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Real efficiency is predicated on results. Given an up-to-date machine equipment with capable operatives manning it and you have latent efficiency. Given machines and operatives with poor shaft alignment and you have a percentage or degree of efficiency —we might call it an efficiency factor as we speak of power factor or load factor. Real efficiency depends upon perfect coördination of all of the factors of a process. Improper functioning at any point produces only relative efficiency.

Normally it devolves upon the engineer to improve industrial processes; the cost accountant measures results and so furnishes a basis for judgment of the adequacy of the new method. In his own province, however, the accountant is responsible for both the fitness of the procedure and the degree of efficiency of the force employed in the accounting.

It may so happen that a number of functions are dependent upon the accounting practice, in which case care is required in adjustment of the system of accounts.

This complicating condition arises in the central station industry. Here considerable forces of meter readers, bill and ledger clerks, cashier's clerks and collectors are simultaneously employed in the general work of billing and collecting. It is necessary that this work be distributed over the billing cycle (usually the calendar month) as the men are regularly employed for a particular class of work and must be kept busy. For any of these forces the formula of efficiency may be stated simply

$$\frac{\text{Cycle task}}{\text{Days in cycle}} = \text{Day's task for force}$$

$$\frac{\text{Day's task for force}}{\text{Number of men available}} = \text{Individual task}$$

Obviously, when such equal division of work is made possible the point of increase of force is peak cycle task for the force and

not for the more or less frequently recurring individual peaks common to any system not delicately adjustable.

The solution of this particular problem of coördination rests on the establishment of a fixed routing of work, governing in each division of the work. The route is the common factor. It has been the usual practice in the lighting business to divide the territory served into blocks, reading, billing and collecting in each as a unit. Rapid growth in one section or a number of sections makes a new division necessary or results in unbalancing the system. Incidentally it usually happens that one street or avenue is cut by the boundaries of a number of blocks and the finding of an account for any particular address is made difficult and results in loss of time. Such a loss, while in the individual case trifling, cumulates to considerable amounts. Where personal accounts are allocated geographically it is of no little importance that they be written up in sequence throughout each street and avenue.

A little close examination of the question of routing suggests the characteristic of the ideal. Theoretically or ideally, the route should be circular; practically, it is sufficient that the route be endless, or in other words, that the end of any day's work shall be the beginning of the following day's work. With such a route any part of it may be apportioned to the men available and a high average day's work is made possible. Where with the block system men are scattered into different sections there always develops a wide divergence between maximum and minimum task. Especially with growing companies it is common to find frequent recurrence of the maximum days or overloads and consequent increase of force brought about by reapportionment of blocks or the assignment of extra men to the fractions or balances over normal task. Assuming, then, a fixed route following so far as practicable the general run of streets and avenues, and a close if not actual connection of the ends of the route, it is plain that the outside work, reading and collecting, is afforded every opportunity for efficiency.

The accounting work of necessity must follow the course of the meter reader. A nice apportionment of the office work would seem to demand either a loose leaf or card ledger. But here, as in any business, peculiarities of the business in some measure determine methods. Certain practical considerations which have

ruled in the matter dictate the use of bound books with numbered folios. Without attempting a detailed recital of the objections to the loose leaf system it might be well to note that with numbered folios the recording of a multitude of cash receipts can be very quickly and satisfactorily accomplished by simply assorting such receipts by ledger numbers and listing folios and amounts only. Assuming the bound volume as a condition precedent it follows logically that the smaller the unit volume, the more readily and equally may work be distributed.

Usually accounts are written up about every three years. During such a period great changes may occur in some sections of the territory served. Provisions must be made for this unstable condition. Generally it may be stated that maximum growth is determined by area and as maximum growth is the ultimate condition the accounting system if scientifically planned will adapt itself to every stage of development. It is necessary before writing up the accounts that certain fixed points or mile stones be marked in the route. If area is the logical basis for division of territory, street frontage is its practical equivalent. The total street frontage of the route being ascertained by measurement, equal subdivision into any desired number of sections is simple. These route sections become ledger districts. They may and will vary greatly in number of accounts, but ultimately they will tend to equalize.

If the unit volume or ledger section be limited to four hundred folios (representing almost the limit of billing capacity per man per day) the total of any day's work can be apportioned very fairly. Each ledger district being a unit, the ledger section folios are numbered 1 to 399, 400 to 799, 800 to 1199, etc. For journal work and periodic balances any number of sections which may be required for a ledger district may be handled as a unit.

The system thus briefly outlined is elastic and adaptable to any stress of growth whether uniform or spasmodic. The periodic rewriting of accounts may be distributed over a number of months to avoid undue pressure on the office force at such times. No redistricting or readjustment is necessary. The efficiency of a force of men depends quite as much on the routine established for them and the supervision furnished as it does on the individual ability of the men: in fact individual excellence may count for very little if not given proper facilities.