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## Relative Costs of Near-Print Processes

A discussion and analysis of book manufacturing costs which compare Linotype with various typewriter methods of composition, plus a comment on Monotype costs

### The Background

THIS is the complete text of a "Memo on Cost of Book Production" which was prepared by Herbert S. Bailey, Jr., Science Editor of Princeton University Press. It was first circulated among faculty members of Princeton University for their guidance in connection with publication of their scholarly documents. Later it came to the attention of PUBLISHERS' WEEKLY who printed it in their July 1, 1950 issue under the title "Scholarly and Technical Printing: Comparative Methods and Costs."

When we requested permission to reprint the article for this Manual, Mr. Bailey sent us a copy of the memo as distributed at Princeton. He said: "The original memo was edited somewhat by the editors of PUBLISHERS' WEEKLY, and they cut out the first and last paragraphs which were aimed primarily at university press publishers. This made me somewhat unhappy, as I was afraid that some people might think that I was a devotee of typewriter-offset printing. I think that the complete text makes it clear that I believe that typewriter-offset printing has very important uses, but that it is by no means a universal replacement or money-saver compared with Linotype printing. . . ."

On studying the portions omitted by PW, printed here in full, we judge that they felt the general book trade might not be interested in the group problems of university presses. The "Kerr Report" emphasized the present difficulties in getting scholarly works into print because of high production costs. The final paragraph, com-

menting on list prices of books which are "three to five and sometimes more times the unit manufacturing costs" we assume gave an "inside" picture of costs and selling prices which PW didn't want to print without a more complete discussion. It is noted that Mr. Bailey didn't mention authors' royalties, probably one of his "many other expenses" which he didn't itemize. But the three to five times unit cost is a familiar factor in book publishing—and necessary if they are to stay in business.

Princeton University Press is among the most active of the university presses. They operate five Linotypes, one Monotype keyboard and one caster—thus have first-hand knowledge of the costs discussed by Mr. Bailey.

### Memo on Cost of Book Production

THERE has been much written lately about the possibilities of producing small editions of scholarly books cheaply through the use of near-print processes. The object is certainly desirable, as perhaps no one is more keenly aware than the university presses, except the scholar-authors themselves. During the Survey Year of the Kerr Report, the university presses published 727 "titles," and a much larger but undetermined number of manuscripts were rejected. Many of these rejected manuscripts deserved to be published and in other circumstances might have been published; but the university presses, with limited resources and limited capacity for publication, must pick and choose according to the judgments of their publication committees and of the scholars who advised them.

It is said that much good work is fruitless because of failure of publication. If the university presses are doing their job, however, the best and most important work is being published. I believe that the university

presses *are* doing their job, that they *are*, using the best advice that scholars can give them, publishing the cream of scholarly production. Of course they make mistakes, and occasionally they reject an important work, but this is almost without exception the result of bad advice from scholar-advisors, and not from any undue conservatism on the part of the presses.

Some recent criticism seems to imply that the university presses are not making efficient and economical use of their resources, that by the use of new methods their production could be vastly increased and less scholarship would be lost by non-publication. It is hardly necessary to say that the university presses welcome news of methods that would enable them to increase their usefulness, but the so-called new near-print methods (some of which have been in use by university presses and others for more than ten years<sup>1</sup>) must be examined in the light of actual figures of comparative costs, and not by the vague emanations of wishful enthusiasts.

The discussion has centered on book production, and many scholars have been led to believe that new near-print processes are available which can be used to produce small editions at very low cost. Photo-offset printing has been held up as the panacea for the ills of scholarly publishing, and every day scholars approach university press editors with the suggestion of publication of specialized monographs by the typewriter-offset combination. "Of course this work will be useful to perhaps three hundred scholars," they say, "but if we type it and print by photo-offset it won't cost very much—will it?"

The answer is a reserved "Maybe." Many scholars have been misled; false hopes have been raised. Perhaps some of the devices that will be available in the future will radically reduce the cost of book production; I hope so, though I do not see how any of the machines reported will do so for the specialized scholarly monograph. Meanwhile, let us examine the current situation.

Table I gives a comparison of four book production methods. The first is traditional Linotype composition plus letterpress printing. The other three are various combinations of typewriting plus offset printing. Method II is the standard office (mechanical or electro-matic) typewriter plus offset. Method III is the IBM proportional spacing typewriter with bookface type, using unjustified lines (ragged right-hand margin) plus offset. Method IV is justified IBM proportional bookface typewriter composition plus offset.

Method I produces the traditional printed book, which may appear attractive or not depending on the skill of the printer. Method II produces a "typewritten" book, which is not usually regarded as beautiful but

<sup>1</sup>Since 1938, eight per cent of the "titles" published by Princeton University Press have been printed by the typewriter-offset combination.

which is familiar to everyone. Method III produces a book which looks somewhat like type, though none of the type faces available are remarkable for their beauty. Method IV produces a book that looks much like that of Method III, except that the lines are all of equal length, as in traditional letterpress printing.

## The Basis of the Figures

IN TABLE I an attempt has been made to make the figures in all four columns comparable, using prices as of November, 1949. The differences in cost are seen to be mainly differences in composition and makeup, paper costing approximately the same for all methods (but the total varying with quantity).<sup>2</sup> The actual printing by offset is slightly more expensive than by letterpress because of the additional cost of making offset plates, which more than makes up for the slight advantage in press time gained by the faster-running offset presses. The press time for a 1000-copy run is so small that the result of difference in speed is virtually negligible.

The figures on Method II are based on the cost of office typing including proofreading and corrections. Since work for offset printing should be done more carefully than routine office typing, the cost is somewhat higher than for ordinary office work.

The figures on Methods III and IV are based on prices for these types of composition from printers or establishments specializing in this work.

## Comment

IT SHOULD be emphasized that the figures in Table I are for "straight composition." This might apply to the usual monograph in history, literature, economics (if not too many tables), and the like. Mathematics, linguistics, most books in the natural sciences, and other material requiring special characters or difficult composition present a different picture, as we shall see.

But let us consider first the book that is "straight going." The methods will be considered in order of decreasing cost; that is: I, IV, III, II. The first method produces the traditional letterpress book, and if cost were not a factor it would certainly be the first choice of format by the vast majority of scholars. But cost is necessarily a factor in planning scholarly publications, and we are led to Method IV. Method IV, in this particular case, is 16% cheaper<sup>3</sup> than Method I, and it produces a result that looks very much like that of Method I, except

<sup>2</sup>Actually "offset paper" costs slightly more than "letterpress paper," but recently Princeton University Press has been getting good results with letterpress paper on offset presses. Hence the paper-cost is presented as uniform.

<sup>3</sup>It should be remembered that these percentages are based on the cost of manufacturing *without binding*. Adding in the binding would reduce all the percentage differences slightly.

TABLE I—COMPARISON OF BOOK PRODUCTION METHODS

This comparison is based on a MS of 300 typed pages (468,000 characters) of "straight composition" (not many technical difficulties). The result required is a 6 x 9" book, of about 10/12 type, 27 pica line, 42 picas deep, 1000 copies.

I	II	III	IV
LINOTYPE COMPOSED AND LETTERPRESS PRINTED	STANDARD TYPEWRITER (ELECTROMATIC OR MECHANICAL) OPERATED IN AN OFFICE, AND OFFSET	IBM PROPORTIONAL, UNJUSTIFIED AND OFFSET	IBM PROPORTIONAL, JUSTIFIED AND OFFSET
COMP. AND MAKEUP 10/12 Bask. @ 70 ch/line gives 3080 ch/page $\frac{468000}{3080} = 152$ pages text $\frac{3080}{8}$ pages FM 160 page book	COMP. AND MAKEUP 61 ch/line 61 x 42 = 2562 ch/page $\frac{468000}{2562} = 183$ pages text $\frac{2562}{8}$ pages FM 191 page book office typing @ 75¢/page	COMP. AND MAKEUP 70 ch/line same as Linotype 152 pages text 8 pages FM 160 page book typing @ \$1.50/page	COMP. AND MAKEUP 70 ch/line same as Linotype 152 pages text 8 pages FM 160 page book typing @ \$2.50/page
Comp. and makeup.. \$600 Printing ..... 320 Paper ..... 85 Cost of mfg (without binding) ..... \$1005	Comp. and makeup.. \$143 Printing (offset).... 420 Paper ..... 100 Mfg (no binding).... \$663	Comp. and makeup.. \$240 Printing (offset).... 360 Paper ..... 85 Mfg (no binding).... \$685	Comp. and makeup.. \$400 Printing (offset).... 360 Paper ..... 85 Mfg (no binding).... \$845
% of Lino. and Letterpress \$ 100%	66%	68%	84%
BINDING 1000 copies Paper @ 15¢..... \$150 Cloth @ 30¢..... 300			
TOTAL Paper ..... \$1155 Cloth ..... 1305	Paper ..... \$813 Cloth ..... 963	Paper ..... \$835 Cloth ..... 985	Paper ..... \$ 995 Cloth ..... 1145

that a uniform type-size must be used throughout, and the type faces available on this type of machine are not noted for their beauty. Also, the mechanism of justification of typewriting has not yet been advanced to the point where "rivers of white" or objectionably close spacing can be readily avoided.

And so we turn to Method III, exactly like Method IV except that the extra typing required for justification is dispensed with, and the page has a ragged right-hand margin. In my opinion Method III is usually more readable than Method IV because of better word-spacing. And in addition it is another 16% cheaper (32% cheaper than letterpress).

The "typewritten" book of Method II, using the letter-forms of the ordinary office typewriter, is only slightly less expensive than Method III, and Method III

would usually be chosen because it more nearly simulates the appearance of letterpress printing. In my opinion, where *cost* is of first importance, where *straight text* is involved, and where *strict accounting* of all costs is practiced, Method III is the logical choice.

On the other hand frequently a scholar in a university can obtain the services of a good typist within the departmental organization. He can have this typist prepare his manuscript for offset printing without actually obtaining an appropriation for the purpose or paying for it out of his own pocket. Of course this is not a real saving, but it has more than once been the practical way of meeting a situation. If a scholar can get \$500 as subsidy, he may prefer to have the departmental secretary do the typing on her standard machine to the alternative of paying an extra \$180 to the printer for Method III.

TABLE II—MATHEMATICS COMPOSITION

MONOTYPE AND LETTERPRESS		TYPEWRITER AND OFFSET	
Monotype comp. @ \$10/page + AA's		Electromatic or standard typ- ing @ \$2.00 per page—esti- mated length of comparable book, 190 pages.	
Monotype comp. @ \$11/page		190 pages x \$2	\$380
160 pages x \$11	\$1760	Printing	420 (1000)
Printing	320	Paper	100 copies)
Paper	85	Mfg (no binding)	\$900
Mfg (no binding)	\$2165		

Add \$150 for paper binding or \$300 for cloth binding.

## Difficult Composition

BUT THE COMBINATION of typewriting and offset comes into its own for books requiring difficult composition. Here the costs of setting type run up to perhaps \$10 per page, where office typing will rarely cost more than \$2 per page.<sup>4</sup> It is my conviction that for most manuscripts requiring difficult composition, Method II is the most practical. The reasons are simple: the standard typewriter type face is familiar to everyone in every field of scholarship. The scientist, for example, is accustomed to seeing formulas and equations as typed on the standard typewriter. But the machines using "bookface" type faces produce pages that look enough like Linotype or Monotype composition so that the reader is annoyed when the letterpress conventions are not followed. Thus scientists do not like to have equations set in roman type by bookface typewriters; it looks enough like type so that the reader expects italic equations. It looks wrong, whereas standard typewriting is completely acceptable. Thus for many purposes where difficult composition is required the standard typewriter will be preferred over the proportional spacing machines and those with book-face type faces, and Method II will be adopted.

Some figures are shown in Table II, where a mathematical manuscript is assumed, for which conventional Monotype composition might cost \$10 per page plus author's alterations. In this table it has been assumed that the cost of office typing has increased to \$2 per page, which corresponds with experience.

Here we see that letterpress printing is more than twice as expensive as the near-print method, and it is in the field of technical publication that the combination of typewriter plus offset printing comes into its own.

<sup>4</sup>It must be emphasized that this is *office* typing, by an office stenographer who is available to the scholar through his department or is hired by the hour specifically for the job. Of course the prices of commercial typewriter composition houses are much higher, for they must allow for overhead, idle time, profit, etc. This figure represents simply the wages of the typist.

(Do not confuse the data in Table I with Table II. The first covers straight-matter, the second mathematics.)

## The Future

IN ORDER to compose a book of any kind whatever, it is necessary for someone to press keys corresponding to the letters in the manuscript. This fact is not likely to be changed by any of the new composing machines, and the associated fact is that someone must be paid to press the keys. A large percentage (about 35%) of the cost of Linotype or Monotype composition is labor—the wages of the operator. A larger portion (about 65%) of Linotype costs is taken up by overhead and profit. By overhead I mean rent, depreciation and maintenance of machinery, cost of idle time, salaries of supervisory personnel, and the like. Most of the overhead is avoided by using typewriters for composition.

By using an office machine, the operator can be paid typists' wages rather than the higher wages of well-trained compositors. But the more complicated near-print machines which produce justified lines require operators nearly as skilled as the operators of Linotype and Monotype machines. Thus their wages are not much lower, and they must be continuously employed at typewriter composition—they cannot be economically transferred to correspondence or filing when no composition is to be done.<sup>5</sup> It must be expected that near-print compositors will organize themselves or be taken into other typographic unions, and the inevitable result is the approach in cost of the two competing methods. Thus the only hope for cheap composition in the future is in holding typewriter composition in the office, with simple enough processes and easy enough operation to be used by regular office personnel.

<sup>5</sup>In a recent article favoring the use of DSJ Varitypers, it was said that the operator had difficulty until he discovered that he had to be "married" to the machine in order to use it well. Surely, once the operator has "married" the machine, he (or she) will no longer be useful for ordinary office work.

## Conclusion

CONSIDERATION of the figures shown in this paper should make it obvious that printing is not cheap by any method in use today. Scholars should not be misled to believe that a small investment will be sufficient for production by near-print methods, nor should they assume that the near-print methods are necessarily cheaper or more appropriate than the traditional letterpress. Scholars, and those concerned with the problem of bringing scholarly and scientific works of limited appeal to publication, should learn all they can about the various methods of production so as to be able to select the best for their particular purposes and circumstances.

It would be well also to point out in closing that the cost of manufacturing a book is by no means the entire cost of publishing it. If the book is to be distributed from the author's private office, costs of mailing and the like can perhaps be absorbed into running expenses and overhead. But if publication in the normal sense is an-

ticipated, one must allow for the cost of review copies, advertising, mailing, bookkeeping, storing, dealer and library discounts, and the many other expenses which are common to all publishers.

Inclusion of these expenses in cost calculations drastically reduces the percentage saving made possible by near-print methods. It is because of these expenses that publishers must list their books at from three to five and sometimes even more times the unit manufacturing cost of their books. The author, institution, or society which publishes a book without taking these expenses into account must be willing to absorb them in the running expenses of the organization and thus provide a hidden subsidy, or the books will lie unread on its shelves. Sometimes, admittedly, it is cheaper to give the books away.

HERBERT S. BAILEY, JR.  
PRINCETON UNIVERSITY PRESS  
DECEMBER 15, 1949

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## Sales Observations

IN A GRAPH based on Table I, which we have not reproduced, Mr. Bailey projects his cost data to show a fact highly significant to Linotype:

Comparing Methods I and II (Linotype-letterpress vs. IBM justified-offset) the production costs become equal when 3000 copies are printed. The reason is that offset plates and running conditions on a 3000 edition will equal the extra cost of Linotype composition over IBM plus letterpress printing. All other factors being equal, the 3000 edition costs the same for:

- (1) a clean, legitimate, type-set book
- or (2) a near-print, IBM substitute.

Methods II and III (standard typewriter vs. IBM unjustified) about balance each other in cost on an edi-

tion of 1250 copies. In this case Method II costs \$143 for typing and makeup against \$240 for IBM typing. But the cheaper typing makes more pages, 191 against 160, therefore paper and printing cost more. On 1000 copies the difference is \$22, while above 1250 copies the cheaper typing of 191 pages would cost more per copy to produce.

One thousand books may be more than the desired edition for many works. Then the making of offset plates is an increasing factor against letterpress printing direct from slugs. Shorter runs may thus be closer in unit costs than on the one thousand basis.

The Linotype salesman who encounters typewriting, IBM, or Varsity arguments for "substantial savings" in costs may use these data to prove that the alleged savings are by no means so considerable as is often casually assumed.

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## A Specific Case

IN SITUATIONS where Linotype slug composition is in a competitive position with typewriter composition it is important to establish a basis of comparison. It is obvious that to get a true evaluation of relative costs the end product of the competing processes must be as nearly identical as is possible under the conditions imposed by differing methods.

The following case history is not an academic prob-

lem. It is an analysis of the cost figures on an actual job. The reference is obvious.

Directory, published biennially in New York City. Trim size 6½ x 9¼, 480 pages. Edition of 2532 copies. Latest edition, 1948. Price \$5.00. Total cost \$5,985.95 by letterpress. Length of time required for production, eight months.

**Problem:** To reduce cost and length of production time.

BIDS FOR 1950 EDITION—2500 COPIES

<i>Letterpress</i>		<i>Offset</i>	
Composition			
480 pp. @ \$7.55.	\$3,624.00	\$2,048.00	512 pp. @ \$4.00
Alterations .....	475.00	100.00	
		640.00	Plates
Makeready and			
Printing .....	408.00	440.00	
Paper Sub.			
60 @ \$13.90 ...	667.00	767.00	
Binding @ .3578 ..	895.00	920.00	@ .3678
Thumb Indexing ..	150.00	150.00	
Freight .....	46.00	20.00	Delivery in N. Y.
Line Cuts and Dies	20.00	15.00	Charts and Dies
Copyright .....	4.00	4.00	
Extra Proofs .....	123.00	...	Not Available
Total 2500 @ \$2.56	\$6,412.00	\$5,104.00	2500 @ \$2.04

*Schedule in Weeks*

Composition .....	6	12	1 Machine
Reading Galleys .....	4		
Paging .....	2		
Reading Pages .....	4	4	
Indexing and			
Setting Index .....	2	2	
Printing and Binding ..	4	6	
	<u>22</u>	<u>24</u>	

With the "comparative" figures in hand the production man took a look at what the end product of the type-writing-offset combination would be. There would be no boldface. There would be no caps and small caps. Because there would be no galley proofs in the offset method there could be no author's corrections.

Therefore he imposed these same conditions on his letterpress printer and gained the following savings:

Omitting boldface (non-mixer)	\$744.00
Omitting caps and small caps..	216.00
Omitting extra proofs.....	123.00
Omitting author's corrections..	375.00
	<u>\$1,458.00</u>

This saving applied to the letterpress bid gave a new price of \$4,954.00, or \$150.00 cheaper than the substitute process. (2500 copies @ \$1.98.)

And, too, a saving of six weeks in production time was made by eliminating galleys.

The principles involved in this case history can often be cited to show it is false economy to use a substitute process without imposing the same limitations on a slug-composing machine and tabulating the results.