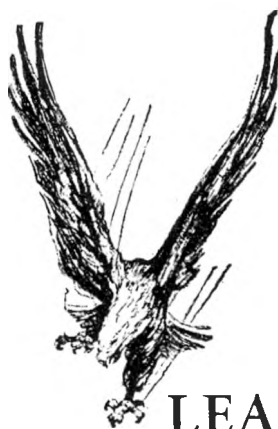


en temperature. The technologist has
side use of this characteristic in con-
with his work on cellulose nitrate, and
ubtless be able to apply much of that
ation to similar products employing
e acetate. However, a warning note
e sounded in regard to this practice.
it exhibits many of the properties of
rate, cellulose acetate possesses a group
inactive characteristics which are not
ble to the treatment accorded cellulose
or cellulose benzoate. For example,
se nitrate is readily soluble in methyl
, whereas the acetate is quite insoluble
liquid. Any solvent formula, whether
inning, coating, spraying, brushing or
g, which contains methyl alcohol, may
sidered in the case of cellulose nitrate
g a formula containing a solvent; where-
nds. Representatives of this class are
e, 1, 4 dioxen and tetrahydro furfuryl
en cellulose acetate is substituted the
d alcohol becomes a diluent with respect
cellulose ester.

liquids which will dissolve cellulose ace-
between 36% and 42% acetyl are not only
as regards classes of compounds, but
er properties as well. Among the very
oiling liquids may be mentioned aniline,
84.5° C., and acetophenone, B. P. 198° C.,
rmer an amine and the later a ketone.
g the esters which are solvents for cellu-
acetate may be mentioned methyl formate,
l salicylate, methyl lactate and glycol
ate. Some of the halogenated hydro-
ns are also solvents, for example, tetra-
ethane, trichlorethane, and hot ethylene
de. These are, however, all more or less
ble and somewhat toxic, both of which
them less desirable than other materials.
lose acetate is also soluble in heterocyclic
ol. Nitrobenzol is also a solvent, repre-
ing another class of organic substances,
itro-compounds. Heat is required to bring
ose acetate into solution in the majority
e nitro bodies. Of the alcohols, mention
een made previously. However, cellulose
te is readily soluble in diacetone alcohol.
e ether-alcohols are also solvents, in the
of the mono methyl or ethyl ether of
l, or trimethylene glycol. The above
ill suggest the wide variety of the solvents
hich cellulose acetate is soluble. But this
s only a part of the story, for as in the
of cellulose nitrate, there are mixed sol-
s for cellulose acetate in which neither
onent is a solvent. The action of these
d solvents has offered a most perplexing
lem to the scientific worker, not only in
field of cellulose esters, but in other fields
ganic chemistry where this same phenome-
has been observed. Again, the technologist
found such mixed solvents to be valuable.
he case of cellulose nitrate the example
h immediately comes to mind is the use of
l volumes of ether and alcohol, neither
which will dissolve the ester when used
e. A parallel to the above in the case of
lose acetate is the use of mixtures of
roform and alcohol. Other halogenated
rocarbons with alcohols also may be used.
the acetyl content of cellulose is reduced
w the acetone soluble range, say to 30%
yl, it becomes soluble in a still greater
ety of solvents, such as hot 75% aqueous
hol. However, the products so obtained
e not been found useful by the technologist.
rom the above it is seen that for technical
poses the range of solvents for cellulose
ate is sufficiently broad to permit of great
tude in choice so that the optimum solvent
be found to suit



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the ratio of solvent to solute. This procedure
is subject to grave limitations and usually is
governed by the requirements imposed by the
apparatus in which the solution is to be used
or by the character of the coating which it
is desired to obtain. The solutions of cellulose
acetate for brush lacquers should, of course,
be higher in viscosity than those to be used
in spraying. It is obviously impractical to at-
tempt to use the spraying solution for brush-
ing both because of the difference in volatility
of the solvent mixture and the viscosity of the
solution which would produce brush marks.
On the other hand, in a spraying lacquer it
is not desirable to reduce the viscosity by ad-
dition of solvent because of the fact that a thin
layer of cellulose acetate would be produced

in the not very distant future, it will take its
place among the new coating materials which
have become such important factors in the
problem of the protection of all manner of
surfaces against the forces of nature, or that
of the beautification of the home and its fur-
nishings. For some purposes it is believed
that cellulose acetate lacquers will be much
more suitable than cellulose nitrate. Examples
will be given later.

(To be concluded)

NEWS AND COMMENTS

Increased Production of Carbon Black in
1928. The carbon black industry continued to

At the top of the tabulating card is an "order form," simplified somewhat but containing the major items of information needed in running a company's business activity. If this order form represented the entire year's business of this fictitious company, the bill would provide the managers with all the information they would need in planning the next year's operations. They would know that they had sold a certain quantity of a certain quality of paint to a certain company in a certain place, and they could fairly easily determine the cost of handling that commodity and could, without great difficulty, figure their net profit from the transaction.

It happens, however, that this bill is but one of many hundred that will be made out in the company's offices during the course of the year. Sales will be made in the territory of five salesmen, to nine types of customers located in sixty-three cities, and these sales will represent orders for an amazing variety of items, sold in widely varying quantities and at widely varying discounts. Somewhere in the maze, this order of ten gallons of red paint is lost. It is never seen again unless the Smith Hardware Co. of New York writes in and says that there was a mistake in the total charge or that they had ordered blue paint instead of red. If that happens, and the jobber isn't busy, he may reflect that he made such and such a profit on that sale, but he still has no way of knowing how much red paint he sold for the year, in what quantities, and at what price.

It is plain, then, that the first task involved in reconstructing last year's business is the recording of the information contained on the sales slip in such a fashion that it may be readily classified and integrated.

To accomplish this, we first convert all the information on the record into numbers. Salesman Charles Adams becomes salesman No. 1, and the territory served by him takes the same number. The Smith Hardware Co. becomes customer No. 213, located in county No. 41 and city No. 4. All of the items carried by the store are carefully coded after the manner of this order so that the description column will bear, in this instance, the number 6174, the first digit indicating that the article is paint, the second that it is of a particular manufacture, the third that it is used for a particular purpose, and the fourth that it is sold in a particular size container. Three additional digits are then added to show color; discount, value, etc., are similarly treated and the bill is then given to an operator who punches holes in the card under the proper headings. When the punching work is completed, the card represents exactly the information that is contained on the charge slip, but that information is now in such a form that it may readily be associated with all similar information. The data, now, instead of being written, is expressed by a hole punched in the card, and by use of a sorting machine all cards bearing similar information may readily be brought together. If the invoice lists several items, a card is punched for each item and another is punched to show the total of the order.

We might now begin at the left of the card and discuss the significance of the information that may be derived from each section as we cross the sheet. The first three columns are used purely for identification and as an aid in checking back on possible errors. The more direct interest in the card begins with the two columns under the heading of date.

A Detailed Record

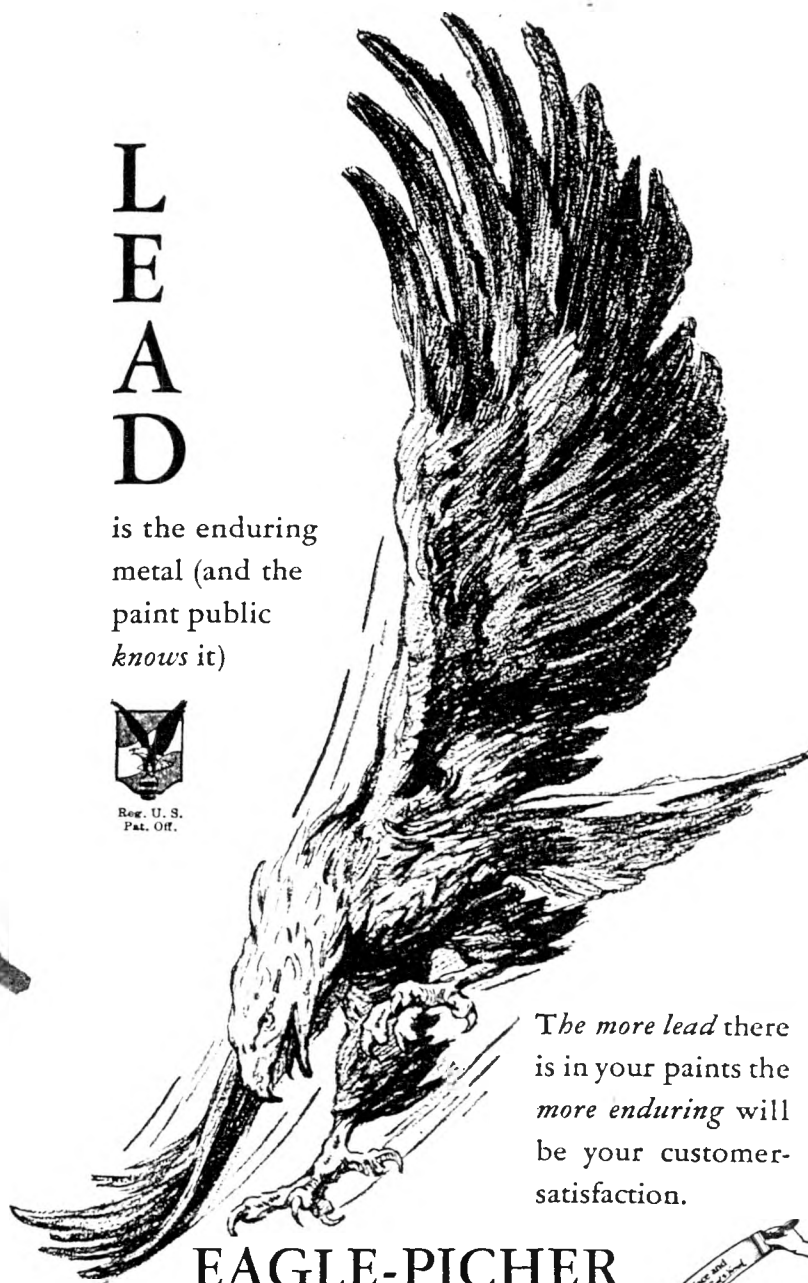
It is from this column that the logical time and quantity of purchases may most readily be determined. We will start by sorting out all the cards punched "1" in this column and

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Litharge • Red Lead • Zinc Oxide • Lithopone



merely secured the total sales for the entire business by months.

It would be safe to rely on such figures if the house sold only one item, but where many items are sold it becomes necessary to know not only how much is sold in a particular month, but what it is out of the entire stock that goes most strongly to make up that total. To discover this, we take the cards for each month and break them down by items. When the tabulation comes off this time, each item speaks for itself. Any faults in buying that may have crept in stand out and ask for correction. For instance, the vendor's invoices may show a purchase of \$10,000 worth of red paint in the month of January. The tabulation would show the monthly distribution of sales to be 5 per cent. for January, 4 per cent. for February, 20 per cent. for June, etc. With these figures in hand, the merchant can see

able and how many are costing you money. The first thing to determine is, of course, the amount of his total annual purchase for each customer. But while this figure may give us a rough outline of our fortune or lack of fortune with reference to customers, it hardly starts to tell the story, for just as important as the total amount ordered is the method used in ordering. It would be quite possible to sell one customer \$1000 worth of goods during the year at a loss and another \$500 worth at a profit. This fact can readily be appreciated if we consider the \$1000 worth of business representing 500 two-dollar orders, and the \$500 as representing five \$100 orders.

Customer Analysis

I have here the record of sales made to four companies during the months of January, February, May and June, 1928, which will demonstrate the pertinence of such customer analysis.