Inventory Cost Allocation Practices and Concepts*

by OSAMU NISIZAWA

In this article, I shall present the results of my survey on the problem of how manufacturing companies in the United States are now apportioning their costs between product and period costs, and then arrive at the inventory cost concepts which seem to underlie their current accounting practices as determined from the survey.

OBJECTIVE AND PROCEDURERS OF THE SURVEY

General principles applicable to the pricing of inventories of mercantile and manufacturing enterprises, as set forth by Accounting Research Bulletin No. 43 issued by the Committee on Accounting Procedure of American Institute of Certified Public Accountants, are:

> " The primary basis of accounting for inventories is cost, which has been defined generally as the price paid or consideration given to acquire an asset. As applied to inventories, cost means in principle the sum of the applicable expenditures and charges directly or indirectly incurred in bringing an article to its existing condition and location."(1)

It continues to discuss the content of inventory costs: " Although principles for the determination of inventory costs may be easily stated, their application, particularly to such inventory items as work in process and finished goods, is difficult because of the variety of problems encountered in the allocation of costs and charges."

Although the above mentioned statement and related discussion make

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* From " N. A. A. Bulletin," December 1959, pp. 81~93. Reprinted by permission of the National Association of Accountants, New York, N.Y., U.S.A.

(1) *Restatement and Revision of Accounting Research Bulletins,* American Institute of Certified Public Accountants, 1953, p. 28.

it clear that inventory costs in manufacturing enterprises include the general and administrative expenses related clearly to production but exclude abnormal manufacturing expenses and all selling costs, they do not describe what kind of cost items should be included in inventories. Thus, the practical determination as to which cost items are to be included in inventories is left to the mangement's decision in individual companies. Therefore, it will be surely of interest to managements, as well as to other interested parties, to gain insight into the inventory cost concepts which leading manufacturing companies follow, as disclosed through a field survey on current cost accounting practices in these companies. This is main objective of this study.

In order to achieve this objective, the method of mail questionnaire was selected as the basic survey method and the following problems were carefully considered before questionnaires were sent to the surveyed companies;

1. What kinds and what number of companies should be surveyed?
2. How should cost items be classified for this survey purpose?
3. What kind of questionnaire forms should be used?
4. With what data should this survey results be compared?

First of all, the 100 largest industrial corporations in 1957 were chosen as the participating companies in this survey from the list in "The Fortune Directory–The 500 Largest United States Industrial Corporations" (*Fortune*, July 1958, pp. 131–134). The total sales in these 100 companies were $128 billion, which is about forty percent of total sales of $ 323 billion for the 132,835 manufacturing companies in the United States; consequently, I believe, some generalizations can be drawn from the survey results on the above companies notwithstanding the limited numer of surveyed companies.

As to the cost classifications, all costs and charges in the manufacturing companies ware classified as follows for the survey purpose.

I. Manufacturing costs:
   A. Production department costs
   B. Service department costs;

a Production support departments
(e.g., power, water and repair departments).

b Plant administrative departments;
1. Cost department
2. General accounting department
3. Purchasing department
4. Timekeeping
5. Personnel department
6. Payroll department
7. Invetory control

C. Special manufacturing categories;
a Research and development costs
b Royalties paid
c Standard cost variances;
1. Material and labor variances
2. Burden variances
(a) Under-absorbed burden balances
(b) Over-absorbed burden balances
d Inventory cost adjustments;
1. Adjustment to "lower of cost or market"
2. Write-offs for shortages and obsolescence, etc.
3. Adjustment to new standard costs

II. Distribution costs:
A. Order-getting costs
(e.g., advertising costs, sales promotion costs, direct selling costs, and marketing administrative costs).
B. Order-filling costs;
a Costs of physical handling;
1. Costs of packaging products
(a) When products are packaged as manufactured
(b) When products are packaged for shipment
2. Shipping department costs
(a) At factory
(b) At field warehouses

3. Costs of storing finished products
   (a) When goods are stored at factory
   (b) When goods are stored at field warehouses
4. Costs of transportation to field warehouses
5. Costs of interdivisional shipments
   (a) Interfactory transportation
   (b) Interfactory storage

b Clerical costs of marketing
(sce section I B b)

C. General administrative costs:
   a Salaries of topexecutives
   b Other administrative costs

III. Non-operating costs
(e.g., interest expenses, amortization of certain deferred expenses and loss from sales of securities).

IV. Net income deduction
(e.g., federal and state income taxes).

The questionnaire forms were designed to be answered only by placing check marks in order to collect the research data as objectively as possible.

The N. A. C. A. Research Series No. 10, "Costs Included in Inventories" (*N. A. C. A. Bulletin,* Section 3, August 15, 1947) was chosen as the data against which this survey would be compared. As the similar terminologies to those in N. A. C. A. Research Series No. 10 were used in this questionnaire as often as possible, I feel confident the present survey results can be usefully compared with 1947 survey results.

The questionnaires for the present survey were sent by mail to the controller or treasurer of the participating companies of November 1, 1958, and were returned by 75 companies through December 31, 1958. Summarization was done early in 1959. As 10 companies of the 75 answered the questionnaires incompletely, the replies by the remaining 65 companies are used in this study as basic materials.

There are some differences in number of the reporting companies between the N. A. C. A. survey (here called the 1947 survey) and the present survey (here called the 1958 survey). Therefore, all data by both surveys will be shown in the form of percentages, in order to remove these differences.

APPORTIONMENT PRACTICES ; PRODUCT OR PERIOD COSTS

Costs of Physical Handling. The accounting practices for treating physical handling costs are charted on Exhibit 1. The results of both the 1958 and 1947 surveys are shown by vertical bars for each cost item. The dark section on each bar represents the percentage of the companies charging the surveyed cost items to product costs ; the shaded section represents the percentage of the companies charging the surveyed cost items to period costs ; and the dotted section represents the percentage of the companies dividing their costs between product and period costs. (The same methods of graphic presentation are used on other exhibits.) The following characteristics of treating costs of physical handling are summarized from Exhibit 1 ;

A. Costs of packaging products whch goods are packaged as manufactured are charged to product costs by over 90% of the participating companies in both surveys.

B. Interfactory transportation and interfactory storage costs, that is, interdivisional shipment costs, are charged to product costs by about 70% of the participating companies in both surveys.

C. Shipping department cost at field warehouses and costs of storing finished products at field warehouses are charged to period costs by over 85% of the participating companies in both surveys.

D. Roughly speaking, other costs of physical handling, that is, costs of packaging products when goods are packaged for shipment, shipping department costs at factory, costs of storing finished products at plant, and costs of transportation to field warehouses are charged to product costs by half of the participating compnies, and to period costs by another half of above companies in both the 1958 and 1947 surveys.

Comparing the 1958 survey results with the 1947 survey results, it

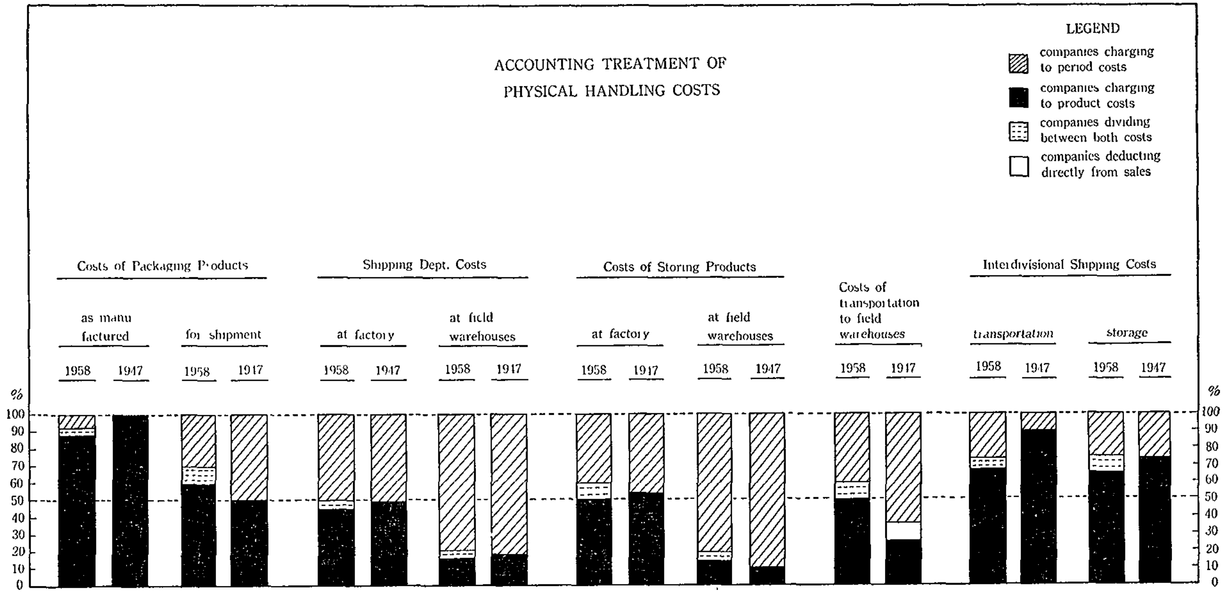
ACCOUNTING TREATMENT OF
PHYSICAL HANDLING COSTS
LEGEND
companies charging to period costs
companies charging to product costs
companies dividing between both costs
companies deducting directly from sales
Costs of Packaging Products
as manufactured
for shipment
Shipping Dept. Costs
at factory
at field warehouses
Costs of Storing Products
at factory
at field warehouses
Costs of transportation to field warehouses
Interdivisional Shipping Costs
transportation
storage
1958 1947
%
100
90
80
70
60
50
40
30
20
10
0

Exhibit 1

is notable that they show almost same results in spite of the fact that the surveys were carried out with different companies and in different years. This seems to mean that uniformity of treating the costs of physical handling exists among the manufacturing companies and that accounting practices in this field have undergone no essential changes during these 11 years.

Further investigation of above data reveals that most of the participating companies divide their costs between product and period costs on the basis of the organizational places at which their costs are incurred. It is very interesting that the apportionment practices are influenced neither by types of natural costs (e.g., salaries, insurance, or depreciation) nor by types of functional costs (e.g., packaging, storage, or transportation costs) but by types of business segment costs (e.g., shipping costs at factory or field warehouses).

This trend is indicated by the fact that most of the participating companies charge the costs incurred within the proper manufacturing process to product costs, while the costs incurred at field warehouses are charged to period costs. However, there is no such uniformity on the costs incurred between the manufacturing processes and field werehouses (e.g., packaging costs for shipment, shipping and storage costs at factory, and transportation costs to field warehouses). This costs seem to be charged to product costs when topmanagements consider the corrssponding operations an inseparable part of the proper manufacturing processes, but to period costs when considered a part of the subsequent processes of distribution.

Service Department Costs (plant administrative department costs). From Exhibit 2 the following characteristics can be pointed out.

The 1958 survey results;

1. General accounting department costs are charged to period costs and timekeeping costs to product costs by 65% of the participating companies.
2. Very broadly speaking, other service department costs are charged to product costs by one third of the participating companies, to

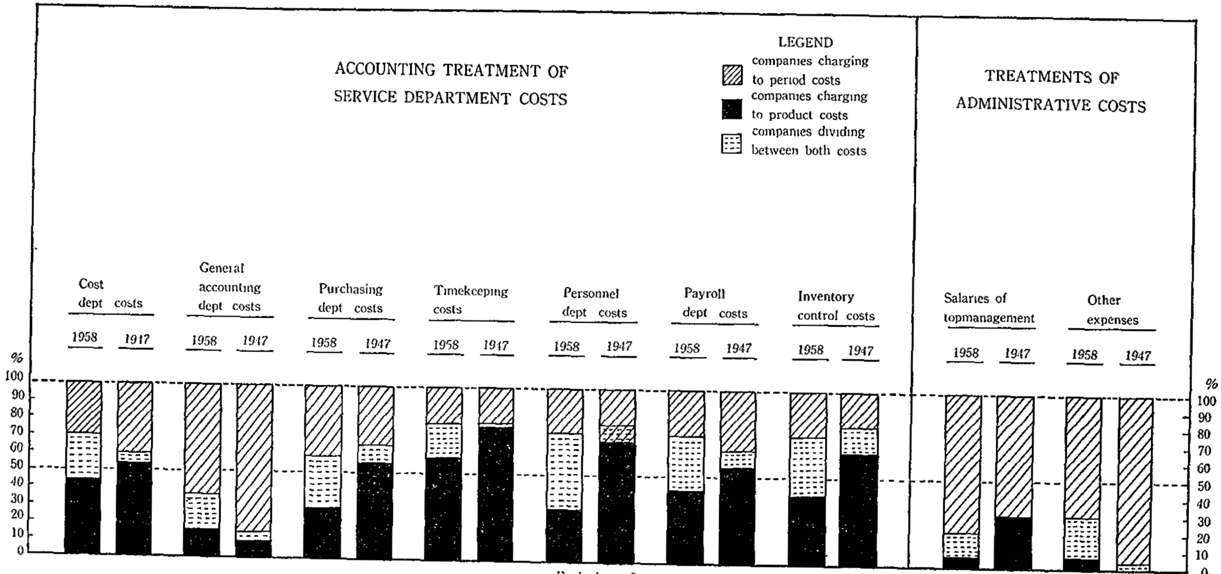
ACCOUNTING TREATMENT OF
SERVICE DEPARTMENT COSTS
LEGEND
companies charging to period costs
companies charging to product costs
companies dividing between both costs
TREATMENTS OF
ADMINISTRATIVE COSTS
Cost dept costs
General accounting dept costs
Purchasing dept costs
Timekeeping costs
Personnel dept costs
Payroll dept costs
Inventory control costs
Salaries of topmanagement
Other expenses
1958
1947
%
100
90
80
70
60
50
40
30
20
10
0

Exhibit 2

period costs by one third of the companies, and divided between product and period costs by the remaining one third of the companies.

The 1947 survey results;

1. General accounting department costs were charged to period costs by 90% of the participating companies.
2. Cost department costs and purchasing department costs were charged to product costs by more than 50% of the companies.
3. Other service department costs (i.e., timekeeping costs, personnel department costs, payroll department costs and inventory control costs) were charged to product costs by almost 70% of the companies.

Comparing the 1958 survey results with the 1947 survey results, the percentage of companies charging to period costs remein unchanged, while the percentage of the companies dividing between product and period costs have increased remarkably. In both surveys general accaunting department costs are charged to period costs by most of the participating companies, while timekeeping costs are charged to product costs by most of the companies. All other service department costs, that is, cost department costs, purchasing department costs and inventory control costs show similar shadows when the percentages of the companies charging these costs to product costs, the percentages of the companies charging them to period costs, and the percentages of the companies dividing them between product and period costs, are brought together for comparisions. Different treatments seem to result from the facts that nature and condition of service departments are different from company to company. For example, companies with service departments located at the plant which serve only the plant charge the service department costs to product costs, while companies with service departments located at home office which serves both the plant and home office divide service department costs between product and period costs. On the other hand, to the companies which charge service department costs to period costs, the convenience of computation may take priority because of small amount of the service department costs.

General Administrative Costs. The last four bars on Exhibit 2 show the treatment of general administrative costs, which include salaries of topexecutives and other administrative costs. Some characteristics are summarized as follows;

A. Salaries of topexecutives and other administrative costs are charged to period costs by over 70% of the participating companies in the 1958 survey.

B. Salaries of topexecutives and other administrative costs are divided between product and period costs by 15 to 20% of the participating companies in the 1958 survey.

C. The difference in treatments, found between salaries of topexecutives and other administrative costs in the 1947 survey, has disappeared and both treatments became nearly equal in the 1958 survey.

According to N. A. C. A. Research Series No. 10, the companies which charge general administrative costs to period costs follow the view that "administration is a separate function coordinated with manufacturing and selling. Since inventories are, by well established custom, composed of costs of manufacture rather than total costs of running the business while the goods are being made, administrative costs are usually treated as period costs."(2) The companies which divide general administrative costs between product and period costs, follow the view that "two primary functions of operating a business are manufacturing and selling, and the administrative costs are really incurred for the benefit of these two functions,"(3) so that the companies "include in manufacturing costs (and inventories) an appropriate share of the general and administrative costs."(4) The above data indicates that companies following the former way of thinking prevail in number to those following the latter way of thinking.

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(2) *N.A.C.A. Research Series No. 10.*, op. cit, *p.* 1593.

(3) *Ibid.*, p.1594.

(4) *Ibid.*, p.1594.

Special Manufacturing Categories. Apportionment practices of these costs between product and period costs are charted on Exhibit 3. From this exhibit, some characteristics can be pointed out as follows.

Research and Development Costs.

1. Research and development costs are charged to period costs by 70% of the participating companies in the 1958 survey.
2. Research and development costs are charged to product costs by only 10% of the companies in the 1958 survey.
3. The 1958 and 1947 surveys show almost opposite results.

It is especially interesting that the companies charging the costs to period costs in the 1958 survey have increased by about two and a half times as compared to those in the 1947 survey. This remarkable change seems to have been resulted from the revision of Internal Revenue Code in 1954. Section 174 in the Internal Revenue Code of 1954 describes the general treatment of research and experimental expenditures as follows;

> "A taxpayer may treat research or experimental expenditures which are paid or incurred by him during the taxable year in connection with his trade or business as expenses which are not chargeable to capital account. The expenditures so treated shall be allowed as deduction." 〔(a) (1) of SEC 174, Research and Experimental Expenditures, *Iuternal Revenue Code of 1954* (83rd Congress-2nd Session, H. R. 8300)〕.

This method can be adopted by a taxpayer, without the consent of the Secretary or his delegate, in each taxable year which begins after December 31, 1953. Therefore, most of the participating companies have changed their policies to charging of research and development costs to period costs. Otherwise, the companies must treat the costs as deferred expenses and amortize them over a period not shortor than 60 months.

As the other two N. A. C. A. Research Reports in this field,(5) have

(5) a. "The Recent Day Practices in Accounting for Research and Development Costs", *N.A.C.A. Research Study, N.A.C.A. Bulletin,* Section 3, March 1, 1939.
b. "Accounting for Research and Development Costs", *N.A.C.A. Research Series No. 29, N.A.C.A. Bulletin,* Section 3, June 1955.

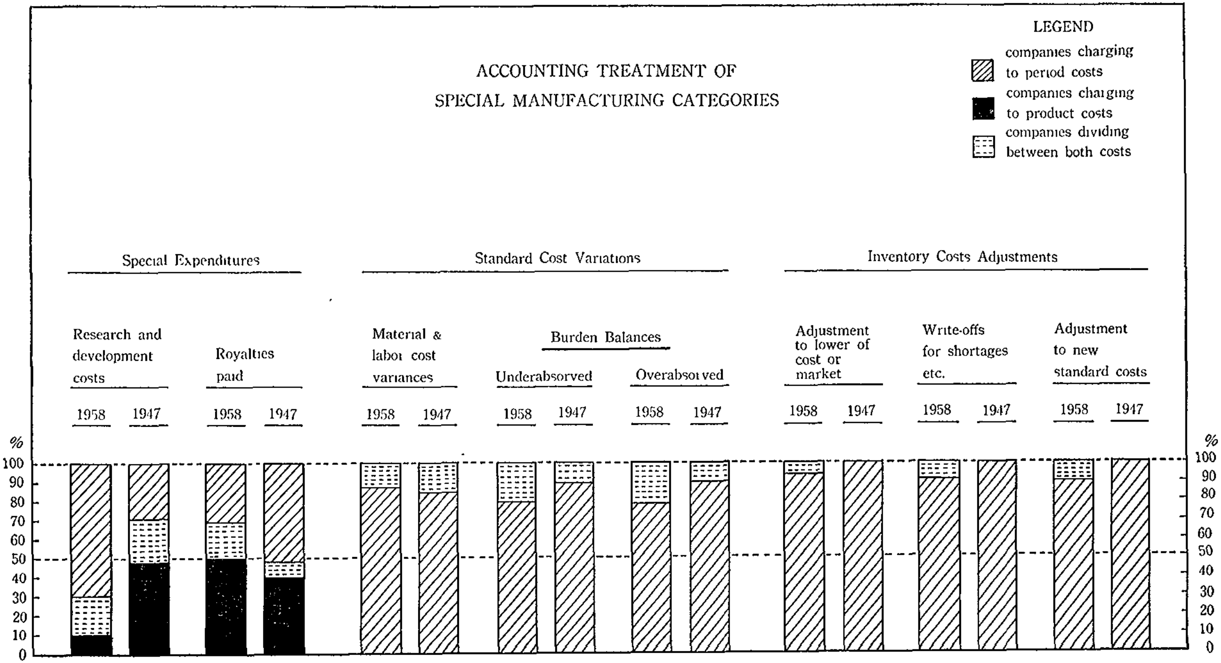
ACCOUNTING TREATMENT OF
SPECIAL MANUFACTURING CATEGORIES
LEGEND
companies charging to period costs
companies charging to product costs
companies dividing between both costs
Special Expenditures
Standard Cost Variations
Inventory Costs Adjustments
Research and development costs
Royalties paid
Material & labor cost variances
Burden Balances
Underabsorved
Overabsorved
Adjustment to lower of cost or market
Write-offs for shortages etc.
Adjustment to new standard costs
1958
1947
%
100
90
80
70
60
50
40
30
20
10
0

Exhibit 3

stated, several other factors (e.g., the objectives of research and development activities and the amount of research and development expenditures) will, of course, influence the apportionment practices of resesrch and development costs.

Royalties Paid

1. Royalties paid are charged to product costs by about 50% of the participating companies in the 1958 survey.
2. Royalties paid are charged to period costs by about 30% of the participating companies in the 1958 survey.
3. The percentage of the companies dividing royalties paid between product and period costs has increased as compared with that in the 1947 survey.

Royalties paid are usually classified into two cotegories; royalties paid on the basis of use of machinery, materials, manufacturing process, or units produced, and royalties paid on the basis of units sold or dollars of sales. Generally speaking, the former kind of royalties paid may be charged to product costs, while the latter kind of royalties paid may be charged to period costs (costs of goods sold).

Standard Cost Variances

1. All standard cost variances are charged to period costs (costs of goods sold or profit and loss) by about 80 to 90% of the participating companies in both the 1958 and 1947 surveys.
2. All standard cost variances are divided between product costs and period costs (costs of goods sold or profit and loss) by about 10 to 20% of the companies in both surveys.
3. No participating company in either survey charges standard cost variances to product costs only.

N. A. C. A. Research Report, " How Standard Costs Are Being Used Currently" (*Complete N. A. C. A. Standard Cost Research Sesies,* pp. 59–60) reports the following data on standard cost variances. (The data below are partly modified by the author.)

	PERCENT OF COMPANIES		
	Material quantity variances	Labor variances	Burden variances
Variances treated as period costs.	78	82	84
Variances divided between product costs and periad costs.	22	18	16
Total	100%	100%	100%

The adove figures show the almost identical results as those in Exhibit 3. Therefore, it can be assumed that standard cost variances are charged to period costs (costs of goods sold or profit and loss) by most of the manufacturing companies. One of the reasons why the companies follow such practices is that they have the view:

"One of the principle concepts underlying standard costs is that variances represent costs of waste and inefficiency, and so such should be excluded from costs of the goods manufactured." (N. A. C. A. Research Series No. 10, *op. cit.,* p. 1599)

Inventory Cost Adjustments

1. All of inventory cost adjustments (i.e., adjustments to lower of cost or market, write-offs for shortages, etc., and adjustment to new standard costs) are charged to period costs by over 90% of the participating companies in the 1958 survey.
2. All of inventory cost adjustments are charged to period costs by all of the participating compnies in the 1947 survey.
3. No participating company in either surveys charges inventory cost adjustments to product costs only.

Adiustment of inventories to lower of cost or market, inventory write-offs for shortages and obsolescence, etc., and adjustment of inventories to new standard costs are usually made at the end of the accounting period and have no definite relationship with proper manufacturing activities, so that most of the participating companies will apply these adjustments directly against income of the period without assignment to inventories.

TENTATIVE INVENTORY COST CONCEPTS

In the foregoing pages, our attention has been primarily directed at those cost items which lie near the boundary line between product and period costs. Apportionment practices of these costs have been summarized on the basis of the information which the participating compnies in both the 1958 and 1947 surveys reported.

It is one of the most outstanding findings of the 1958 survey that its results show almost the same survey results as those in the1947 survey, except that the companies dividing costs between product and period costs have increased to some extent, especially in the treatment of service department costs.

In conclusion, let us list the tentative inventory cost concepts which the participating companies seem to follow in their accounting practices. Of course, it is unnecessary to say that these concepts are based on the information given by 65 of the largest industrial companies in the United States, so that it may only be conjectured as to how these concepts apply to the other companies. Nevertheless, I believe that it is of value to try to restate the inventory cost concepts of the participating companies in the 1958 survey.

Concept 1. Production department costs and production support department costs are usually charged to product costs.

Concept 2. The physical handling costs incurred with the proper manufacturing process tend to be charged to product costs. However, accounting treatments of the physical handling costs incurred between the proper manufacturing processes and field warehouses or sales branches seem to be different from company to company.

Concept 3. As to plant administrative department costs, general accounting department costs are apt to be charged to periad costs and timekeeping costs to be charged to product costs by many companies. Other plant administrative department costs seem to be, very broadly speaking, charged to product costs by one third of the companies, charged to period costs by one third of the companies, and divided between the product and period costs by the remaining one third of the companies.

Concept 4. General administrative costs are not usually charged to product costs, except in companies which regard administrative costs as really incurred for the benefit of both the manufacturing and selling functions.

Concept 5. The companies charging research and dvelopment costs to period costs have remarkably increased because of the revision of Internal Revenue Code in 1954. Those royalties which are paid on the basis of use of machinery, materials, manufacturing process, or units produced, tend to be charged to product costs.

Concept 6. Standard cost variances and inventory costs adjustments are not usually charged to product costs by most of the manufacturing companies.

Concept 7. Order-getting costs, non-operating costs and net income deductions are not be charged to product costs under the usual conditions.