

search unit. The addition of the research unit to the combination of operations has increased the productivity of the whole and *the sales research unit is therefore a producing unit*—just as much so as the individual worker who manipulates a machine working upon the physical product.

Other cases might be cited showing the productivity of other forms of indirect effort—the contributions of the purchasing agent, the personnel manager, the comptroller, the methods engineer, and so on.

#### Some Observations

The conventional attitude of mind of the American executive is an attitude inherited from the early frontier shop with its limited market, minimum of mechanical equipment and limited division of labor. In the early days of a Douglas, the shoe manufacturer gathered his small group of skilled workers and apprentices about him in a crude shop, built the shoes by hand and sold them directly in the nearby market. It was natural for him to look upon only those who actually handled the shoes physically as productive—other activities as an incidental "expense" to be avoided. Management of that day was, as much as management of today, a combining of certain basic elements—materials, labor, etc.—in the production of a consumable product, but the elements were simple and few and obvious, and incorrect inferences were made concerning what was and what was not productive. The manager of today has inherited these ideas without giving thought to the significance of large-scale industry, specialization and division of labor.

Whereas in the earlier day the production of a consumable commodity consisted in the combination of a few simple elements, today it consists usually of the combination of a large number of elements, some of them not simple and obvious, and some of them very indirect. The productivity of any one element of the combination cannot be determined by a consideration of that element in the abstract, but by a consideration of its influence in combination with other elements essential to the complete production of the commodity.

If  $a + b + c$  produce 100 units of a useful product and if the addition of  $d$  results in a production of 150 units, then  $d$ , no matter what its nature, provided its value (cost) is less than the value of the 50 additional units, is productive.

It is obvious, therefore, that the common fear of "overhead" in the abstract is not reasonable. The contribution to productivity of an element of overhead cannot be determined except by experiment with the

combination of which it is a part. The particular element experimented with may prove to be highly productive or it may prove to be non-productive. But so also may direct labor or a machine.

It is obvious, also, that the determination of the productivity of an element depends upon precise and accurate cost accounting and related statistical analysis; cost accounting which discloses not only the productivity of the combination  $a + b + c + d$ , but also the approximate influence of  $a$ ,  $b$ ,  $c$  and  $d$  in the combination.

It is a practicable but not a simple matter to determine the productivity of an element, no matter how indirect it may be, by comparison of combinations in which the element is absent with combinations in which it is present. The net productivity of  $a + b + c$  compared with the net productivity of  $a + b + c + d$  indicates the contribution of  $d$ , although it might be utterly impossible to compute or even estimate the contribution of  $d$  by itself.

The most useful method of comparison of the relative productivity of combinations is to reduce cost records to cost of production per unit. Provided the system of cost accounting is logical, accurate and complete (by no means a simple matter), if  $a + b + c + d$  shows a lower unit cost than  $a + b + c$ , then the manager can feel assured that  $d$  is productive; he need not worry whether it apparently has only the most remote relation to manipulation of the physical product, and he can laugh at those who point, with concern based on false assumptions, at his ratio of overhead to prime cost.

The Taylor philosophy and system of management has been frequently criticised as adding to conventional management a large body of "indirect" operations and therefore of "indirect" costs. The criticism is correct as to facts but incorrect in using these facts as a basis for criticism. For it is wrong in implying that these added "indirect" operations and costs are not productive. In this connection a new definition of the Taylor System might be given: A system of management which by research and experiment discovers new *highly productive* indirect elements to add to the combination of production elements; which by special devices of control introduces these new elements into and maintains these elements in the combination; and which by a precise cost accounting constantly verifies the productivity of these indirect elements.

#### Direct and Indirect Costs

These and other terms have been devised by the

accountant for his convenience, and have no implication whatsoever concerning the productivity or non-productivity of an element which represents a cost. The accountant's terminology is perhaps nowhere better given than in the following quotation from Kester's "Accounting: theory and practice," Vol. II, p. 49:

Three elements enter into the manufacture of a product. These are material, labor, and expense. The problems of factory accounting are therefore those connected with the accounting for the costs of material, labor, and expense. Some terms used in this connection will need explanation. A standard terminology for cost-keeping is becoming fairly well established. Direct and indirect costs, prime cost, factory burden, or overhead expenses, factory cost, full cost or cost to make and sell—these are some of the terms needing definition. Direct costs are those which can be allocated directly to a specific product. They are items which can be separated from all other cost items and applied solely to a particular product. Indirect costs are those which are shared in common by the various products and so must be distributed over them on some equitable basis. Direct costs are sometimes called prime costs. The cost elements which can almost invariably be applied directly to the product are material and labor. The sum of these two items constitute, therefore, the prime or first cost of the product. The other items of cost which are incurred in the factory or with which the factory is chargeable are variously called factory expense, overhead, or burden. These indirect costs cannot be charged directly to any specific product, and so they are shared by the entire factory output.

The sum of prime cost plus factory expense constitutes factory cost, i. e., the entire cost of manufacture up to the point at which the product is turned over to the selling department for sale. This is sometimes called total manufacturing cost.

Full cost is the price at which the manufactured article can be made and sold. In other words, to the factory cost must be added its equitable share of all the other costs of conducting the business and also a margin of profit in order to arrive at a selling price. These definitions indicate some of the purposes of cost-keeping.

Now, while all of this is good accounting terminology, it is unfortunate that the term "expense" is set over against the terms "prime cost" and "direct cost." For the contrast suggests that the costs of material and labor are inherently necessary and productive, and therefore not undesirable, while all other costs are "expenses," inherently unnecessary, unproductive, and therefore undesirable. But as a matter of fact all outlays are "expenses" in that they cost something—materials and labor included. The distinction between "direct" and "indirect" is sound and is necessary in accounting technique; but any implication that the productivity of an element is in direct ratio to its directness, is unsound.

#### Business Cycles

We have suggested that the common unsound identification of direct with productive and of indirect with non-productive is due to the fact that executives have accepted the thinking of an earlier generation which was concerned with simple processing only, and have not thought out their problems anew in the light of the more involved processing, with its specialization and

division of labor, with which they are today concerned. There is one other explanation of their fear of the indirect as non-productive; that is their experience with periods of depression.

Both direct and indirect elements of production may be highly productive in a period of business activity, and both may become non-productive in a period of depression—i. e., non-productive from the point of view of the individual enterprise when there is no demand and no market value for its product. By custom direct expenses—for material and labor—can be stopped abruptly under circumstances of depression. (This may be with respect to labor socially undesirable, and if so social measures may be taken to correct it; but it is nevertheless the fact.) But the indirect expenses are usually not so easily discontinued, and if discontinued, not so easily restored. The elements which involve indirect expense are usually highly skilled or specialized, or for some other reason to be let go only as a last resort. Therefore, in a period of depression they may be retained as an overhead. For instance, in a shop there is in a time of activity one repair man and one dispatch clerk for twenty machines. This ratio has been proved to be in the particular instance the most economical, and both repair man and dispatch clerk are highly productive elements in the combination. But a depression comes on and one-half of the machine operatives are discharged and one-half of the machines left idle. But one-half the repair man and one-half the dispatch clerk cannot be let go. They become relatively less productive. The ratio of "overhead" increases.

For an enterprise belonging to a regime of industry subject to cyclic fluctuations, the problem becomes one of the long-run productivity of the indirect. For a complete cyclic period covering activity and depression, the net productivity of any indirect element is derived by subtracting the loss it causes during the depression from the gain it causes during the activity. The gain caused during a period of activity will almost invariably be greater than the loss caused during the complementary period of depression.

This suggests also why the study of cycles and devising measures for overcoming the influence of cyclic changes is of such great practical importance to the manager. If he can remove from his enterprise the influence of cyclic changes, he can then go ahead towards that better management which utilizes productive indirect elements without fear of the subtractions from productivity compelled by a period of depression of unknown intensity and duration.