



## ***Guidebook economics-"The Incremental Book"***

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*This is one of many related papers that were included in the 1974 NMGS Fall Field Conference Guidebook.*

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## **Annual NMGS Fall Field Conference Guidebooks**

Every fall since 1950, the New Mexico Geological Society (NMGS) has held an annual [Fall Field Conference](#) that explores some region of New Mexico (or surrounding states). Always well attended, these conferences provide a guidebook to participants. Besides detailed road logs, the guidebooks contain many well written, edited, and peer-reviewed geoscience papers. These books have set the national standard for geologic guidebooks and are an essential geologic reference for anyone working in or around New Mexico.

### **Free Downloads**

NMGS has decided to make peer-reviewed papers from our Fall Field Conference guidebooks available for free download. This is in keeping with our mission of promoting interest, research, and cooperation regarding geology in New Mexico. However, guidebook sales represent a significant proportion of our operating budget. Therefore, only *research papers* are available for download. *Road logs*, *mini-papers*, and other selected content are available only in print for recent guidebooks.

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# GUIDEBOOK ECONOMICS-"THE INCREMENTAL BOOK"<sup>1</sup>

by  
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## INTRODUCTION

The sale of guidebooks constitutes the most important source of income of the New Mexico Geological Society. The relationship of both the unit cost and the number of copies of the guidebook printed for a particular field conference to the rate of return on invested capital, the profitability of the edition, and the impact of the future earnings on the long-term financial condition of the Geological Society apparently has not been previously examined in depth. Fortunately, sufficient statistical data for an investigation of this nature have been compiled by Robert A. Bieberman. Some of the data compiled by Bieberman have been published in Northrop (1969). These relationships, therefore, were studied and form the basis of the resulting conclusions and recommendations herein presented.

## GUIDEBOOKS AS AN ASSET AND SOURCE OF INCOME

Each year, for the past 25 years, the New Mexico Geological Society has published an annual guidebook containing the road logs of the route traversed during the field conference for that year, a collection of scientific papers describing the geology and history of the region, and other abstracts and information relating to the activities of the Geological Society. The inventory of all guidebooks on hand constitutes the principal asset of the Geological Society. In turn, the money obtained from the sale of guidebooks out of inventory is the principal income of the Geological Society. These funds support many activities, including the grants-in-aid given to students, and provide a reserve for the occasional year when a deficit is incurred.

Guidebooks can be a source of funds for the Geological Society only if (1) they are available, and (2) they can be sold at an overall profit. The future financial posture of the New Mexico Geological Society depends heavily on the ability of the officers, editors, and field conference chairmen to continue to publish a quality product and make it available to the scientific community at a salable price that includes a modest profit.

## GUIDEBOOK SALES

A casual examination of the data provided in Northrop (1969, p. 61-63) and the inventory records maintained by Robert A. Bieberman suggests that 300 to 700 guidebooks are sold during the first year following publication. Also, depending on the number of copies printed, generally only a few hundred copies remain in stock after a period of about 10 years. The number of copies sold during the first few years

greatly affects both the rate and magnitude of the return on the investment, the overall profitability of the investment, the amount of capital invested, and the level of working capital available for additional publications or other functions of the Geological Society.

My experience suggests that the quantity of books sold during the first and subsequent years can be controlled, or, at least enhanced with a reasonable amount of merchandising. The amount of initial advertising effort focused on the new publications, therefore, becomes very significant in setting the prices and the number of copies printed.

Excluding several thousand dollars in initial sales at the time of the field conference, sales have averaged over \$6,000 per year during the past 5 years. A gradual increase in sales through the Publications Section of the New Mexico Bureau of Mines and Mineral Resources in Socorro over the past 3 years to \$8,600 in 1973 reflects, in part, the reprinting of several guidebooks. Although the long-term demand for the guidebooks published by the Geological Society has been demonstrated, a thorough analysis of the elements that influence the demand for a particular edition of a guidebook has not been made.

## IMPORTANCE OF REPRINTS

Almost 25 years after the formation of the New Mexico Geological Society, the Executive Committee at the urging of Frederick D. Trauger, Chairman of the Publications and Sales Committee, recognized that (1) profits from the sale of guidebooks constituted the "life-sustaining blood" of the Geological Society and (2) a significant demand existed for out-of-print guidebooks (the initial printing of the 1,500 copies of Guidebook 1 in 1950 was exhausted within 2 years). A program of reprinting the out-of-print guidebooks was subsequently initiated and the entire series of guidebooks is now available for the first time in many years. The income generated from the sale of the second and subsequent printings will be substantial. The availability of a complete set of all guidebooks is important to anyone assembling a reference library on the geology of New Mexico. Institutions, companies, or individuals now purchasing a complete set will undoubtedly keep the sets intact by purchasing new editions as they become available. Such customers create a fixed demand for the guidebooks.

## NUMBER OF COPIES PRINTED IN AN EDITION

The number of copies printed in an individual edition has ranged from 750 to 2,000 (Northrop, 1969, p. 61). Decisions appear to have been frequently based on the amount of funds readily available, and (or) arbitrarily on the intuitive judgment of the Executive Committee and Editors. The fixed demand

<sup>1</sup> Publication approved by Director, U.S. Geological Survey

for older guidebooks after the second year of publication suggests that the information presented in this series of publications has long-term appeal. Furthermore, the length of press run should not be curtailed merely because of a suspected ephemeral demand. Nor should any of the books be allowed to go out of print.

A depleted treasury should not necessarily induce a corresponding decision to publish a limited edition of a guidebook for a field conference as done previously (Baltz, 1962, p. 3). An effort should be made to obtain additional funds. The present Executive Committee assured adequate support for the Silver Anniversary Guidebook by increasing advertising income to more than \$6,000 and by conducting a promotional effort that resulted in more than \$20,000 in sale of guidebooks from inventory.

### ANALYSIS OF PRINTING COSTS

The charges for original composition, author alterations, proofs, artwork, paste-up, and other make-ready work are the most costly aspects of publishing guidebooks. These fixed charges constitute approximately 50 percent of the cost of the average guidebook and are comparable to the fixed charges computed by Underwood (1960, p. 5 and 57) for the average university press book. Hawes (1967, p. 115-133) contains a brief but useful discussion on the economics of book publishing.

Printing costs are described as being either "fixed" or "variable" depending on whether or not the accumulative total of the charges changes with the number of impressions made. Fixed costs are the charges incurred prior to the first impression and are not significantly affected by the number of books produced. In contrast, variable costs are charges that continue to accumulate as the number of books published increases. Materials and other supplies comprise 15 to 20 percent of the variable charges of the average guidebook. The remainder of the variable costs, including presswork, binding, overhead, amortized cost of equipment, and profit, are individually small compared to the fixed cost of composition (Underwood, 1960).

Cost estimates for printing 1,000, 1,500, and 2,500 copies of Guidebook 24 are shown in table 1, along with the actual cost of printing an edition of 2,000 copies. The estimates of the cost and the actual cost of Guidebook 24 shown in table 1 were not obtained collectively at one time but were acquired individually at random intervals over a period of about 9 months. Changes in the cost of labor and (or) materials that may have occurred between individual estimates can be expected to have caused some aberration in the data.

Comparing the costs of printing guidebooks is difficult because of the variation in the number of pages in the books being compared. Using data obtained for Guidebook 24 (table 1), the average cost of an individual page, in cents, was computed by dividing the estimated job cost by the total number of pages to be printed. The resulting quotient is shown in the 5th column of table 1. The logarithm of these values were then plotted against the number of copies printed. The curve fitted to these data expresses the relationship of the combined fixed and variable printing costs to the total number of books printed (Fig. 1). To illustrate the use of the graph in determining the cost of individual guidebooks, the average cost per page is also expressed in terms of a typical Geological Society guidebook containing 250 pages.

Table 1. Actual and estimated costs of Guidebook 24<sup>1</sup>

Total number pages per book <sup>2/</sup>	Number of copies in press run	Total cost of job (dollars)	Total number of individual pages printed	Average cost per individual page per run (cents)	Average cost per book (dollars)
230	2,500	15,350 <sup>3/</sup>	575,000	2.67	6.15
230	2,000	12,835 <sup>4/</sup>	460,000	2.79	6.42
230	1,500	11,000 <sup>3/</sup>	345,000	3.18	7.35
230	1,000	10,350 <sup>5/</sup>	230,000	4.50	10.35

<sup>1/</sup> Estimated and actual costs obtained from University of New Mexico Printing Plant. The actual cost and estimates were not received collectively at one time but were acquired individually at random intervals over a period of about 9 months.

<sup>2/</sup> Includes foreword, text, abstracts from annual spring meeting, and advertisements.

<sup>3/</sup> Estimated cost.

<sup>4/</sup> 2,046 copies printed at actual cost of \$13,128. Figures adjusted to basis of 2,000 copies for simplicity of further calculations.

<sup>5/</sup> Extrapolated from estimate for a 200 page book.

The cost of an individual page (or book) is dominated by the fixed costs for short press runs, with the cost of the first copy produced approximately equaling the make-ready charges. The influence of the fixed charges on the combined cost decreases precipitously as the size of the press run is increased. As shown in Figure 1, the cost per individual page is reduced from several thousand cents for the first copy to less than 6 cents for a run of 750 copies, and slightly over 3 cents per page for a run of 1,500 copies. Thereafter, the influence of the fixed charge on the cost per individual page diminishes as the cost curve asymptotically approaches an average cost per

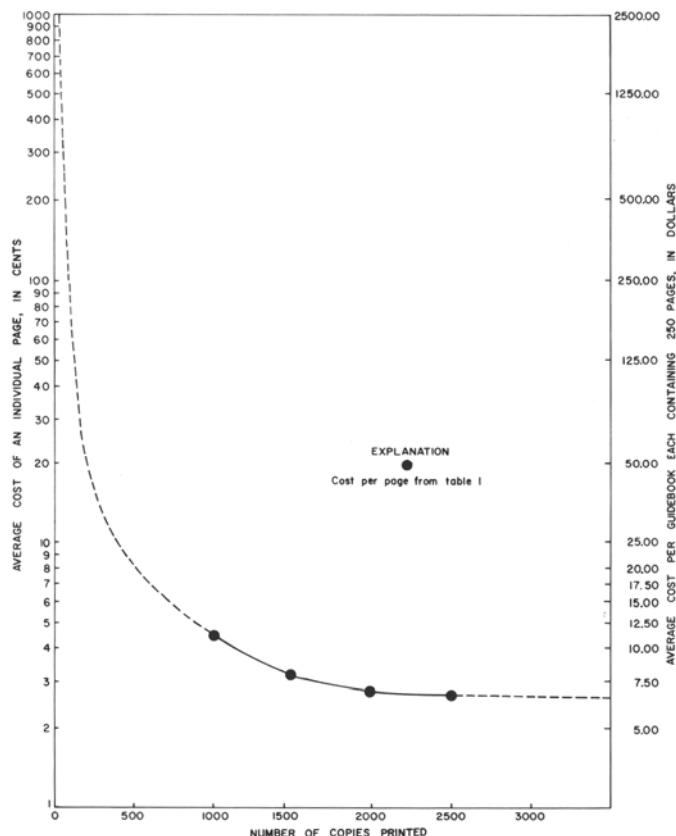


Figure 1. Relationship of combined fixed and variable printing costs to the number of copies in an edition.

copy of approximately \$6.00 that depends almost entirely upon the variable costs (materials, supplies, and presswork). Similar, but much more complete, sets of data are in Underwood (1960, p. 3-16 and 36-109).

Concordantly, the cost of a book also decreases rapidly in response to increases in the number of books printed. The cost per book containing 250 pages decreases to \$20.00 for a press run of 500 volumes, and then further to \$11.25, \$8.00, \$7.00, and \$6.70 on longer press runs of 1,000, 1,500, 2,000, and 2,500 copies, respectively, as shown in Figure 1.

### NET RETURN ON INVESTED CAPITAL

The net return on investment for editions of varying length can be examined by incrementally increasing the number of books printed during one press run (Table 2). Only press runs of more than 500 copies were considered because the cost per book for fewer copies is prohibitive. As shown in Table 2, the net return on total capital invested in guidebooks is only about 33 percent on a press run of 1,000 copies, but can be increased to 88 percent by printing an additional increment of 500 books ("incremental books," costing only \$1.50 each).

The net rate of return on the additional capital (only \$750) required to print an additional 500 "incremental books" reaches a maximum of 900 percent when an edition is increased from 1,000 to 1,500 books. Lesser, but substantial, net returns on the additional capital invested are obtained by increasing the press runs from 500 to 1,000 and from 1,500 to 2,000 copies. Net returns of more than 150 percent are ob-

tained by increasing the size of the edition from 2,000 to 2,500 and from 3,000 to 3,500 copies.

The demand for the guidebook to be printed rather than the cost per copy should be the limiting factor in deciding the number of copies to be published by the Geological Society. The past sales history, along with the information on costs that has been compiled, suggests that press runs of 2,000 to 2,500 copies of most guidebooks are essential in order to maximize the return on invested funds.

The relationship between the accumulative cost and return in dollars for varying press runs of a guidebook containing 250 pages is demonstrated in Figure 2. The break-even point is about 700 copies. The return on invested capital, in dollars, can be read directly from this graph by subtracting the value of the accumulative cost from the accumulative return at intersection of the respective curves with the "Y" axis for any press run.

### RATE OF RECOVERY OF CAPITAL INVESTED

The time required to recover capital invested in each edition of the guidebook printed by the Geological Society determines, to a great extent, the amount of capital available for subsequent publications and other activities, particularly the grants-in-aid program. The rate of recovery of the investment is, in turn, related to the margin of profit and the level of sales. Assuming sales of 450, 250, and 150 books during the first, second, and third years respectively, and a press run of 2,000 copies of a guidebook containing 250 pages, as shown in Table

Table 2. Return on investment for varying press runs.

Number of copies in press run <sup>1/</sup>	Cost per book (dollars)	Total cost of job (dollars)	Incremental decrease in cost obtained by increasing the number of books printed (dollars per book)	Additional capital investment required per increment of 500 books <sup>2/</sup>		Net return on entire investment		Net return on additional capital required to finance additional increment of 500 books <sup>2/</sup>	
				Total (dollars)	Per book (dollars)	Total (dollars)	(percent)	Total (dollars)	(percent)
500	20.00	10,000				2,500	-25		
			8.75	1,250	2.50			6,250	500
1,000	11.25	11,250	3.25	750	1.50	3,750	33	6,750	900
1,500	8.00	12,000	1.00	2,000	4.00	10,500	88	5,500	275
2,000	7.00	14,000	.30	2,700	5.70	16,000	117	4,800	178
2,500	6.70	16,700	.20	2,800	5.60	20,800	124	4,700	168
3,000 <sup>3/</sup>	6.50	19,500	.00	3,000	6.00	25,500	131		
							150	4,500	150 <sup>4/</sup>

<sup>1/</sup> Book is assumed to contain 250 pages.

<sup>2/</sup> Selling price of \$15.00 per book is assumed.

Time value of money is disregarded as is inflation.

<sup>3/</sup> Costs extrapolated from figure 1.

<sup>4/</sup> Values of incremental decrease in cost, net return on investment, and return on additional capital required as fixed costs are amortized and the costs asymptotically approach values dependent entirely on variable costs.

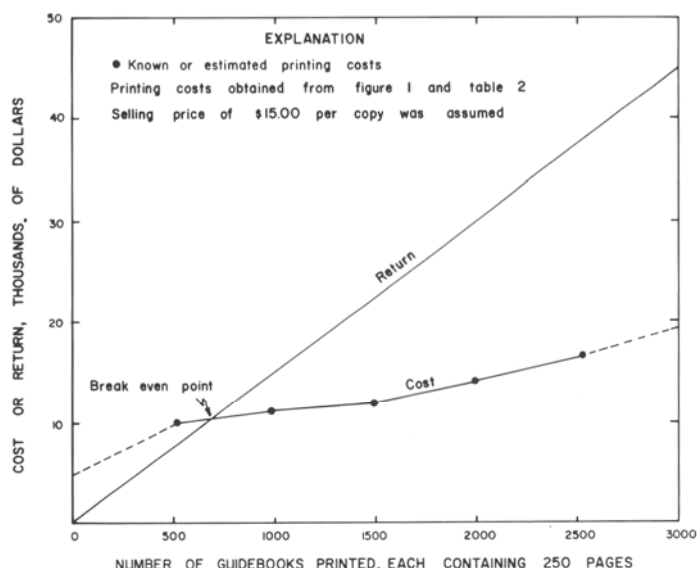


Figure 2. Relationship between accumulative cost of and return on an investment in guidebooks.

2 and Figure 2, \$12,750 of the investment of \$14,000 would have been recovered by the end of the third year.

In actual practice the sale of a modest amount of advertising in the guidebook should enable the recovery of substantially all the capital invested by the end of the second year.

If these optimistic objectives are met, the income from the sale of guidebooks should enable the Geological Society (1) to

continue the program of reprinting guidebooks as the supply of an edition is exhausted; (2) to increase the number and size of the grants-in-aid given to graduate students at the University of New Mexico and the New Mexico Institute of Mining and Technology; and (3) to accumulate a modest fund as protection against the cyclical periods where deficits may occur.

The initial investment in a guidebook should be recovered over a period of 1 to 2 years if a margin of approximately 100 percent profit is structured into the edition. The bulk of the remaining investment will then be recovered in gradually decreasing amounts per year over a period of approximately 5 to 10 years. A number of sets of guidebooks in inventory can thus be expected to provide the Geological Society with a dependable continuing flow of income and attendant financial health for as long as earth scientists have an interest in the geology and natural resources of New Mexico.

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## OUR 500th MEMBER IN '74



Ms. Anne Kramer Loring, Geologist with the *Metallics Division of Continental Oil Company, Albuquerque District*, was the 500th person to join the *New Mexico Geological Society* during the 1974 membership drive. Ms. Loring is also the *Treasurer-elect* of the Society. W. L. "Bill" Hiss, *President of the Society*, is shown presenting Anne with a bouquet in honor of the occasion. On the left is Anne's boss, Philip J. Stirling, *District Geologist for Continental*.