INDUSTRIAL DATA PROCESSING APPLICATIONS REPORT

Applications	Integrated System for Billing, Payroll, Accounts Payable and Inventory Control
Type of Industry	Meat Packer
Name of User	Sigman Meat Co. Denver, Colo.

Equipment Used	IBM 1440 Data Processing System

Synopsis

In Denver, Colo., Sigman Meat Co. has transferred its data processing operation from IBM unit record equipment to an IBM 1440 data processing system. Sigman is thus enabled to perform many functions which were beyond the capabilities of the previous equipment. The greatest benefit to the company, however, is the implementation of a total systems concept that brings together all areas of the business into a single, unified system.

The total systems concept consists of the integration of all systems into one. It integrates the accounting system with the invoicing system with the accounts payable system and so on. The three basic subsystems are: billing, payroll and accounts payable. Together with two supplementary inventory control routines, these three systems provide entries to the general ledger which is the fulcrum of the total system.

Among the significant items of computer output are daily sales analyses by product and weekly computations of salesmen's commissions. The sales manager receives a weekly report showing what each customer purchased and what each salesman sold by category. In addition, a weekly run produces a comparison of the current week's sales with those of the previous week and with the same accounting period in the preceding year. Input data for these and other reports provide entries for the general ledger which is computer-prepared in 30 minutes.

The old-time Chicago meat packers used to boast that they used every part of a hog but the squeal. Yet, their knowledge of their own businesses seldom matched the extent of their technical know-how. At Denver's Sigman Meat Co. the old-timers' boast has been superseded by the company's claim that its new total information system will now provide management with instant knowledge about every aspect of the firm's activities - from sales and inventory down to the most economical composition for sausage meat. This system, based on an IBM 1440 computer installation (See Fig. 1), is designed to expand management control at a time when Sigman Meat Co. is going through a period of continuous expansion.

When the Sigman Meat Co. was founded in 1938 by Max Sigman and his son, Arthur Sigman, now company president, its original operation occupied only 3,000 square feet and required one truck for deliveries. Since then, the firm has gone through a continuous expansion and now occupies a plant of about 165,000 square feet, or three acres, under one roof. Gross sales approximate $30 million with a sales expansion goal of 50 percent. The annual $2.8 million payroll now takes in about 450 employes.

Meat production operations include the weekly slaughtering of 750 to 900 beeves and the processing of about 5,500 hog carcasses, butchered and dressed in Iowa and Nebraska. This pork and beef yield all varities of fresh meat and 40 odd types of processed products which are marketed in more than 100 packages. These products are sold by the parent company and its specialized subsidiaries from Denver and production facilities in neighboring states. The present Sigman sales area includes Colorado, Wyoming, Nebraska, Montana, Nevada, Idaho, Oregon, Washington, New Mexico, Arizona, Utah, California, Hawaii and Alaska.

Fig. 1.   IBM 1440 DATA PROCESSING SYSTEM used by Sigman includes IBM 1443 card read-punch (upper left), IBM 1443 printer (lower left) and two IBM 1311 disc drives (lower right).

EDP at Sigman Meat Co.

The total systems concept, explains Max Hathorn, Sigman's data processing manager, consists of the integration of all of the company's systems into one (See Fig. 2). It integrates the accounting system with the invoicing system with the inventory system with the salesmen's commissions systems, and so on. In the total system concept, when a message is received by the computer, it disperses the information in the message to the appropriate records and reports.

This system implementation has been gradual, related as it is to the company's growth and to the equipment at its disposal.
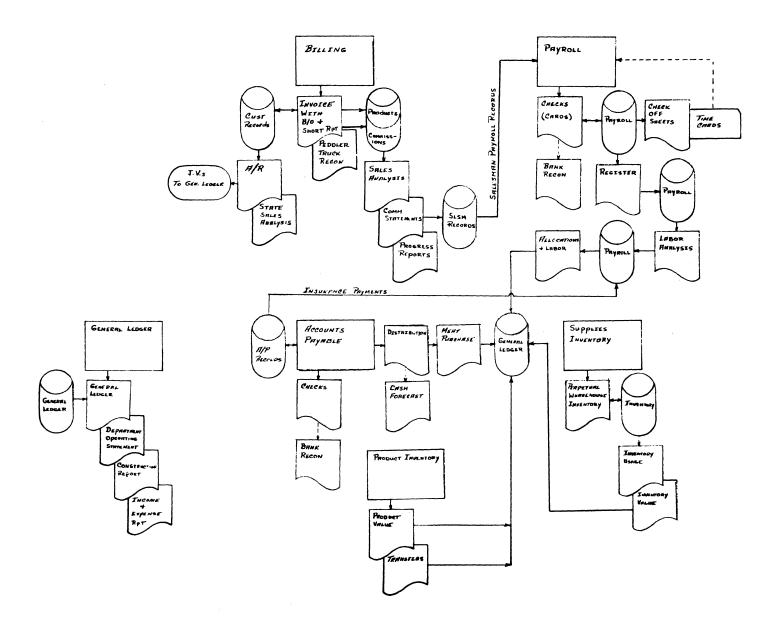
Fig. 2. SIGMAN TOTAL SYSTEM FLOW CHART shows integration of all company functions into a single, unified system.

Sigman's first experience with data processing dates back to 1960 when the company installed an IBM Series 50 402 system. Its first application was billing. When this had been operating successfully for about two months, payroll was added and the design of an accounts payable system suitable for the equipment was begun.

Very soon it became apparent that the company's continued growth would bring about a need for more powerful equipment. An IBM 407-604 system was accordingly ordered. With its installation eight months later, the accounts payable system was put on the air. With its introduction, Sigman had in the system the majority of entries to the general ledger. The next logical step was to introduce the general ledger which was operated as a detail card system.

Once the general ledger was operating successfully, it was found that the product inventories could be machine-extended with greater speed and accuracy than could be done by a clerk. Product inventory and departmental transfers were therefore also incorporated into the system. This now provided several other automatic entries to the general ledger so that the latter was by then almost wholly automated.

By this time Sigman's business had again grown considerably and with the experience which the company now had in data processing it felt that it could consider larger equipment that would do a more complete job and also provide an expansion factor. Linear programing was then becoming accepted by some of the smaller packers. There had been a lot of experimentation, a lot of trials and quite a few failures. Hathorn felt, however, that this was the same situation most data processing systems encounter and that the problem was mainly one of proper preparation of input data.

Subsequent selection studies resulted in the installation of Sigman's present IBM 1440 data processing system with an 8K core memory, believed to be the first 1440 in the meatpacking industry. Besides the console and processor, the system configuration includes IBM 1442 card read-punch, a 1443 printer, and two 1311 disc drives. Computer data are stored in interchangeable disc packs that can each contain about three million alphanumeric characters. With two disc drives, almost six million characters of information are instantly randomly accessible. Sigman has a total of 24 million characters of information stored on discs. Additional information going back three-and-a-half years is kept in cards off-line.

The 1440's selection came about through Sigman's belief that it could not operate on a straight line system such as tape and really needed random access equipment. Through the implementation of its total system concept, the company now expects to obtain forecasting, cost reporting, and automatic pricing, and also be able to elaborate data transmission systems to be used in invoicing and data flow from production areas. Requirements also exist for productivity reports, "biff" sheets, freezer inventories and truck reporting.

With the acceptance of the 1440, all the jobs that were on unit record equipment were transferred to the computer within a three-day period. This transference, however, represented a full man-year of systems and programing work. Under the present system, three main areas of the business - billing, accounts payable, and payroll - provide the bulk of general ledger entries. Most other requirements may be obtained as by-products of these three major jobs which must be done as an integral part of normal operations. Two other routines - warehouse inventory and the product inventory and transfer system - provide significant ledger entries.

Billing work begins with the receipt of orders. (See Fig. 3.) These are taken at Sigman in three ways:

1. Telephone orders are transcribed onto mylar belts through the telephone system.

2. Direct mail.

3. Telephoned to the order desk.

All orders taken by outside salesmen are coded with a Mod 11 account number which provides protection against transposition and bad numbers. All other orders are coded in the sales office. Once the order is filled, an invoice is written and a back order and short report prepared for the sales department.

While invoicing is being done, the product records on disc are updated as well as the customer records for commission statements. A sales analysis and commission statements are run daily (see Fig. 4) and weekly (see Fig. 5), respectively. The detail cards used for these operations are kept about two months for special reports that may be requested.
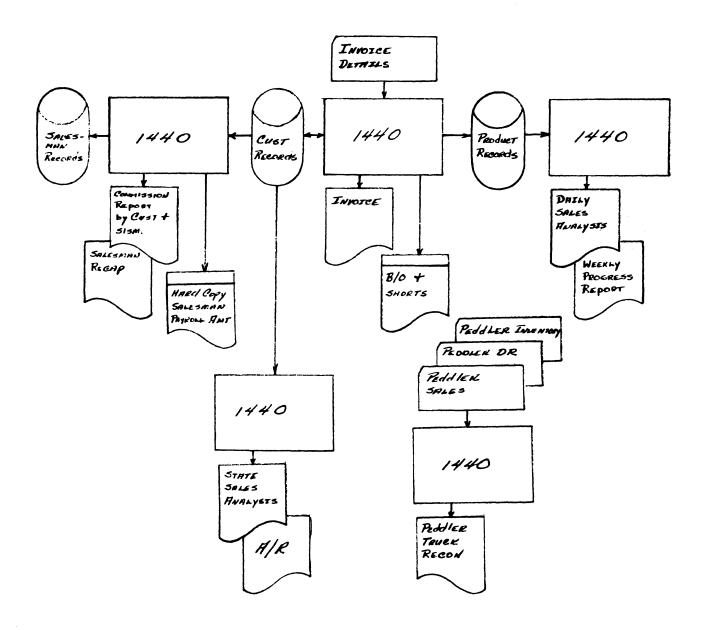
Fig. 3. SIGMAN BILLING SYSTEM fulfills invoicing requirements and provides input to salesmen's commissions payroll.

Payroll (see Fig. 6) is usually standard or normal in type. At Sigman, there are three union, a non-union, a salaried and a commission payroll involved, which are incorporated into one unit for processing. The data processing department writes checks, prepares time cards and an hourly check-off sheet for personnel. At the end of each quarter, 941's which have been up-dated weekly are run. The 941 procedure takes about 30 minutes. On unit record equipment it took about eight hours. W-2 forms are run at the end of the year.

Accounts Payable work (see Fig. 7) involves the preparation of accounts payable checks, the distribution journal, a check register, a cash forecast report (see Fig. 8), a meat purchase

SALES ANALYSIS - DATED 03/20/64   YESTERDAY   WEEKLY   PERIOD

AVG PR	CURR PPD	WEIGHT	AMOUNT	AVG PR	WK WEIGHT	AMOUNT	AVG PR	MO WEIGHT	AMOUNT
.4715	12	252	119	.4520	1,380	626	.4465	4,872	2,200
		60-	28-		60-	27-		132-	60-
.4401	7,020	10,685	4,825	.4460	27,556	12,497	.4513	103,280	47,076
					17-	7-		113-	51-
.4353	168	2,772	1,210	.4402	10,536	4,677	.4371	56,050	24,665
		2-	1-		26-	11-		231-	80-
.3988	264	3,299	1,320	.3961	18,689	7,465	.4120	44,070	18,310
		3-	1-		9-	3-		100-	44-
.3809	1,380	2,812	1,095	.3885	7,492	2,960	.4023	20,060	8,194
					26-	10-		124-	28-
.2573	12	186	48	.3416	1,200	416	.3416	1,200	416
.3963		1,992	789	.3999	7,950	3,202	.4018	39,102	15,600
					2-	-		19-	6-
							.4350	120	52
.1896	72	474	91	.1957	997	198	.2022	4,644	949
								308-	59-
							.4122	2,700	1,160
							.4127	1,305	561
.5014	342	573	293	.5090	1,485	768	.5155	6,992	3,654
					2-	1-		102-	52-
.4596	900	924	440	.4642	1,170	562	.4683	4,692	2,271
								12-	7-
.4075	25,200	25,200	10,710	.4147	43,020	18,284	.4101	95,496	40,522
				.4600	480	221	.4638	1,740	807
							.4645	540	260
				.4625	444	213	.4651	1,296	625
					2-	1-		2-	1-
				.4425	240	110	.4457	792	357
								2-	1-
							.3834	3,707	1,466
								144-	56-
.1745	144	579	104	.1715	3,545	629	.1727	18,257	3,256
					147-	12-		798-	136-
DEPT TOTAL	35,514	49,683	21,014		125,895	52,757		408,828	172,046

Fig. 4. SALES ANALYSIS is run daily on completion of invoicing procedure.

S A L E S   P R O G R E S S   A N A L Y S I S   03/13/64

WEEKLY COMPARISON				PERIOD-TO-DATE COMPARISON			
TOTAL WEIGHT	TOTAL AMOUNT	WEIGHT VARIANCES TO LAST WEEK	. LAST YEAR	TOTAL WEIGHT	TOTAL AMOUNT	WEIGHT VARIANCES TO LAST PERIOD	SAME PERIOD LAST YEAR
1,224	552	252	359CR	3,420	1,542	909CR	2,040CR
20,963	9,634	286	2,330	75,628	34,536	7,489	17,265
10,784	4,807	10,916CR	1,196CR	45,309	19,917	7,469	11,333
6,421	2,763	2,822CR	1,174CR	25,290	10,804	5,203CR	662
3,788	1,598	405CR	1,989CR	12,470	5,217	385	4,348CR
9,987	4,002	1,601CR	3,433	31,135	12,590	6,684	9,451
30	12		2,520CR	120	52	1,770CR	4,830CR
1,152	242	19	1,255CR	3,339	692	1,144CR	4,097CR
1,200	513	300		2,700	1,160	600	1,145CR
825	352	600	420	1,305	561	285	15
1,869	968	251	1,869	5,407	2,835	4,115CR	5,407
1,008	502	468CR	1,008	3,510	1,702	756	3,510
1,980	841	23,220CR	1,980	52,476	22,238	5,124CR	52,476
300	138		300	1,260	586	180CR	1,260
		540CR		540	260	540	540
514	246	490	514	850	411	314CR	850
300	138	264	300	550	255	734CR	550
		60CR		3,563	1,428	3,287	3,563
4,110	742	1,509CR	4,110	14,061	2,505	1,356	14,061
66,458	28,060	39,080CR	7,771	282,933	119,298	9,358	104,483

Fig. 5. WEEKLY SALES ANALYSIS is a comparative progress report which enables management to gage the company's progress in various areas.
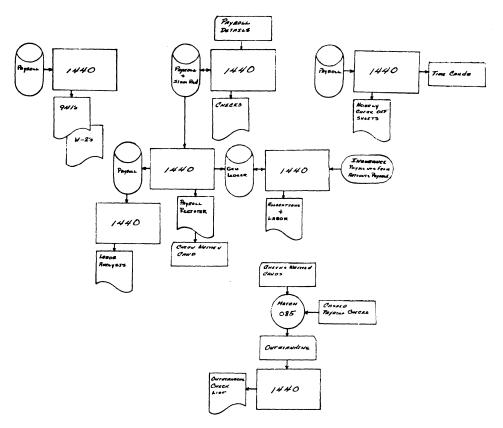
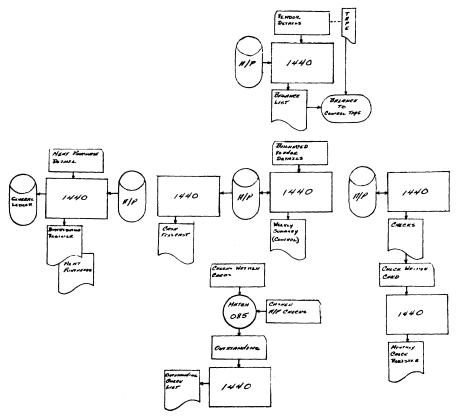Fig. 6. SIGMAN PAYROLL SYSTEM incorporates 6 payrolls into one unit.

Fig. 7. SIGMAN ACCOUNTS PAYABLE PROCEDURE represents one of the most involved portions of the total system concept owing to its wide variety of input documents and output information.

DATE	NAME VEND	VO NO	INV NO	GROSS	DISC	NET	DUE	NEXT WEEK	2ND WEEK	3RD WEEK	OVER
KINGSBY TRUCK LINES											
02-25-64	0610	3580	410463	677.68		677.68	677.68				
				677.68		677.68	677.68				
RIO GRANDE MOTORWAY											
03-05-64	0811	3579	112087	976.83		976.83	976.83				
				976.83		976.83	976.83				
ROBINSON BRICK & TILE											
09-17-63	0816	0313	030176	33.75		33.75-	33.75-				
				33.75		33.75-	33.75-				
ROCKMONT ENVELOPE CO											
03-06-64	0818	3559	007474	8.34		8.34					8.34
				8.34		8.34					8.34
ROCKY MTN ASSN OF CREDIT											
02-28-64	0819	3312	000874	8.75		8.75				8.75	
03-02-64	0819	3498	001013	50.00		50.00				50.00	
				58.75		58.75				58.75	
ROGER SALES CO											
02-20-64	0824	3347	007927	409.43		409.43		409.43			
				409.43		409.43		409.43			
ROSS THOMASSON CO											
02-28-64	0829	3407	000517	51.38		51.38				51.38	
				51.38		51.38				51.38	
ROYAL FOODS INC											
02-03-64	0830	2656	000222	591.00		591.00	591.00				
02-12-64	0830	2838	000241	155.00		155.00	155.00				
02-13-64	0830	2957	000245	310.00		310.00	310.00				
02-24-64	0830	3273	000253	144.15		144.15	144.15				
02-28-64	0830	3499	000259	472.75		472.75					472.75
				1,672.90		1,672.90	1,200,15				472.75
SACHS LAWLOR COMPANY											
02-13-64	0840	2958	090375	12.65		12.65	12.65				
02-14-64	0840	2958	090619	18.97		18.97	18.97				
02-17-64	0840	2958	090701	7.65		7.65	7.65				
02-19-64	0840	3076	091050	23.46		23.46	23.46				
02-19-64	0840	3076	091126	7.14		7.14	7.14				
02-20-64	0840	3076	091333	4.59		4.59	4.59				
02-26-64	0840	3500	092206	3.06		3.06			3.06		
03-02-64	0840	3500	092946	2.24		2.24			2.24		
03-05-64	0840	3529	093474	2.14		2.14					2.14
				81.90		81.90	74.46		5.30		2.14
SCHACHET MERCANTILE											
02-11-64	0842	3134	010723	20.00		20.00	20.00				
				20.00		20.00	20.00				

Fig. 8. CASH REQUIREMENT FORECAST REPORT is actually an aged open file which indicates payments due in subsequent periods.

register and a construction report. This application is thought to represent one of the most involved portions of the system because of the variety of information that can be obtained from it and also because of the variety of documents which provide input for accounts payable entries.

Warehouse Inventory portion of Sigman EDP operations (see Fig. 9) involves the preparation of a daily perpetual warehouse inventory, a monthly usage report, and a departmental valuation, thus providing several general ledger entries.

Product Inventory and Transfer System (see Fig. 9) calls for the creation of two reports - interdepartmental transfers and other product inventories. Every job at Sigman Meat Co. is coded to coincide with the firm's accounting structure. The product inventory and transfer system therefore provides two other series of entries to the general ledger.

General Ledger (see Fig. 9) entries are mainly provided by the five preceding subsystems. All of these entries have been created during the month and directed into the general ledger system. The general ledger is composed of an official general and a department operating expense report. The 1440 also consolidates the income and expense report for comparison.

Billing

Billing input comes to the 1440 for processing in the form of a series of detail cards. Each of these cards is coded by customer number and has the quantity ordered, the package, weight and price punched into them. Once the details enter the 1440, an address is developed permitting location of the disc-stored customer record. The customer's name and address are retrieved to be imprinted on the invoice. This invoice is an 8-1/2 by 11 inch form which can hold up to 36 line items. There is no overflow invoicing. If an order requires more than 36 line items on an invoice, another and separate invoice is prepared.
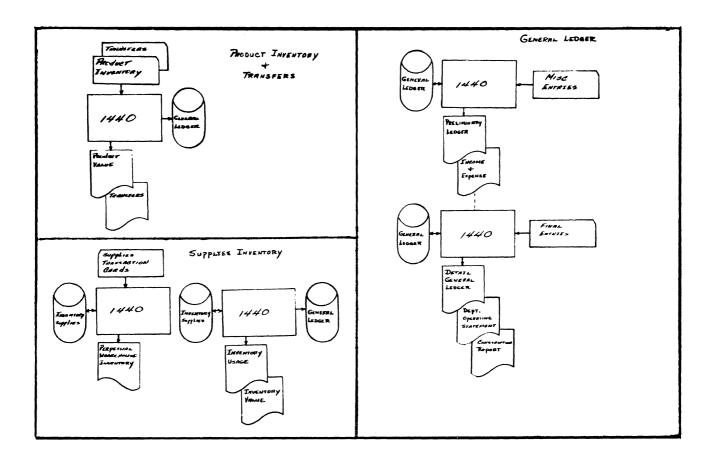
Fig. 9. PRODUCT INVENTORY AND TRANSFERS and SUPPLIES INVENTORY subsystems also contribute entries to the GENERAL LEDGER SYSTEM.

While the invoice is running, the console typewriter prepares a back order and short report for the sales office. This particular report is used in creating another order. At the same time, the product records are being updated and the commission weights are being accumulated on the customer record. Each record has the standard state code associated with it and is accumulating the total dollar amount shipped and sold to that particular customer. When the invoicing procedure is completed for the day, a sales analysis, which is actually a progression type analysis, is run.

Sigman Meat Co. operates on a 13 month basis or a four week period. The sales analysis shows what was sold by weight and amount of dollars during the day, gives an average price received for each item, a total weight and amount for the week and a total weight and amount for the month. This report also accumulates data for a progress report.

At the end of every week, a progress report is run comparing sales that week to those of the preceding week, the preceding week a year before, the last period and the same period a year ago. In this way, management is provided with a sensitive tool with which to gage the company's progress in various areas.

Similarly, commission reports are run at the end of the week. These reports are run by territory and by customer, with weights and amounts recorded on commission areas. Sigman

commissions vary for different products such as sausage, ham, bacon and so forth. When this report phases out, a recap of the sales territories is prepared on the printer showing total weights. Simultaneously, the payroll amounts for each salesman are recorded on the typewriter for hard copy.

Every week a peddler reconciliation is run. Sigman's peddlers are billed all through the week with a no charge invoice which is a debit to their accounts. Daily sales are picked up through the invoicing system and are credited against these debits. Inventory which they return at the end of the week is credited to their accounts. A truck reconciliation is then prepared by product and salesman.

After state sales amounts for the month have been accumulated, a report is run each period on total dollar sales in each state.

An accounts receivable debit is prepared at the same time that the invoice is run. Sigman is now working closely with some of its customers who have data processing equipment so that in the future a great deal of paperwork may be eliminated through a direct communications network. The accounts receivable entry provides further input to the general ledger.

The billing area is one where Sigman is implementing many new features. Among them is a data transmission system which will permit invoices to be written at the same time as orders are filled.

Payroll

Sigman's payroll procedure takes the following form. Time cards for hourly personnel are keypunched with man number and hours. The salary payroll is a repetitive type and the commission payroll is drawn from the billing procedure. An edit or balance list is first run for an audit trail and for future reference. Once this is finished, the detail cards are entered into the 1440 system and the checks are run. While the checks are being run, information from the check writing procedure is laid on disc to form a payroll register. This payroll register contains such items as hours worked, check number, man number, man's name, deduction, net and gross amount of the check. This is a combination report, and once this phases out a register total as well as a deduction total are printed at the bottom. Thus, it is no longer necessary to prepare a deduction register and a payroll register. During preparation of the register a check written card is punched out for later use in payroll reconciliation.

The payroll register run provides input to the disc-stored labor analysis. This analysis is related to the accounts structure and departmentalizes the total payroll by hours and amount. This information is accumulated on disc and at the month's end is combined with information from the accounts payable system to produce what Sigman calls a JV 6 entry. Insurance payments such as Blue Cross and life insurance are applied to the payroll records. The JV 6 report then allocates all insurance, computes state and federal unemployment taxes, and the employer's portion of FICA (social security) . It creates 124 entries to the general ledger system. This report alone previously took about four man hours to prepare on a manual basis.

With the 941's already updated on disc and the checks written, all that is required at the end of the quarter is to put in the 941 paper, the 941 program and to list off the 941's. Again, as the checks were being written, the year-to-date information was accumulated on discs for the end of the year W-2 forms and special tax reports that become necessary.

Once a week, the 1440 is also used to run hourly personnel check sheets and at the same time to punch out time cards for the plant and hourly employees. The check sheets are used by the personnel department to check out each foreman's time cards to ascertain that each man's time card is accounted for and that he will be paid.

Accounts Payable

After vendor invoices are approved, they are sent to the accounts payable desk where they are checked for the distribution codes. Each line item is keypunched on every invoice. Rather than punching the amount of the line item, the quantity and price are punched in. These invoices are batched daily and are sent to data processing where each card is extended and totaled by invoice and vendor. A balance of the tape to the balance report indicates a bad extension on an invoice or possibly a keypunch error. However, these cards are key-verified. The accounting department has its own keypunch unit and creates the majority of its own entries to the system.

After the balance of each batch of invoices and at the end of the week, the detail cards are summarized by the 1440 and an accounts payable open file is created. This invoice from the vendor has previously been coded as to when it should be paid. A cash requirement forecast report is then run. This report is actually an aged open file. It is reviewed by the accounting department and, if it proves satisfactory, the checks are written.

As checks are written, a checks written card is punched for later bank reconciliation use. It also provides input for the check register which is run at the end of the month.

The original detail entries, from which the accounts payable open file was created, go to a distribution file from which the distribution journal is run each month. This also creates all of the entries from accounts payable to the general ledger.

The accounts payable system also includes a meat purchases or draft system. It is operated in exactly the same way as the accounts payable system except that data processing does not write the drafts. Distribution, however, is made in the same manner.

Perpetual Warehouse Inventory

This system's purpose is to generate information which will facilitate maintenance of adequate stock levels with minimal use of warehousing facilities. Also, in many instances, items purchased are stored by vendors. There are, therefore, two areas of interest in this inventory system. One is a warehouse level which should always be maintained for efficient company operations. The second is an availability level consisting of items on-order plus warehouse stocks.

The warehouse fills out a warehouse sheet containing a withdrawal section, a receipt section each day. The on-order section is filled out by the purchasing agent at the end of the day. This particular warehouse sheet is keypunched into a spread card. This system, too, is based on a Mod 11 number. The spread card indicates receipts, withdrawals and on-order for any given item. It is processed in the 1440 which updates the files and calculates new levels. This application is made in a sequential manner; however, the report is printed out in a vendor sequence so that each morning the purchasing agent has a warehouse listing.

When stock levels are below a certain minimum figure, the purchasing agent may call the salesman for the appropriate vendor and place an order. At the end of the month, a final warehouse inventory is run. This particular inventory report indicates withdrawals during the month, deliveries and final balance. The file is then sorted out automatically, resulting in an inventory valuation report by department. A physical inventory has been taken in each foreman's area and applied to the record. This again creates entries to the general ledger system.

Product and Transfer System

This system supplements an actual inventory of products on hand by providing an accounting of merchandise transferred by one department for use in another. During the month, as the foreman transfers merchandise, he fills out a transfer sheet showing the product he has transferred and where he has transferred it. He is then given credit for this material, and the other department is correspondingly debited. At the end of the month, all this detail is passed through the 1440 where other general ledger entries are created.

A physical inventory is taken every four weeks. This physical inventory is priced and key-punched. Inventory extension and distribution to appropriate departments are made for general ledger updating.

General Ledger

The five preceding applications make up about 95 percent of general ledger entries. Accounting will give the data processing department any miscellaneous entries they may have, which are not yet included in the system. The preliminary ledger is then run. This ledger contains entries for the current month plus a balance brought forward for the year. This report is checked out by the accounting department, and any final entries that might be necessary are sent to data processing. At this point, the detail cards for the month are pulled from the balance forwards and merged into the complete detail file. A complete general ledger is then run. The general ledger is run so that it will compare one period to another in every accounting area. Thus, through this accounting structure, departmental operating reports are created simultaneously with the general ledger.

Sigman does all of its construction work which necessitates a construction report. Expenses incurred in any such undertaking are extracted from the labor payroll and from accounts payable. From these, a construction report is run showing the total job cost. This is primarily a reference file which is used for tax purposes.

Results and Future Plans

Sigman Meat Co. management believes that the implementation of the total systems concept is providing it with adequate, current and correct data necessary for the efficient operation of a business. This has been done by reducing data processing procedure to its simplest form, basing it on the company's three major areas of activity - billing, accounts payable and payroll. The company has thus strived to produce that which is necessary and vital, to eliminate that which is not, and through an over-all system to know the difference.

The biggest problem encountered by Sigman is the education of the people who must work with a computer or data processing system. These people, who are not directly associated with the equipment, are of paramount importance to the operation in that its success or failure basically depends upon their cooperation. Sigman has an extensive education program in which complete computer courses have been given to key personnel. The computer has forced the company to reevaluate all jobs and to standardize job specifications. This is regarded as a potential side benefit, considering that the surprising number of exceptions encountered during systems work often were not really exceptions but hangovers from earlier conditions. Similarly, some surprise has been expressed at the ease with which a phone call to a customer or a vendor could easily clear up an exception. Under some conditions, both Sigman and the other firm conducted their relationship on an exception basis when neither really wanted it to be so.

There are two other independent and unrelated areas that are being converted to computer processing. One is automatic pricing. The 1440 prepares price lists for the sales offices, but orders must still be priced manually. Under the new scheme, the computer will automatically price each item on an order.

Similarly, Hathorn expects to use the 1440's ability to solve simultaneous linear equations to determine sausage formulations. Use of the computer, he believes, will assure an absolute standard high quality sausage made with the most economical material available at any given time.

Sigman has employed a doctor of chemistry whose duties include analysis of material available for sausage with respect to its color, moisture, protein and fat. This information, along with current prices, will be fed into the computer, which will compare all possibilities and determine a formula that meets absolute standard and uses the most economical materials currently available.