of working days that should be covered on the C.A.O. So at this point, data for the remaining T-A days is missing and it has to be estimated. For instance, the data in question is labor costs. Using the figure for labor costs for the period A, the average cost per day is calculated. That is: if "C" is the mentioned labor cost, average cost is C/A. Then the total labor cost shown on the Operating Statement is:

$$C + (C/A) * (T-A)$$

However, the amount (C/A)*(T-A) has to be noted on the Spread Sheet so that correction of this estimate can be made the next month, when the official information covering the (T-A) days is available. The correction process is called "reverse accruals". Of course, the accruals made for March have to be reversed when the Spread Sheed for April is being prepared. The preparation of the Spread Sheets take at least 2 days, all the calculations are done by hand which is very time-consuming. Once the work on the Spread Sheets is finished, then the Monthly Operating Statements are prepared. It takes another 2 days to complete them. They are taken to the Housing and Food Services to be typed because they are done in pencil at the Faculty Club and the Faculty Club does not have a wide-carriage typewriter needed to type the M.O.P.'s. The typing takes anywhere from 2 to 3

days, depending on the work-load of the secretaries. It is at least a month before the manager gets his M.O.P., often it is nearly two months. In this case the M.O.P.'s are good for knowing only where the Faculty Club stands in terms of revenues and costs, they cannot be used to pinpoint current problems since the information is already 2 months old. Management decisions based on timely data are virtually impossible.

The Operating Budget for the next year is estimated by using the previous year's figures, a common budgeting technique. One problem with the previous years' figures is that they are not detailed enough. The total labor cost for FY 1980, for example, is known but how much of that was paid for sick leave or over-time is still unknown. Recently, the personal computer resources available from the Housing & Food Services have been utilized to study various budget scenarios and this has proven to be very useful. In the previous system, the change of a figure on the budget would require further changes, all to be calculated and made by hand. Now, such charges, which are needed for reviewing various budget alternatives, can be done on the touch of a key. Experimenting with a personal computer has produced evidence which can be used to justify the flexibility and efficiency provided by this option, which will be exploited furhter in the Recommendations section.

CHAPTER III

ALTERNATIVES

In this section, some alternatives are considered. The first two sections provide short-term solutions, whereas, the third section covers possibilities that may be available in the future and there is potential for more research in this area.

3.1 CONTRACTING OUT

The contracting-out option studied here is based upon the formal proposal of Guardian Business Services of 28 Travis Street, Allston, MA 02134. Although the proposal covers Accounts Receivable only, Guardian Business Services offers Payroll and General Ledger Systems as well.

There are two different kinds of services offered for the Accounts Receivable needs of Clubs. Both options will be considered here, starting with the "batch service bureau processing". For this operation, guest checks will be collected from the Faculty Club on an average of every 10 days so that the information on these checks can be processed to prepare the monthly statements to be sent to the members of the Club. This is exactly the same way the current Accounts Receivable System is set up. However, Guardian Business Services guarantees a very fast and reliable service. The cutoff date for billing is the last day of the month, the monthly statements are prepared to go out in the mail the next day. All the necessary forms, envelopes, etc. are provided by this firm. Monthly charges for this service are 23 cents per active account and 10 cents per

transaction. Using 2,400 for the number of active accounts, with each account having an average of 6 transactions per month, the monthly cost for this service is:

$$(\$0.23 \times 2,400) + (\$0.10 \times 6 \times 2,400) = \$1992.00$$

which gives $23,904 for 1 year.

If the postage costs are included, supposing that 70% of the mail is interdepartmental, the total cost is:

$$(2,400) \times (0.3) \times (12) \times (\$0.17) + \$23,904 = \$25,372.$$

The second kind of service available is processing through a terminal (a personal computer). An IBM Personal Computer is used to store the transactions on disks, which are taken back to the premises of Guardian Business Services to be processed. The only difference from the first option is the medium used, all other features remain. The charges for this service are 23 cents per account and 4 cents per transaction.

Using 2,400 for the number of active accounts, with each account having an average of 6 transactions per month, the monthly cost is:

$$(\$0.23 \times 2,400) + (\$0.04 \times 6 \times 2,400) = \$1,128.$$

The rental fee for the IBM Personal Computer is $175 per month, which also includes software and maintenance costs. With this, monthly cost is:

$$\$1,128 + \$175 = \$1,303$$

which results in an annual cost of

$$(\$1,303 \times 12) = \$15,636.$$

Including postage costs, total cost is:

$$\$1,468 + \$15,636 = \$17,104.$$

The IBM Personal Computer does not need to be rented, the client may but its own. If the client wishes to use the rented IBM PC for other purposes such as Accounts Payable or Word Processing, Guardian Business Systems charges $25 per month per application. They also provide training for personnel at the client's location. There is no requirement for a contract; service is provided as long as the client is satisfied.

However, this option is limited in the way it eliminates errors. Guardian Business Services uses a self-checking system of Account Numbers called IBM Mod-11 Check Digit Routine System. This feature causes the rejection of an account number during the keypunching process, if it does not exist. Still, the Faculty Club staff has to spend the time to make the corrections. If the incorrectly entered account number belongs to another member, it will go unnoticed as in the current system. The existing M.I.T. Faculty Club Account Numbers can be used by the Guardian Business Services but in either case, there will still be problems with the incorrectly entered account numbers.

3.2 PERSONAL COMPUTERS

In this section I examine some of the many accounting software packages available in the market. The hardware to be used depends on the type of software chosen, since each of these software packages run on specific machines. Thus, issues relating to hardware will be considered after the choices for the software are determined.

This study covers 54 different software packages, each marketed by a different company and each package containing 4 parts, namely: Accounts Receivable, Accounts Payable, General Ledger and Payroll. Since Accounts Receivable is the most important of all because of the problems of the current Accounts Receivable System, I will narrow down the number of packages by considering the features offered for Accounts Receivable.

The most important issue when choosing a software package for an Accounts Receivable System is the size of the business under consideration. The Faculty Club has approximately 6,000 members so the system chosen has to be capable of handling at least 6,000 accounts. This constraint immediately eliminates more than half of the packages considered. The other features sought in a good Accounts Receivable Software Package are: being able to enter daily transactions, producing customer invoices, having different credit codes and/or credit limit for each customer. Six software packages meeting the requirements above are compared in Table 1 with their additional features also included.

A General Ledger Software Package should have the following features: printed reports, trial balance, balance sheet, profit and loss, periodic cumulative reports, etc. Details of the General Ledger Features of the six software packages are shown in Table 2.

Table 3 contains a comparison of the Accounts Payable features provided by the six software packages.

Table 4 shows the Payroll features available on these six software packages. It should be noted that all the features provided are not necessary for the Faculty Club's needs, since some of the information kept at the Institute Payroll Office is of no use to the Faculty Club Management.

All these 6 companies have software written for Inventory and the features they provide are almost the same.

The machines on which these software packages can be run are listed in Table 5. Usually one set of packages run on more than one machine, which expands the range of options. The addresses of the producers are also included in this table, so that further information can be obtained.

The question of which set of software packages or which machine will be answered in the Recommendations Section.

ACCOUNTS RECEIVABLE FEATURES

Table 1

COMPANY	Number of Customers Accommodated	Adresses (Bill to)	Adresses (Ship to)	Credit Code for Each Customer	Credit Limit for Each Customer	Classifications (Retail)	Classifications (Wholesale)	Trial Balance Aged	Produce Customer Invoices	Separate Accounts more than 9 months	Deal with Unapplied Cash	Record Daily Activity	Day Limit	Open Item	Balance Forward
CYMA Corp. (Small Bus. Sys)	10,000	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DATA TRAIN Inc. (Superchief)	No limit	•	•	•	•	•	•	•	•	•	•	•	•	•	•
MICROCOMPUTER CONSULTANTS	32,000	•	•	•	•	•	•	•	•	•	•	•		•	•
SIERRA NATIONAL Corp.	100,000	•	•	•	•	•	•	•	•			•	•	•	•
SYSTEMS PLUS I	65,000	•	•	•	•	•		•	•		•	•	•	•	
UNIVAIR INT'L.	99,999	•	•	•	•	•	•	•	•	•	•	•	•	•	•

GENERAL LEDGER FEATURES

COMPANY	PRINTED REPORTS Trial Balance	Journal Entry	Detail General Ledger	Balance Sheet	Profit & Loss	Departmental	Number of Company Entries	Number of General Entries	Print Out Separate Accounts	List Transactions Separately	Periodic Cumulative Reports	Customized for each Company	Extendable to the first month of next Fis. year
CYMA Corp. (Small Busi.Sys)	•	•	•	•	•	•	32,000	32,000	•	•	•	•	•
DATA TRAIN Inc. (Superchief)	•	•	•	•	•	•	No limit	No limit	•	•	•	•	•
MICROCOMPUTER CONSULTANTS	•	•	•	•	•	•	depends on disk capacity	32,000	•	•	•	•	•
SIERRA NATIONAL Corp.	•	•	•	•	•	•	99	depends on disk capacity	•	•	•	•	•
SYSTEMS PLUS I	•	•	•	•	•	•	depends on disk capacity	65,000		•	•	•	•
UNIVAIR INT'L.	•	•	•	•	•	•	246	depends on disk capacity	•	•	•	•	•

Table 2

ACCOUNTS PAYABLE FEATURES

COMPANY	Maintain Vendor History	Maintain Customer History	One-time transaction Facility	Manual Check Writing	Classify Vendors	Analysis of Purchasing & Expenses	Cash Requirement Projections	Aging List	Expandable System	Number of Vendors to handle
CYMA Corp. (Small Busi. Sys)	●	●	●	●	●	●	●	●	●	6,000
DATA TRAIN Inc. (Superchief)	●	●	●	●	●	●	●	●	●	No limit
MICROCOMPUTER CONSULTANTS	●		●	●		●	●	●	●	32,000
SIERRA NATIONAL Corp.	●	●		●	●	●	●	●	●	100,000
SYSTEMS PLUS I	●		●	●	●	●	●	●	●	65,000
UNIVAIR INT'L	●	●	●	●	●	●	●	●	●	999

Table 3

PAYROLL FEATURES

COMPANY	CYMA Corp. (Small Busi.Sy.)	DATA TRAIN Inc. (Superchief)	MICROCOMPUTER CONSULTANTS	SIERRA NATIONAL CORP.	SYSTEMS PLUS I	UNIVAIR INT'L.
Number of Possible Deductions	26	14		19	10	10
Annual Tax Updates	•	•		•	•	•
Individual Employee Histories	•	•		•	•	•
Summarize Employee History by Category	•	•		•		•
Increase number of Employees	•	•		•	•	•
Retain Constant Payroll Data	•	•		•	•	•
Accommodate Multiple Pay Bases	•	•		•	•	•
PROVIDE SUMMARY INFO. Monthly	•	•		•	•	•
Quarterly	•	•		•	•	•
Annually	•	•		•	•	•

Table 4

HARDWARE INFORMATION

CYMA Corporation

Runs on CP/M, CP/M 86, MP/M

MSDOS

1550 E. University

Mesa, AZ   85203

(602) 835-8880

DATA TRAIN INC.

Runs on CP/M, IBM PC, HP

840 NW 6th Street, suite 3

Grant's Pass, OR   97526

(503) 476-1467

MICROCOMPUTER CONSULTANTS

Runs on CP/M-80 based systems

P.O. Box T

Davis, CA   95617

(916) 756-8104

SIERRA NATIONAL CORP.

Runs on CP/M-based systems

5037 Ruffner Street

San Diego, CA 92111

(714) 277-4810

SYSTEMS PLUS INC.

Runs on CP/M, Apple II

1120 San Antonio Road

Palo Alto, CA 94303

(415) 969-7047

UNIVAIR INTERNATIONAL

Runs on Apple II and III with

CP/M, S-100, IBM PC

10327 Lambert

International Airport

St. Louis, MO 63145

(314) 426-1099

3.3. INTERACTIVE ACCESS TO EXISTING M.I.T. SYSTEMS

Having on-line communication with the existing systems at M.I.T. that the Faculty Club has to use now, is perhaps the ultimate solution to the problems of the Faculty Club. Although still dependent on M.I.T. Systems, the decentralization would be eliminated and various operations could be integrated. The systems to which on-line access is sought are Accounts Receivable, Accounts Payable and Payroll. The task of studying or planning the changes, in order to realize on-line communication is beyond the scope of this thesis, since it involves many other issues and requires more experience and expertise. However, there is work being done by several offices of the Institute in the direction of providing on-line facilities to the offices which use M.I.T. Systems. What I can do here is to report what is being planned for the future and how the Faculty Club can benefit from these changes when they are made available.

Out of the three systems, Accounts Payable is the one that has not been paid attention in terms of making on-line acess available. During the course of my interviews, it became clear that there are not going to be any major changes in the Accounts Payable System for the next 5 or 6 years.

Payroll system presents difficulties because of the confidential nature of the data. Security is the main issue, the confidential information must not be accessible by the unauthorized people. To overcome this security problem requires complex software to be written and tested. The people working on this project estimate that on-line access to Payroll information will be available in the next 2 to 3 years. Thus, the idea of on-line access to Payroll information turns out to be

an alternative to be considered in the future and other alternatives should be given more consideration for short-term purposes.

Accounts Receivable is the only system that promises on-line access in the near future. The work which will provide limited access is being done in 2 areas and it will be available to potential users in the Fall. First, around September, the Faculty Club Personnel will have on-line access to Accounts Receivable name and address files. In other words, non-programmer users will be able to look up the account number, or the address or the name of a member on a CRT terminal, by entering either the name, or the account number of the member. This feature will be considered in the Recommendations section in more detail. The second change to take place in the Fall is the ability to enter the Accounts Receivable transactions from the Faculty Club by using a terminal. Thus, the guest-checks would not have to be delivered to the Accounts Receivable Office at E19. It should be reminded here that this feature provides only on-line data entry. Corrections cannot be made or individual accounts cannot be looked up to find out about the members debts. The possible uses of this option is studied in detail in the Recommendations Section. It will take about 3 to 5 years to make all the changes in the current Accounts Receivable System to provide unlimited on-line access available so that corrections can be made or reports can be generated from the premises of the Faculty Club.

CHAPTER IV

CONCLUSIONS

The current system has many problems, with varying levels of complexity. Two of these problems require immediate attention and they are:

1. Customers write down their account numbers on the guest checks themselves. They often make mistakes while doing this; sometimes they put their room numbers, or telephone numbers, etc. The signatures on the guest checks are not legible, so they cannot be used to make the corrections. These incorrectly entered account numbers result in charges made to wrong accounts. The staff time and the costs associated with dealing with these errors cannot be justified. Personnel morale and productivity are also affected. Recent personnel cuts make the situation worse.

2. Payroll information received by the Faculty Club is not in a ready-to-use form. The information provided by the Payroll Office lacks the details needed to make quick managerial decisions.

While the efforts should concentrate on these 2 problems, the following problems should be kept in mind.

3. The billing process for the Accounts Receivable is too long, monthly billing statements must be sent out with minimal delay.

4.   Payments get credited to wrong accounts at the Cashier's Office, with results similar to the first problem.

5.   Payments are not made to vendors on time which results in the loss of potential savings and potential delay of deliveries.

6.   The current Inventory System presents inconveniences in terms of the staff-time it requires.

7.   The cash registers are out of date and their replacement is needed to obtain better cash control.

CHAPTER V

RECOMMENDATIONS

Unfortunately there is not a single unique solution which will take care of the problems. It has to be kept in mind that the solutions have to be practical and efficient. Buying a state-of-the-art system which costs thousands of dollars to purchase and maintain while at the same time requires three staff members to operate is not the kind of solution sought here. Measures should be taken to minimize the number of problems if they cannot be eliminated completely. Some of the problems require immediate solutions, while the remaining ones are not as fital to the operations of the Faculty Club. Alternatives which concentrate on these high priority issues should be considered first, while keeping an eye on their possible applications to the remaining issues. In some cases, there may not be direct solutions, as in the Payroll System, but improvements can be made in other ways.

An issue that must be addressed immediately is the Account numbers. As it has been proposed by the staff in the past, the "credit-card" option is the most suitable; it eliminates the incorrectly entered account numbers completely, with minimum waitress time. It should be remembered that it costs the Faculty Club some $16,000 to correct the errors. If the "credit-card" system is not acceptable, another alternative must be adopted. Here is one option: the guest-checks should have 3 copies, instead of 2, and once an order is taken, the waitress should take the first copy to the desk, where currently the lunchtime cashier works and sells candies, lifesavers, etc. The waitress then goes to the kitchen and places her

order. Using the information on this copy, an account number vs name verification should be made in real time. Keeping in mind that, the Faculty Club Account Numbers and Names Files will be accessible on-line in the Fall, this verification can be done very fast either by the cashier or by a part-time employee. Everything should proceed normally in case of no errors, but if an error is discovered, the waitress should be called back to the desk, given the copy of the guest check and asked to clarify the mistake by requiring the correct information from the customer who is still in the premises. The waitresses can be called back to the desk in many ways, for example every waitress can be assigned a number and this number may be announced through a PA system. Or a scoreboard type panel may be placed in the kitchen and controlled from the desk where the verifications are made. In case of an error, the corresponding waitress number is put on this scoreboard and the waitress becomes aware of the situation when she goes to the kitchen the next time.

To clear the other problems of the Accounts Receivable Operations, the Guardian Business Systems option may be considered. The advantages of this option are:

1. It is a solution that can be implemented very easily and fast. All it requires is a personal computer to be placed at the Faculty Club.

2. The Club management does not need to worry about maintenance or personnel training. These services are a part of the proposal.

3. The decentralization is eliminated, it involves only the Faculty Club and the Guardian Business Services.

4. The delay for correcting errors is cut down considerably, since the error-correcting will be done by the Faculty Club staff only.

5. The average two-week delay that occurs in the billing process is cut down to two, Guardian Business Service guarantees that the monthly statements are out in the mail, following cut-off-day.

6. Costs are reduced drastically. If the personal computer is rented, annual cost is $17,104. This cost is lowered by about $3,000 annually if the personal computer is purchased by M.I.T. The current system costs at least $33,075.

7. Since the Guardian Business Service does not require a contract to be signed, in case of unsatisfactory results the services offered by them can be cancelled. This greatly reduces the risks of adopting this new system.

8. The IBM Personal Computer can be used to run other software packages such as Payroll, General Ledger, Accounts Payable, Inventory, etc., with minimal software costs, since the cost for the hardware is accounted for in the Accounts Receivable Operations.

If an IBM Personal Computer is going to be used, the software produced by Data Train, Inc. for Payroll, Inventory, and General Ledger is the best choice.

If the Guardian Business Services option is abandoned and a personal computer other than an IBM PC is considered, the selection for the software should be made between the Data Train, Inc. and the CYMA Corp. products.