

of the operation of the electrical apparatus, he should keep this log and his name be on the blank.

At the end of the month, the totals from the various data sheets should be tabulated and compared with the same month of the previous year. At the end of the year the grand total should be made up. This may be illustrated by Fig. 4, which is a copy of a monthly sheet used in a plant under the care of the writer. It is a very different plant and used for a different work from the one we have under consideration, but the idea is the same. The electrical load is very even, so no mention of it is made on this sheet. The data for this sheet is taken from Fig. 5.

Record of Supplies and Repairs.

Many of the stores are carelessly or even wilfully wasted. For this reason close watch must be kept on them. The easiest way is to have a card system, using 3 x 5 cards, such as Fig. 6. Some one person should be directly responsible for the storeroom. A set of cards may be kept for each watch if found necessary, using different colors to distinguish the one watch from the other. Such material as packing, es, ally in the small sizes, could be given out of store in fixed amounts, say 1-4 or 1-2 pound, and entered against the person or machine for which it was issued. This prevents such an entry as "one ring of packing 2-oz.," and keeps track all the same. This system acts as a continual stock taker. Of course it is necessary to verify the cards every so often by actually counting or weighing the goods, and so detect any possible error. This is much easier than keeping a stock book, and one can always insert a new article without disturbing any of the other items. An ordinary A to Z set of index cards will help to locate the various items, which may be arranged in alphabetical order, or under divisions.

Repairs.

Bills for material, repairs, etc., can be easily taken care of by the use of ordinary 3 x 5 cards. Write headings

ARTICLE-OIL-CYLINDER		PRICE	
QTY	QTY	QTY	QTY
DATE	QUANTITY	DATE	QUANTITY
RECD	OUT	RECD	OUT
MARCH		24	
4	100	134	
4	100	10	144
			MAIN ENGINE
			400

Fig. 6.—Method of Listing Supplies.

on the cards, Engineers' Supplies, Oil-Waste, Repairs to Boilers, Brickwork, Engines, Piping, etc., Coal, and as many divisions as are necessary to meet your case. If you are asked to give a yearly report to be used as part of the general report, it is well to keep your divisions in accord with the divisions under which they are placed in the general report.

Fig. 7 will give an idea of how this may be carried out. The number over the amount is the number of the bill for the year, put in consecutive order. The No. 1826 is the order number. The number of the bill is also on the check sent in payment and placed on this bill when O. K'd. If you write your own orders, or have a copy of them on file, if you desire details of the account, turn to the order by number, and you

have it right away. The number bill (order number also on the bill) will also be easy to find, and then you have the whole affair before you.

A monthly statement of cost can be made up from your various sheets something after the fashion of the right

REPAIRS ENGINES			144
QTY	QTY	QTY	QTY
DATE	QUANTITY	DATE	QUANTITY
RECD	OUT	RECD	OUT
MARCH		24	
4	100	134	
4	100	10	144
			MAIN ENGINE
			400

FIG. 7. SAMPLE REPAIR CARD

side of Fig. 4. In this case we have to pay for the removal of our ashes at a fixed rate per can. In the suburban plant, if it takes the time of one man to wheel away the ash, his time should be counted as ash expense, unless it be preferred to put it in as wages. The item general supplies does not include tools or repairs. They come in on another account. The item refers to regular supplies outside of those specially mentioned.

ASH TICKET	
DATE	190
CANS OF ASHES	100
" " SOOT	
" " REFUSE	
TOTAL	
DRIVER	

Fig. 8.—Ash Ticket.

Figure 8 shows the ash ticket signed by the driver when carting away ashes. A carbon copy is made at the same time and kept as a check. Bills are made

out from these tickets. They prevent disputes.

Where your output is practically all electricity a record of coal per k. w. hr. should be kept. The total monthly cost divided by the total k. w. hr. will give the cost per k. w. hr.

The cost of water may also be put in the account as a separate item. If taken from a river, the estimated cost of pumping may be taken (from counter on pump) or the cost simply charged up to auxiliary machinery.

All of the foregoing is more or less general, although the writer has kept the suburban power station in mind while writing. To get up a thorough working system for a special plant one should study it on the spot. As far as possible it is well to have all blanks of uniform size for convenience of filing.

When ordering parts for the machinery, one ought always to be careful to give the shop number, style, size, etc., as found on the name plate. In this book a record should be made of every piece of machinery.

Work out the constants for each engine, that is to say, find the power of the engine with a m. e. p. of 1 lb. Then when you take your indicator cards and obtain the true m. e. p. all you have to do is to multiply it by the constant, and there you are. This avoids going over the same work many times. The size of all piston rods, with the depth of their stuffing boxes, should also be made, as well as the size and kind of packing for each rod and the weight to pack the box. This work may be done at odd times. It is worth the work for the time it saves. A saving of one per cent. of the gross charges for operating such a plant as we have had in mind is such a sum as justifies a good deal of work in getting up a system or whatever is necessary to attain this result.

The Engineer a Gentleman

By J. C. THORPE IN POWER AND THE ENGINEER.

To those who have gone aside a little from the course of regular engineering business to consider the engineer in his relation to men and things about him, some little misgiving has been experienced, when attention has been directed to the methods of lax morality and careless professional life that are too often smiled upon by men of the profession.

It has long been the opinion of the writer that the ethical side of engineering has received too little attention. In the close confinement to business affairs, and in the strenuous struggle for industrial supremacy, character building has been greatly neglected by many of those of influence in the engineering profession. It is not with the thought that anything particularly new will be presented here, but rather that a few points which all have considered more or less from time to time, may be again brought to attention and emphasized.

WHO AND WHAT IS THE ENGINEER?

Before considering the engineer, let us note something of the history of engi-

neering, or better, perhaps, some of the steps in its development, and that we may approach on common and well understood ground, let us decide just who and what an engineer is. As a brief definition and a comprehensive one, I like to think of Tregold's definition: "An engineer is one who directs the great sources of power in nature for the use and convenience of man." Surely no better and no more inspiring field is given for men's work. And yet it is only within recent years that the engineer has lived on the same plane with the lawyer or teacher; it has not been a great many years that the followers of engineering have breathed the same air with the clergymen. But have the lawyer, teacher or minister a more gloriously fruitful field of labor? I think not.

Most of us have been taught to think of engineering as a comparatively new profession; that its history has extended over but a limited number of years. And, these impressions are based on fact, in so far as they relate to the recent phe-