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The Graphic Arts A

Study of The Organization and
Management of Printing Plants

Business Administration

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THE GRAPHIC ARTS
A STUDY OF THE ORGANIZATION AND
MANAGEMENT OF PRINTING PLANTS

BY

JAY AUSTIN COLVIN

)
THESIS

FOR THE

DEGREE OF BACHELOR OF ARTS

IN

BUSINESS ADMINISTRATION

COLLEGE OF LITERATURE AND ARTS

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May 31 1913

THIS IS TO CERTIFY THAT THE THESIS PREPARED UNDER MY SUPERVISION BY

Jay Austin Cahoon

ENTITLED *The Graphic Arts; A Study of
the Organization and Management
of Printing Plants*

IS APPROVED BY ME AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE

DEGREE OF *Bachelor of Arts*

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Reagan Printing Plant, R. K. Donnelly Printing Company, and the
Toby Rulovitz Printing Company.

THE GRAPHIC ARTS

The study of the graphic arts organization, or the organization of printing, publishing and composition plants, has never been worked out in its entirety. The foremost reasons for this are the rapidity of change in business methods of the printing trade, and the difficulty of gaining data regarding the already existing plants. It shall be our duty to make an inquiry into the procedure of organizing and managing a large printing plant of the commercial or manufacturing type.

The modern printing plant, as exemplified by the few really great and well organized corporation, partnership and individual, owned companies, has come at last to point where the necessity for careful organization and management is as essential to the success of the business as it is to any other unit of the manufacturing group of enterprises. No longer is the big printing business the work of turning out a few masterpieces of the craft, the finishing of a limited number of rare examples of the printer's art, but has become, under the pressure of commercialism, as much a cog in the machine of business as has the factory which manufactures wire nails, clothes pins or locomotives.

The commercial trend to the printer's trade has come but recently. Formerly, with the old types of machinery used, such as the old Washington hand press, the output was determined by the ability and deftness of the operator, and there was no opportunity or facilities which could turn our news papers at the rate of six thousand per hour, or could print in the course

of a days work twenty-five or thirty thousand of our current monthly magazines.

These developments have come only with invention, organization and the application of scientific management. Most of our large plants are the out-growths of small plants where the owner worked as the foreman of the press room, binding and composing room. Not only was he chief of the mechanical work, but he carried in his mind all the details of each job. He made all estimates, rendered bills, met the customer and if he was unable to attend to any of these details, the business suffered. In this period, printing plants were run on the authority of experience. To day the operations of a plant are based on figures and facts. Without the scientific arrangement of facts and data gained from knowledge of the plant, its costs, output, and capabilities successful operation, under close competition cannot be maintained.

The applications of new methods of processing, the invention of new tools and new machines, and the changes resulting therefrom in the character of the labor employed, has necessitated great changes in the business methods of printing. These things all tend to a greater output per capita, and this greater output is what the modern printing establishment demands.

The system of a well organized printing establishment should be such that the management can view the body as a whole without being prejudiced in any one direction. It should be so constituted that no expansion or contraction of the business could take place at any time without at once becoming apparent to the management. Looking at it from this stand point, we may say that the aims of

the printing plant are:

1. To get the firm properly introduced to the public which has printing and publishing interests.
2. To bring the various officials into proper relations with each other.
3. To correlate the departments so there will be a minimum of friction between them.
4. To unite the employees into a body which will work together for a common end.*

The putting of the firm into relation with the publishing trade is a problem of advertising policy and is beyond the scope of this thesis.

With respect to the official organization of such a concern, one must realize there are two types of relationship which must exist.† There is primarily the organization of ownership. This may take the form of an individual, partnership or corporation. When a plant becomes very large, it is usually advisable to carry the business in the form of a corporation, and as we are dealing with large plants, we shall take up this division of corporate owned plants.

ORGANIZATION OF OWNERSHIP

In the corporation, the basis of authority is the group of stock holders. They own equities in the business, or interests which are represented by the stock certificates which they hold, and it is by virtue of this possession of stock that they control the next group in the ownership organization, or the directors. The board of directors is elected by the stockholders, and has the more immediate direction of the business, whereas the stockholders may affect the policy of the plant only by changing the directorate

† Prof. J. C. Duncan. * Mr. C. E. Woods - Fac. Org.

at the annual or semi annual meeting.

The board of directors determines the policy of the concern and elects or appoints the general officers who are supposed to carry out the directorate's plans.

These officers are, in their order of authority, president, vice-president, secretary and treasurer.

In the printing business these officers are usually members of the board of directors and in most cases they are the owners. The nature of the printing business is such that the ownership is confined to but few persons, and these few owners are usually found to occupy the positions of stock holders, directors and officers at the same time.

THE OPERATIVE ORGANIZATION

The Operative organization of the printing plant has three divisions which are:

1. Legal
2. Accounting
3. Manufacturing.

The Legal department is a necessary element to almost all manufacturing plants. Since every business enterprise is conducted under the laws of the state in which it operates, it is often necessary to have expert advice upon the rights of the company, and the penalties to which it subjects itself for neglect or useful disregard of the law. It is customary for small plants to employ legal counsel as conditions may require, and this is often less expensive than maintaining a legal department.

For the larger plants, it is almost a necessity to have a

legal department which is at the service of the general executive, as well as of the various departments. The Legal department is ordinarily under the direction of a general counsel who is aided by a staff of assistants each of whom may have some special branch of the law of the company's work under his immediate care.

The accountancy department of printing plants comprises three distinct fields, viz., the keeping of the relations between owners or stockholders and the plant; the relation between the plant and the customers, and the keeping of cost on efficiency records.

The ownership phase of accounting has no place in this thesis. It is of the most simple nature and does not involve the large amount of work which a corporation of the nature of the United States Steel Corporation.

With respect to the relation between creditors and customers, it is evident that the extension of credit is a primary consideration.* Accounting data must be gathered and consulted, and a competent credit man must be a good accountant, or possess a rather thorough knowledge of accounting. This is shown by the fact that whenever the credit of a business man is impaired, the expert accountant is at once called in and authorized to make an examination of the books. Of course other factors, such as honesty, habits, etc., are taken into account, but on the whole, credit is fundamentally based on the financial condition of the enterprise and the financial condition is shown by the accounts.

The object of accounting is to secure a record of all transactions, mathematically and economically correct in form, and to

* Prof. M. H. Robinson - Business Administration P. 127.

present such data in summarized statements showing the cost of operating each department, and the net profits or net loss resulting from each and from the business as a whole. Accounting then is a necessary part of the work of all departments, and hence is properly classified as one of the general departments of a business enterprise.*

The Manufacturing department, or the actual work of printing is under the General manager. He is, as are both the Attorney and Accountant, appointed by the board of directors, and like them, is responsible to the board of directors for the carrying out of the work as outlined by the directors. He is supreme over the working force, and in turn is responsible for the working force in carrying out of the work of production. Since his duties and responsibilities are confined to the work of production, his qualification must be determined by the character of the goods produced, therefore in the printing business, he must be an expert on paper, inks, binding, and composition. He must know all the mechanical process through which a job goes, and must be experienced in the actual production, so he will know when any thing is brought to him for his approval whether it is ~~a~~ right or wrong, and the methods of correcting the faults if there are any.

As a technical expert, the general manager should personally, or through his immediate office force take charge of the following matters. The inspection of processes and goods in the process of manufacture; methods and means of stimulating efficiency; the

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Mr. H. Robinson - Business Organizations - P. 127.

general oversight of tools and machinery, the care of supplies and materials. As the authority in direct charge of shop organization, he has supervision of the time keeping system and the allotment of work to the several branches of his department; the wage system and the stimulation of efficiency among the various sections of the factory, the maintenance of discipline; the sanitary conditions of the plant and the inter relationship of the various branches. In short, the G. M. is obliged to take direct and personal charge of all matters which cannot be conveniently managed through the subdivisions of his organization. In the large institutions, the G.M. often is compelled to entrust some of these duties to subordinates where they are specifically within the departments of the subordinate.* To keep him in intimate touch with all his responsibilities, he must have presented to him, in comprehensive form, a record of the work of his subordinates. This is done through the cost and efficiency system.*

The General Manager's duties may be grouped under three heads:

1. Purchasing
2. Selling
3. Manufacturing

The purchasing for the plant, such as paper, ink, type metal etc., unless the business is extra ordinarily large, is under the supervision of the general manager himself.

The selling function is of greater importance. At the head of this section is the sales manager. His office is appointive,

*

M. H. Robinson - Business Organizations - p. 144.

*Prof. J. C. Duncan.

and he ^{is} responsible to the general manager, making his report to, and receiving his instructions from that officer.

The duties of the sales manager are:

1. The supervision of advertising.
2. Estimating.
3. Building up a selling force.

The advertising division includes all of the means through which the business enterprise seeks to retain and extend its market. The work is made the immediate direction of an advertising manager, each having charge of some important branch of the business. In all cases, advertising is an attempt to reach the class of people who have the most use for printing, and every plant has a different set of customers, according to the type of printing it does.

The function of the advertising manager is first to choose the media through which the purchaser is to be reached, second to outline the plan of campaign; third, to organize and direct his assistants in their work; and finally to trace the relationship between the advertising in its results in actual or prospective customers.

Estimating is one of the elements which are necessary to the printing business because technically, the goods are made to order. Its purpose is to determine in advance the approximate cost of printing a particular job. The cost thus ascertained is used for the purpose of making the price, and hence the bureau of estimates is one of the important branches of its work and organization. A properly conducted bureau of estimates will prevent the wreck of a company where the other departments of the plant are running efficiently. It is evident from the nature of the

work that the bureau of estimates demands from its official staff, training in two separate fields of knowledge: first, in printing and second in accountancy. The first of these two requirements is generally recognized. It is admitted that a man must have a printer's knowledge of materials and printing to estimate even approximately the cost of turning out an issue of catalogs or books. It is not generally recognized that the second qualification is equally imperative, and yet unless one admits the truth of the second proposition, he must logically affirm that the proper training for the chief accountant of such an enterprise as the United States Steel Corporation is that of the engineer. The cost of printing a job is not merely the materials and the time directly employed, but a proportion of all the undivided and unassigned expenses, and therefore the accountants training is necessary in the bureau of estimates.*

The selling of the finished goods is done before the goods are furnished. The printing plant differs in this respect from the manufacturer of automobiles or sewing machines, so there is no necessity for having a large corps of salesman who are on the road pushing a line of goods already manufactured. The selling problem is to create a demand, or orders from the publishing and printing public.

3. The Manufacturing department is the last division of the general managers duties. Every printing plants manufacturing department except the most simple may be divided and subdivided into branches and sections. In most cases, the following divisions will be found necessary and are usually employed.

1. Composing Rooms
2. Press Rooms
3. Binding.

Where the plant is small, the general mgr. is more directly in contact with these various departments, but as the business increases in size, it is found that another officer, the superintendent is necessary to share the work of supervising with the general manager. The superintendent is employed by the general manager and is responsible to him for the work of the departments.

Under the superintendent are foremen of the composing room, the press rooms and the binding, and are hired by the superintendent, or the general manager.

The foreman must be a man skilled in the technical side of the work of his department. He should know how much work an employee working at a fair rate of speed is able to accomplish in a given time, and be able to secure the best work of which his men are capable. He must also see that the jobs are properly apportioned so that the men, tools, and machinery are regularly employed. It is also the duty of the foreman to see that the time slips are properly checked and thus assist the accounting department in its efforts to determine the actual cost of printing each of the various jobs which are turned out.

The foremen are assisted by the bosses, who are immediately above the workmen and in some cases take part in the actual labor.

Finally, in each department are the workmen, who, under the direction of the foremen and bosses, take out the finished production in conformity to the rules laid down on the job ticket or presented to them by the foremen. Each workman in a well

organized shop has his own duty to perform, and it is the duty of the general authority to see that the workmen are not only skilled in their particular work, but that each branch has its proper allotment, so that all are uniformly employed, and no department is obliged to wait, owing to the failure of the preceding department to get its work out in the proper time. In addition to the skilled laborers, who cannot readily be shifted from one kind of work to the other there is always a group of general utility men, or laborers who assist in the non-technical work wherever needed.*

The main principles of the printing operation are for the most part the same. This feature of the printing business is due to the standardization of printing and binding machinery. A few manufacturers have improved the type of printing presses, as rotaries, Gordons, and flat bed presses to the point where all plants use practically the same styles in their machinery, so we can safely say that in the majority of plants the divisions of the plant are as follows:

1. The Composing Room, where the type is set, forms made, and stone work, or the trimming up of forms is done. This department includes type setting by use of the linotype machine, and a battery of these type setting machines will be found in almost every large plant.

2. The Rotary Room and Gordon Room contain the presses of various types which are shown by the names. Here the actual work of printing, or making impressions is done. There are other types of flat bed presses, and presses for special work, but these are not usually of a large enough number to permit of a department to

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M. Robinson - Business Organization - page 149.

themselves.

3. The Binding, another distinct department, cares for the assembling of printed book sections, the covering and trimming of bound books, or in the case of small pamphlets, it stitches them. All of this type of small work comes within the of the bindery. Folding machines which take the stock from flat bed presses and fold into the desired sizes of finished work are also in this department.

These are the main divisions of the printing business from the operative standpoint. Many plants which specialize in certain forms of printing have departments which are subdivisions of these already given, but they are peculiar to the type of business which they do and cannot be regarded as characteristic of the printing business.

We shall take up the composition department and inquire into its details.

The introduction of a cost system into a printing plant generally improves a number of other things besides the actual record keeping of the plant, though, of course that is the first necessity of the cost system. It is based upon records of things as they actually occurred and is useless unless methodical and accurate. Its aim is to find the actual cost per hour and per job, and it will do this in every case unless neglected or willfully trifled or tampered with.

In figuring the actual cost of production, the printer is unconsciously stiffening his backbone and educating his mentality so that when it comes to selling the goods he really feels that it does cost that much - he knows it, and when he adds the

profits he knows he is entitled to, it is not easy for a shopping customer to break his price by telling him how much less his competition has bid.*

An article produced in a printing plant contains but two elements - material and time, and in the composing room, it is most important that this time be taken into careful consideration, and the following system is usually employed in keeping track of the time consumed in turning out a job.

The Job Ticket Form 1 M.C.

When a job comes into the office, the first step is to make out a record in which are presented detailed instructions in regard to the job in hand. The job ticket (Form 1 M.C.) is designed to meet the requirements of such a record. The upper half of this form, above the space reserved for the invoice, is printed on the face side of the job envelope, one of which containing the copy accompanies each job throughout its progress through the shop. The entire form is printed on a sheet which is filed in a loose leaf binder of "Work in Process", as soon as the job has been entered on same, this sheet serving as the permanent office record of the job. By means of a carbon, the description and instructions in regard to a job may be entered on the office record, and on the job envelope at one writing. When the job is completed, the job envelope is returned to the office, and the cost of same is computed from the data as to time consumed and material used, also posted on the reverse side (Form 2. M.C.) of the office record. The cost of the job having been computed the bill is then

*
Printing Art. Vol. 21, p. 47.

made out, a duplicate of same being made by means of a carbon on the space reserved for the invoice in the office record.

The office record may then be filed in a loose leaf binder containing the completed work of the current month, and when all the work for the month has been completed, the office records containing the data in regard to same may be filed away in a permanent transfer binder. The job envelope containing all copy and proof of the job should be filed away according to job number as soon as the job has been billed. By entering the job number in making the entry in the customers account in the ledger, the job envelope and the office record may at any time be readily located.

Care should be taken that every job which goes into the shop shall bear the correct job number and complete instruction, as much time and many mistakes will be save thereby. It should be a rule of the office that no job shall be billed until the cost of same shall be computed.

FORM I M.C.*

Date Nov 15, 1912		JOB TICKET		Wanted Nov 19	
For C. S. Rutledge & Co		Address 207 Broad St			
Customer's Order No. 4769		Job Number 6285			
Description		Composition - 10 point - Roman			
		To be made up into pages and locked up ready for foundry			
Proof No. Mr. Knight					
Set Body Short (long) Way Type Roman		10 Point Size of Type Page 3"x6"		(Hand) Machine	
Fac-Simile		Heavy		Plain	
Near As Possible		Light		Fancy	
		Like Copy		Nice Job	
		Like Sample		Cheap Job	
Plates					
		BILL			
Date Billed Nov 20, 1912		Folio			
		103,420 ems L.P. @ \$50 M		51	71
		24 hours make up and lockup @ 150		36	00
		210 # @ 10¢		21	00
				108	71

* Grant Chandler - "System of Cost Finding" (Machine Composition)

Individual Job Record - Form 2 M.C.

Form 2 M. C. is the office record to which is posted the record of all time consumed and material used on a given job. It is printed on the reverse side of the office record of (1 M.C.), and in connection with it, is intended to give complete information in regard to job entered on the same. In posting from the daily time tickets (Form 3 M.C.) the date is entered first, thus the name of the workman then the time he consumed on the job is entered in the proper column descriptive of the work he did. It will be noted that in the lower left hand corner of the form, space has been left for entering all merchandise items connected with the job, such as outside printing and binding, electrotyping, brass rule, etc. It is some times contended that brass rule is properly composing room equipment and should not be charged to an individual job, because of the fact however that its value depreciates greatly when once it has been cut up and because there is danger that much of it may be lost before the forms come back from the printer, the more conservative method would seem to be to charge it to the job direct for which it is used.

In the lower right hand corner space is provided for a summary of the cost and a distribution of the cost on the job. It will be noted that the cost is distributed according to departments, and if several kinds of work are done on a job in one department, the credit to that department in the distribution of the charge is shown as a lump sum.

For instance in the illustration 51, 71 represents the total credit to the lynotype department for the work done on this job. These department credits are to be transferred from the individual

job records to the Monthly distribution of Sales Record - (Form 10 M.C.). To prevent loss of metal, the metal on the job should be billed at the same time as the composition, but, as the charge for the metal constitutes a charge against the customer which will be liquidated by the return of same, as it usually is, the cost of the metal does not properly constitute a part of the cost of the job.

The Compositors daily Time Ticket (Form 2 M.C.)

One of the most essential elements of computing the cost of a job is the keeping of an accurate record of the time spent on each job in its progress through the shop. In the machine composition the most satisfactory form for this purpose is the daily time ticket on which each compositor - whether hand or machine, - should be required to give an accurate and complete history of his days work. On this ticket, the compositor states the job number and the name of the customer. If he is doing hand work on a catalog, he gives the page number; if he is doing machine work he gives the size of the type. In the "Kind of Work" column, he describes the nature of the work by means of numbers, which for ready reference are printed on the back of the daily time ticket; 1, for instance, denotes "Sinotype Composition," 2, "Linotype Corrections," etc., etc. At the time when the daily "string" of each operator is measured in the office, the number of ems on each job he has done during the day is entered in the column reserved for that purpose. In computing the operator's weekly average of ems set per hour he should receive no credit for setting his own corrections, and hence the number of ems ems he has set on that work is omitted. The operator or compositor should be

Compositors Daily Time Ticket

EMPLOYEE J. Smith CLOCK No. 22 DATE Nov 16 1912

Kind of Work Column must be filled in, using numbers listed on back of sheet. Take separate ticket for over time and have it stamped overtime by foreman.

Job No	For Whom	PAGE WORKED ON IF MACHINE SIZE	KIND OF WORK	IF MACHINE GIVE AMT SET	TIME COMMENCED	TIME LEFT OFF	For Office Use Only	
							Chargeable Hours	Non Charge Hours
6791	J. K. Kimball	11 pt	1	11.184	8 30	12 00	3	30
6791	"		2		12 30	12 45		15
6471	L. J. Adams		3	1.041	12 45	1 00		15
6285	E. S. Rutledge Co	10 pt	1	9.025	1 00	8 35	2	35
6285	"		2		8 35	8 50		15
	Office		14		8 50	4 35		45
	"		21		4 35	5 00		25
				21250				
							6	50 / 10

OFFICE: Enter Total Chargeable and Non Chargeable Hours of all Employees

Correct W. K. Ham Foreman

This Record must be carefully filled out, The time verified and signed by foreman and sent to office. Time shown hereon must agree with the time register.

- | | | | |
|--|---|--|---|
| <ul style="list-style-type: none"> 1. Linotype Composition 2. Linotype Corrections 3. Linotype Alterations 4. Linotype O. Ks Chargeable To Job | <ul style="list-style-type: none"> 5. Hand Composition 6. Office Corrections 7. Make up 8. Lockup 9. Alterations | <ul style="list-style-type: none"> 14. Machine Trouble 15. Proof Reading 16. Copy Holding 17. Type Proving 18. Distribution | <ul style="list-style-type: none"> 19. Repairs 20. Office Sorts 21. Standing Time. |
|--|---|--|---|
- Non Chargeable Work. All Depts.

required to account for his entire day, not merely for the time he has worked on jobs, Hence the operator should show his time lost due to machine trouble or standing time, and the compositor should show his time on distribution as well as the time spent on chargeable work. In the casting room the time should be kept by the machine rather than the man. There should be a time ticket made out for each machine daily, on which the entire working day should be accounted for that machine. The time turned in from the casting room will represent machine hours and not man hours, but so far as posting to the jobs, it may be handled in the same manner as compositors time.

The first duty of the accountants clerk in the morning is to take the time tickets of the day preceding and extend the time in the proper columns - chargeable, or non chargeable, as the case may be. The safest test by which to determine whether time is chargeable or non chargeable is this; if it can be charged directly to a particular job, it is chargeable - other wise it is non-chargeable. Having extended the time on each ticket, and totaled the time on each to make sure that the entire day is accounted for, the clerk then posts the time to the individual jobs on the individual job records (Form 2 M.C.). The totals as shown by the daily time tickets are then entered on the Department pay roll (Form 4 M.C.) and on the monthly record of Chargeable and Non Chargeable Hours (Form 6 M.C.)

Department Pay-Roll (Form 4 M. C.)

From the daily time tickets (Form 3 M.C.) the clerk enters the total chargeable and non-chargeable time for each man each day on the weekly pay roll record. In the case of machine departments,

the number of ems set by each man each week, as shown by his daily time ticket for the week, should be entered in the column entitled "Ems Set". This pay roll sheet constitutes the record according to which the employees are paid, and care should be exercised that it agrees exactly with the time as shown by the daily time tickets. All non-productive labor, such as foremen, machinists, galley boys, proof readers, etc., should be kept separate from the productive labor. Non productive workers in a department should not be asked to fill out a daily time ticket giving their days work in detail, but should account for this time by punching morning in and noon out, noon in, and night out by the time on the recording clock. In some offices where the clock is not used - non-productive workers are required to make out a daily time ticket, showing time started in the morning and time stopped at noon, time started in the afternoon, and time stopped at night: Those employed in the caster department should account for their own time (not the time of the machines) in the manner provided above for non-productive employees, in order that an accurate record of their time may be secured for pay roll purposes.

By ascertaining each week the pay roll cost the manager will be able to keep a close watch on his plant and will learn the fact promptly if at any time anyone of his departments shows a tendency to fall below the standard required for efficiency in production.

Not more than one department of the plant should be shown on one pay roll sheet, but a separate sheet should be used for the weekly pay roll record of each department.

Monthly Record of Department - Chargeable and
Non Chargeable Hours. (5 M. C.)

The data for the monthly record of chargeable and non-chargeable hours is compiled from the daily time tickets by the cost clerk. When the time has been extended on the daily time tickets for the month and has been totaled, and the time expended on the individual jobs has been posted to the same, the total chargeable time and the total non-chargeable time for the productive labors of each department separately is added, and is entered by departments on the monthly record of chargeable and non chargeable hours. As the great majority of machine composition departments do not operate both linotype and monotype machines, but one column has been allowed for ems set. In case a plant operates both monotype and linotype machines finds it advisable to keep a record of the total ems set daily on the mono-type, one of the hour columns can be readily utilized for the purpose, or a second sheet can be taken.

In the Illustration, page () the method of entering daily the chargeable and non-chargeable hours and ems set on the linotype are shown and the monthly totals of chargeable and non-chargeable hours are shown for the monotype keyboard, monotype caster and hand composition departments.

Form 5 M.C.

Monthly Record of Department Chargeable and Non-Chargeable Hours.
 For Month of November 1912

Date	Ems Set	Linotype		Mono Keyboard		Mono Caster		Hand Composition		Chargeable	Non Chargeable	Total				
		Chargeable	Non Chargeable	Chargeable	Non Chargeable	Chargeable	Non Chargeable	Chargeable	Non Chargeable							
1	177,220	44	45	3	15											
2	165,715	43	20	4	40											
3																
4	164,680	42	50	5	10											
5	154,210	45	-	3	-											
6	161,790	41	35	6	25											
7	166,460	43	30	4	30											
8	141,270	35	15	12	45											
9	162,140	40	20	7	40											
10																
11	167,890	42	30	5	30											
12	171,570	41	20	6	40											
13	181,650	44	30	3	30											
14	191,280	46	50	1	10											
15	183,750	45	30	2	30											
16	205,380	46	15	1	45											
17																
18	216,790	54	30	5	15											
19	225,379	48	-	-	-											
20	200,980	47	10	-	50											
21	187,800	46	10	1	50											
22	208,600	45	30	2	30											
23	209,770	47	15	-	45											
24																
25	217,650	56	15	2	15											
26	199,300	60	25	2	10											
27	219,380	57	50	2	10											
28																
29	203,700	51	25	8												
30	191,320	48	25	7	10											
	4,665,670	1166	25	101	25	734	25	129	35	518	20	172	45	579	30	79

Form 9 MC

Statement of Cost of Production for November 1912

Item No.	Department Investment Amounts to be charged according to inventory as ded. or add. are made	\$	\$	\$	\$	\$	\$	\$	Total Disbursements
		Gen. Expense	Linotype	Keyboard	Caster	Hand Comp			
1	(Chargeable)		145.20						
2	Pay Roll (Non-Chargeable)	765.90	64.80	191.25	191.25	254.96			1558.61
3	Light and Gas for Machines	4.45	342.58	68.45	68.45	79.60			646.01
4	Power		52.49	21.60	21.60	89.5			87.74
5	Insurance and Taxes	57	12.78	6.80	6.80				25.17
6	Interest	22.04	16.00	14.80	2.82	3.70			37.32
7	Depreciation	3.41	64.03	59.32	28.28	14.78			149.41
8	Bad Debts	70.23	106.72	98.66	18.80	24.36			249.01
9	Spoiled Work		6.57						
10	Debt Direct Expense		30.40	2.50	38.34	15.21			109.41
11	Office Stationery and Postage	13.18		2.61		4.13			
12	Advertising	27.81							
13	Cartage and Carfare	15.10							
14	Commissions	25.00							
15	Interest and Discount	19.81							
16	Allowances	28.20							
17	Machine Metal Waste		23.43	24.68					48.11
18	All other Miscell. Expense	106.66	150.181						
19	Total Gen Expense	1123.99	516.71	532.47	691.50	551.53			
20	Total Cost of Debts		2018.52	723.43	927.39	694.73			4360.64
21	Chargeable Hours of Each Dept.		166.42	518.37	734.42	579.50			
22	Total ems Set Lino. 4665.7 Net Cost per M		1.73	4.40	1.26	1.20			
23	Average Net Cost								
24	Percentage Chargeable Time		92	75		88			

Monthly Statement of Cost of Production

Form 9 M. C.

The two fundamental problems of cost finding are these: first to devise a method by means of which the amount of material used and time consumed may be known with exactness on every job, second to arrive at the cost of that material and labor. The daily time ticket and individual job record (Forms 3 and 2 M. C.) solve this first problem satisfactorily. In a machine composition plant, it is comparatively easy to ascertain the cost of material - if any - which has been used on a job and charged directly to it, such as outside printing and binding, electrotypes, brass rule, etc. It should be said in this connection, that any outside work charged to a job should be treated as a merchandise item, and for cost binding purposes, as merely so much material bought for that job. But the problem of arriving at the absolute cost of the labor in the several departments is much more difficult. This monthly statement of production (Form 9 M.C.), which analyzes and distributes where it belongs every item of manufacturing expense, exclusive of merchandise items, is especially designed to show the true cost per hour in each department in an accurate and yet readily understandable way.

In the Form I M. C. it may be well to amplify the explanation given in small type.

Pay Roll. - The pay roll of each department for the month is entered from Form 4, on which the pay roll of each department with the exception of the caster is divided into

chargeable, non chargeable, and non productive. The caster department is a machine hour proposition, and hence no attempt is made to divide the salary of the productive workers of that department into chargeable and non chargeable. The productive wages of the department are, however, kept separate from the non productive, which latter consist of the departments proper share of the foreman's salary, proof reader's salary, etc.

The monthly charge for Rent and Heat in the shop is divided between the departments on the basis of the floor space.

The bill for Light and Gas for machines is divided among the departments on the basis of candle power and use.

The bill for Power is divided on the basis of the horse power and amount of use of the machines in operation in the various departments.

Fire Insurance and Taxes constitute an expense to be divided between the departments on the basis of the department investment. The monthly cost of liability insurance should be considered an item of office expense and entered in the General Expense column, or better yet, should be divided and charged direct to the department for which it is carried, on the basis of their department pay rolls. In case some departments are considered a greater risk than others and a higher rate of liability insurance is carried on same, this method must be changed to meet individual conditions.

Interest is computed at on half of one per cent on the department investment.

The standard allowance for depreciation is 10 per cent

per annum on machinery and fixtures. Where a shop carries any amount of type depreciation should be figured at 25 per cent per annum on the same. Depreciation from year to year should be reckoned on the original, not on the depreciated valuation.

The standard allowance for Bad Debts is one twelfth of one per cent of the annual sales, but this percentage may be raised or lowered to meet the individual plants condition.

The average cost per hour in a department for any period may be found by dividing the total cost of the department for the period by the total chargeable hours of the department for that same period. Similarly the total and average costs per thousand ems may be found for any period.

Distribution of Sales Record (Form 10 M.C.)

From the Individual Job Records (Form 2 M.C.), the cost clerk enters on the Sales Distribution Record the distribution of the selling price of every job billed during the month. This form is a loose leaf record, and as many sheets may be used as are required by the number of sales during the month. In the illustration (Form 2 M.C.) we note that as each job is entered from the individual job record, the only information necessary to this form is the job number of each job, and the distribution of the selling price into the departments to which the credit belongs. It will be noted that Linotype Make-up and Hand Composition, handled separate on the Individual Job Record (Form 2 M.C.) for convenience in posting, are on the Monthly Statement of Cost of Production and on the Monthly

Form 10 M.C.

Distribution of Sales For Month of November 1912

Job No	Mdse	Lino	Hand Comp	Key	Cas.	Metal	Totals
6181		9.40				6.70	16.10
6182	21.25		3.00	4.50	3.75		32.50
6285		51.71	36.00			21.00	108.71
6340	148.50	4250	12.75	1044.25	825.90	24.30	79.55
		2340.80	767.30			675.70	5802.45

Distribution of Sales Record, considered as one department under the heading "Hand Composition". The credits for all merchandise items are listed separate on Form 10 M.C., from the credits to labor in the mechanical departments. The total of the credits for the metal sold during the month as shown on Form 10 M.C. should be posted to the credit of the metal account in the ledger.

The illustration of Form 10 M.C. shows sections of several sheets used during the month in distributing the sales. The section at the top shows the top of the first sheet used during the month. The middle section is a section of another sheet and shows how Job No. 6285 has been distributed on the Sales Distribution Record. The bottom section is intended to show the end of the last sheet used during the month and shows the totals for the month.

Department Gain or Loss Statement - Form 11 M.C.

One of these sheets is compiled monthly to show the profit or loss in each department of the plant. The debts of the mechanical departments are taken from the Statement of Cost of Production (Form 9 M.C.), and represent the total cost of these departments. The debt for merchandise represents the cost of all merchandise items purchased during the month. The credits are taken from the Distribution of Sales record.

Metal is a part of the plant that is constantly being sold, and constantly being bought back, and as such is not properly to be considered in a statement of profit and loss on the production of the plant for the month. The total cost of

the mechanical departments (Form 9 M.C.) plus the total cost of merchandise purchases for the month, must equal the total debits as shown on form 11 M.C. The total of the month for the "Total" column of Form 10 M.C. less the total of the metal billed as shown on that form, must equal the credits for the month as shown on Form 11 M. C.

The percentage of profit is always to be reckoned on the Sales rather than on the Cost. In other words, divide the departmental profit rather than the departmental credit rather than the departmental debit to find the percentage of profit for the department. Net profit for the month is equal to the net profits of the departments showing a profit, less the total net losses of the departments showing a loss. The average profit for all departments is found by dividing the net profit by the total of the credits. Where it is desirable to arrive at the departmental profits each month with the greatest accuracy, an inventory may be taken by departments of the cost value of the incomplete work in process at the beginning of every month. By adding to the month's production by departments as shown by Form 10 M.C., the incomplete work by departments on hand at the end of the month at cost value, and then subtracting from that total, the incomplete work by departments on hand at the beginning of the month at cost value, the actual production by departments for the month may be found with greater accuracy.

The next department in line is the Press Room. There is generally a single foreman at the head of the department who is responsible to the superintendent for the work done in his department. Like the foreman of the composing room, he has charge of

Form 11 M.C.

Dept Gain or Loss for Month of November 1912

Dept.	Debit	Credit	Profit	Loss	% Profit	% Loss
Mdse	129.75	148.50	18.75		13.	
Lino	2018.52	2340.80	322.28		14.	
H. Comb.	695.26	767.30	72.04		9.	
Key	927.39	1044.25	116.86		11.	
Cas.	723.43	825.90	102.47		12.	
Totals	4494.35	5126.75	632.40			

Net Profit 632.40 Av. Profit, all Depts. 12.3%

the administration of the cost system and is responsible for the careful keeping of records which will present the correct data to the office.

In describing the cost system as applied to the composing room, the main principles of the system are made plain, and it is only due to the difference in the nature of the work carried on in the bindery press room and composing room, that there is a slight difference in the handling of the cost records.

The time of the employees is kept by means of a recording clock and the press room Daily Time Ticket (Form 3 P. Appendix) is filled out with data obtained from the Recording clock, the number of impressions made by the press at which the operator is working, and the job number of the work which he is working on.

The amount of paper used is an item that may be determined at the office, and it is therefore not a necessary part of the foreman's work to keep track of this article. Ink is not so easily figured and the amount used may not be computed until after the job is finished.

The two columns to the right "For Office Use Only" are used by the office to record chargeable and non chargeable hours and are entered in the Individual Job Record (Form 2 Appendix).

In addition to recording the time of men employed in the press room, the time of the machines is also taken into account. This record (Form 6 Appendix), is kept in the office and is filled out from data taken from the Press Room Daily Time Ticket.

Each Press has under it number a complete record for the month of chargeable and non chargeable hours, and also impressions made.

The last department, the binding is, in the main, kept account of like the other departments. The foreman has a Binding Daily Time Ticket (Form 3 B - Appencix) which he fill out which is very similar to the Press Room Daily Time Ticket.

The great diversity of work carried on in this department is simplified by using numbers to describe the various kinds of work, such as stitching, gathering, etc., and is entered by number under the "Kind of Work" column.

The time of the employees is entered by the foreman from recording clock data and is then sent into the office. The hours are charged up to the job as chargeable or non chargeable, as the case may be.

The data gained from the various departments, viz:, the composing room, bindery, and press room, are gathered together in the office, and from them the total cost of the job is found, and filled in on the Individual Job Record (Form 2 Appendix). The purpose of this sheet is two fold. It severs to gather the results of the cost finding system's benefits under one head, so that a fair and correct valuation may be placed on the job which the plant turns out. The second purpose is to form a checker up for the form 9 H (Appendix) which is a summary of all the expense of the plant during the month. In the top row are given the investments in each department. These values are found from inventories taken monthly, or semi-annually. The itēms 1 to 28 are the various expense for the month in

each department, and these expenses are totaled and equal the cost on expense for the month of that department. This form 9 H, is a comprehensive view of the work carried on in the plant for the entire month.

Ignorance of the true cost of an hours work was until quite recently assumed to be the principal trouble with the printing business. The department hour cost has very little to do with the cost or selling price of a job of printing. It is a mere measuring instrument with which is gauged the value of the hours required for the production of a given piece of work and with the number or quantity of those hours it is no more to do than the price of a yard of cloth has to do with the number required for a suit of clothes.

It follows therefore, that on the number of hours, and not on the cost of the hour depends the cost of the work.

The degree of efficiency attained by a plant very naturally exerts some influence on hour costs. The influence is not nearly so great as is generally supposed, however, many actual records, showing almost uniform hour costs in plants of widely varying degrees of efficiency.

Much time which cannot be sold is placed in the productive column in practically every plant. Basing our composition estimate on 600 ems per hour, we estimate, e.g., that 500 hours will be required for the work. When it is finished we find our records a total of 250 hours. The question is how came the men to put in 50% more time than a conservative estimate called for?

The records show the time to have been productive; but is clear that too many hours were put in and that they cannot be charged to the customer, which merely means that the office must stand the loss. Just here is one of the cases in which a real cost system - a system which shows a great deal more than the hour cost - proves to be of great benefit; it shows why the extra time was spent. The manager takes his job record of cost and analyzes the time entries, finding the trouble to have been a shortage perhaps, of material. He finds the hour after hour has been wasted in cutting rule that should have been cut at the foundry; in making changes to bring about uniformity of matter on which two or more compositors had followed different styles; in trimming letters which the store man must watch for and correct from forms on the press before the one in hand can be locked up; in registering forms on the press which should have been registered on the stone, but which could not be, because all the available chases were so faulty, that until the press clamps should prevent further springing, lines would not stay in place; and in various other ways, none of which are taken into account and kept track of in the generality of plants.* Items such as those mentioned above have nothing to do with hour costs. The hour cost may be accurately determined by merely classifying the time as productive and non productive, which is about all the average printer tries to do. As intimated above, however, a cost system which shows merely the hour cost falls far short of giving the full measure of benefit which should accrue from

cost keeping, and many there are who believe that unless it will do more, it is hardly worth the expense and work incident to it. To all such we say that the standard cost system will do much more, for it will,

1. Show the true hour cost in each department, and in press room and binding show that cost by classes, or groups, or by individual machines of the management desires that close a division.

2. Show the cost of operating the departments and of the plant as a whole.

3. Show the cost, and the profit or loss and each job by departments and as a whole.

4. Show the profits or losses on the business served by each salesman by departments and as a whole.

5. Give an exact reliable, and continuous inventory each day of all work in process, both by departments and as a whole

6. Point out unflinchingly all work, regular or otherwise which is being done at too low a price.

7. Point out most of the numerous leaks which are so costly to the printer, and by pointing them out cause them to be stopped.

8. Put the management on its guard so fully that even the leaks a system cannot show will be quickly seen and remedied.

9. Provide the means for analyzing very important jobs, thus rendering it impossible to make the same errors in estimating twice or more times even though the work estimated on differs widely from the job analyzed.

10. Give absolutely reliable data regarding the time

required for each process on every variety of work the printer is called upon to do.

11. Increase by any where from ten to fifty % the efficiency of every plant by adopting and conscientiously using it.

12. Increase to an astonishing extent the profits of every plant adopting and using it.

13. Change the business from one of no especial standing in the community to one which will be looked up to by business men in other lines.

14. Give customers confidence in their printer and his prices and so change their attitude toward him that from 75 to 90% of his work will be given him without a request for a price in advance.

This brief outline of the workings of a printing plant, where we have taken the cover off "to see the wheels go 'round," serves to show in some degree how the plant is organized and managed. The Printing business is poorly organized as a whole, though there are in many cases printing plants that are well organized and highly successful, from the ordinary business man's view of success. The greatest factor in making these plants successful has been the introduction of cost finding system, and it is bound to come in those plants which do not employ it at the present time. I heard it said by two of the most successful printers in the United States, that "the installing and operating of a cost system would cost no more than we would save by it". These men have prospered in spite of that fact that they did not have a cost finding syste, but the reason is

clear when it is considered that they are expertx in their trade, and act as general managers over the plant in which they have their interest. Nothing goes on that they do not know about, and they have a complete and comprehensive grasp on the plant.

This is not the case in all or even a few plants, therefore, though the cost finding system may not be necessary to the success of one plant, a particular case, it does not follow that it is not necessary to others of the more loosely organized type.

When an accurate system, simple, easy to handle, and easy to understand, is instalbd in all of our printing businesses, no longer will we hear it said that "the pring trade is the most poorly organized of our factory industries".

INDIVIDUAL JOB RECORD

STANDARD UNIFORM COST FINDING SYSTEM, FORM 2, DEvised BY AMERICAN PRINTERS' COST COMMISSION

DATE BILLED		PURCHASE ITEMS		SELL		COST		QUANTITY ORDERED		QUANTITY DELIVERED		PROMISED					
DATE	ORDER NO.	DATE	NO.	DATE	NO.	DATE	NO.	EMPLOYEE	DATE	HR.	MIN.	EMPLOYEE	DATE	HR.	MIN.		
1020 Bennett St City		April 30th		Folio 189		6000		6000		6000		April 18-1910		May 1st			
STOCKS																	
H18-3511-6 1/2 Green 7538-100		H02 Green 10 1/4		5019		4063		Williams		4-25		31		Black form		5	
H18-3511-3 1/2 Green 7075-65		Green 10 1/4		7519		7015		Black		4-16		37		2600		745	
ENGRAVINGS		Green 10 1/4		7519		7015		Black		4-16		37		2600		745	
ELECTROS		Green 10 1/4		7519		7015		Black		4-16		37		2600		745	
LABOR ITEMS		Green 10 1/4		7519		7015		Black		4-16		37		2600		745	
HAND		3 1/4 HRS. @ 1.18		4156		3805		Black		4-17		37		4800		345	
" OVERTIME		" " " 1.18		331		265		Black		4-17		37		4800		345	
ALTERATIONS		" " " 1.18		331		265		Black		4-17		37		4800		345	
" OVERTIME		" " " 1.18		331		265		Black		4-17		37		4800		345	
MACHINE		" " " 1.52		41		3280		Black		4-18		31		Cover (outside)		1	
" OVERTIME		" " " 1.52		41		3280		Black		4-18		31		Cover (outside)		1	
CYLINDER		" " " 1.65		5414		4331		Black		4-19		37		3040		345	
" OVERTIME		" " " 1.65		5414		4331		Black		4-19		37		3040		345	
JOBBERS		" " " 1.4		1018		814		Black		4-19		37		3040		345	
UNIVERSAL		" " " 1.4		1018		814		Black		4-19		37		3040		345	
" OVERTIME		" " " 1.4		1018		814		Black		4-19		37		3040		345	
CYLINDER		" " " 1.65		331		210		Black		4-19		37		1070		130	
" OVERTIME		" " " 1.65		331		210		Black		4-19		37		1070		130	
INK		" " " 1.52		762		710		Black		4-19		37		2000		3	
" OVERTIME		" " " 1.52		762		710		Black		4-19		37		2000		3	
HAND		" " " 1.4		1121		112		Black		4-19		37		2000		3	
" OVERTIME		" " " 1.4		1121		112		Black		4-19		37		2000		3	
MACHINE		" " " 1.4		1121		112		Black		4-19		37		2000		3	
" OVERTIME		" " " 1.4		1121		112		Black		4-19		37		2000		3	
PIECEWORK		" " " 1.4		381		310		Black		4-19		37		2000		3	
CUTTING		" " " 1.83		545		436		Black		4-20		37		6000		515	
BOX CARTING		" " " 1.83		545		436		Black		4-20		37		6000		515	
PACKING		" " " 1.83		545		436		Black		4-20		37		6000		515	
DELIVERY		" " " 1.83		545		436		Black		4-20		37		6000		515	
BINDERY																	
MISC.																	
TOTAL																	

BILL AS FOLLOWS

April 30.

6th - 16th Green Combs/lets
Invisible Green in 2 Colors } 256.85
2/4 hrs OUT. } 330

TOTAL

76015

Monthly Record of Chargeable and Non-Chargeable Hours and Press Impressions

For Month of April 1910

DATE	PRESS NO. 8					PRESS NO. 9					PRESS NO. 10					
	MAKE READY	RUNNING	IMPRESSIONS	NON CHARGEABLE	IDLE TIME	MAKE READY	RUNNING	IMPRESSIONS	NON CHARGEABLE	IDLE TIME	MAKE READY	RUNNING	IMPRESSIONS	NON CHARGEABLE	IDLE TIME	DATE
1	25	2	2410	55	440											1
2	30	415	4785	15	3											2
3																3
4	115	5	5390	45	1											4
5	135	615	6685	10												5
6	205	445	5350	25	45											6
7	115	6	6230	45												7
8		15	190	30	115											8
9	3	315	3250	1	45											9
10																10
11	210	3	3350	1	150											11
12		8	8120													12
13	2	6	6400													13
14		645	1205	45	30											14
15	1	230	2615	30	4											15
16	145	530	5950	45												16
17																17
18	2	4	4100	30	130											18
19	3	230	2610	15	215											19
20		6	5940	30	130											20
21	1	2	2130	30	430											21
22	45	315	3910	45	315											22
23	2	330	4020	45	145											23
24																24
25	5	245	2600	15												25
26	1	345	4250	45	230											26
27	245	230	2770	30	215											27
28	230	245	3180	30	215											28
29	1	6	6020	30	30											29
30	1	3	3240	30	330											30
31	39	10530	113430	14	4930	26	101	81680	16	65	2230	8115	18283	11	8115	31

The monthly totals of make-ready and running time are chargeable hours and are carried to line #25 on Job 9 H. Cylinder Press hours are kept separate.

✓ 3 445 4800 - 15
 ✓ 130 330, 3050

STATEMENT OF COST OF PRODUCTION FOR MONTH OF April 1910

*Items Nos. 8, 11, 12, 13, 14, 20, General Expense Column

ITEM NO.	DEPARTMENT INVESTMENT (Amounts to be charged according to inventory as distributed on addresses set inside)										Total Disbursements
	\$ 100.00	\$ 366.00	\$ 1428.00	\$ 8534.40	\$ 2611.20	\$ 11973.20	\$ 1150.00	\$ 1100.00	\$ 350.00		
	Stock Handling and Shipping	General Expense	Hand Composition	Machine Composition	Job Presses	Cylinder Presses	Bindery A	Bindery B	Bindery C		
1											
2	90	876.90	662.14	146	364.68	284.41	152.58	95	251.31	192.86	
3	4	873	336.3	140	126.9	401.4	100.3	80.4	180.6	141.62	
4	15	214	460	80	3	3	115	85	2	18.29	
5	23	85	1175	468	1110	396.5	688	344		105.15	
6	50	183	3179	1991	609	218.2	408	257	81	119.61	
7	83	305	11115	4261	1305	596.2	815	550	115	110.96	
8		50		1184	2116	993.6	1458	918	292	346.61	
9		15									50
10	1545	1150	450		610		150				15
11		23									13250
12		48									23
13		4394									48
14		73199		950	3225	16	550	450			4394
15											29974
16											
17											
18											
19											
20	11176	11176									
21		143719									
22			87716	35880	47572	58600	21105	13308	28910	436370	
23			47846	17538	23240	28679	10310	6502	14154	143019	
24			130562	53418	70812	87229	31415	19810	43124		
25			1106 1/2	379 3/4	957	528 2/3	378 3/4	367	105 1/2		
26			118	162	74	165	83	54	41		
27											
28											

NET COST PER CHARGEABLE HOUR
 Average Net Cost per Hour for 12 Months
 Percentage of Productive time





UNIVERSITY OF ILLINOIS-URBANA



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