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SPECIAL LIBRARIES

Vol. 16

March, 1925

No. 3

STATISTICAL INTERPRETATION

Special Librarians, Statisticians,
Research Workers, Economists,

Have One Objective—

The Acquisition of Essentials,

The Presentation of Truth,

The Maximum of Effort,

The Minimum of Delay—

This Number Links

Their Activities.

Writers

Harry Jerome

John Moody

Irving Fisher

Percival White

Frederick H. Sterns

McDonald H. Wilson

J. George Frederick

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The editors of SPECIAL LIBRARIES are gradually broadening the scope of the magazine beyond the mere routine of library work. It is anticipated that articles by men from without the library world will furnish the necessary background for intelligent study of the sources of information and in addition their publication creates a sympathetic understanding between the researcher and the librarian. We ask the opinions of our readers in regard to our new policy.

Statistical Interpretation

By John Moody, *president, Moody's Investors Service*

FURTHER progress in the art of interpreting statistics, in financial fields at least, appears to depend upon more and better data. We are suffering from a deluge of *method* and a famine of data. Wherever one goes in bookstores, libraries, offices, banks, and research departments, the shelves are lined and relined with business and accounting books upon the subject of method. Every phase of statistical and accounting method is written to death. We are told how to do forecasting, and all about link-relative seasonal averages, and how to apply logarithms to cotton raising, and what differential calculus has to do with the price of Liberty Bonds. Blanks and forms galore upon which to fill out statistical information stare us in the face, and indeed we can readily get everything except the data we need.

It reminds me of certain fashionable hotel dinners with exquisite displays of china, and the china mostly unsoiled by any perceptible quantities of food. What the modern business world needs for statistical interpretation is not china, but food—not method, but data. Let us illustrate. It is easy enough as a rule to forecast the broad movement of steel prices, because we know what industries consume

the steel and in what proportions; but it is mighty difficult in the case of copper, because we have very little information anywhere in the world as to the actual distribution of the ultimate consumption of copper. All the method in the world will not produce a reliable forecast of copper price movements, because of lack of absolutely essential data.

Nor is this an exceptional circumstance. Instead it is typical; for the instances of lack of necessary data far outnumber the instances wherein such data is available. The business and financial books published as a rule contain about a dozen classes or types of statistics or returns which are in everybody's hands and aside from these they are poverty stricken as to material or data. Now and then a real gem comes out, such as Pogue's "Economics of Petroleum," or Bliss's "Financial and Operating Ratios"—gems absolutely replete with new researches that throw a flood of light upon the given subject. But on the other hand either a large minority or else an actual majority of books and articles do not bother with researches at all, but confine themselves to a worthless and salable mass of platitudes.

Dearth of Data

No subject perhaps better illustrates the famine of data than the literature on the stock market. Books and articles upon this subject written during the past half century would literally have to be measured in tons and carloads. Yet there remains a nearly complete dearth of data upon most of the essential points. We do not know how the ownership of stocks is distributed by classes of people; or what is the relative importance of assets and earning power as elements of value; or what is the distinction between the kind of goodwill that reflects itself in market value, and the kind of goodwill which is mere water. We do not know in what degree relatively stock prices respond to variations in earnings; to changes in commodity prices; to the flow of investment capital back and forth between the Wall Street markets and the tills of merchants; and to manipulation on the part of professional traders. In this most written and rewritten of subjects, we are still three-quarters in the dark.

Statistical sorcery is not going to do a bit of good. There is a rage at present for what might be called automatic methods of forecasting. The essence of the method is that it is supposed to work mechanically. Sometimes the automatism consists of an index number which is supposed to magically move in advance of the development which one wishes to forecast. In other cases it consists of some sort of a cycle wherein each stage or step is expected to more or less automatically forecast the next. In still other instances it consists of a mathematical formula for applying the methods of alchemy even to crude and non-mathematical trade returns in such a way as to produce magical prophecy. There are those too who select one factor out of many, and presume to be able to arrive at a complex resultant of many forces in spite of ignoring all factors except this one.

One may reasonably contend that further progress in statistical interpretation depends mostly upon data. When we have the necessary data, almost any reasonable method will accomplish the desired result. General Foch, even with all his military genius and accurate scientific methods of giving battle, could never have driven the Germans back without accurate data as to topography and distribution of men, equipment, etc. Too many statisticians and economists however are giving battle against the uncertainties of future business

without much attention to economic topography.

By this phrase we mean a knowledge of the relationships of economic forces and developments to each other. The whole business world is actually synchronized, and one needs to know how every economic force moves or operates in comparison with every other. Lack of knowledge of even the most normal of relationships often leads to utterly needless errors. In the Autumn of 1914 for example nearly all financiers and economists believed that owing to the war destruction of capital, we faced a long era of high interest rates—a belief quite without foundation. The normal relationship then generally overlooked was that war for the first few years habitually destroys the demand for capital more than it destroys the supply thereof, and thus reduces interest rates.

Likewise just after the war ended, it was the common belief of all the high authorities that the railways would forthwith spend huge sums for new construction and equipment, and that the equipment manufacturing companies would, therefore, enjoy an immediate boom in business. In fact the boom in their domestic business was slow in coming, as was bound to be the case. The normal relationship then overlooked was that railway improvement outlays are habitually in proportion to the amplitude of net earnings and net working capital—whereas the roads then were short of both.

Interpretative Methods

Interpretation by any rational method could forecast almost every business development with fair accuracy and reliability if only the data were available. In the case of nearly all commodities and products there is a great dearth of statistics of ultimate consumption—although these statistics are a prime necessity. When one knows what industries consume a given commodity, and in what proportion, he is pretty sure to be able to tell the statistical position of the commodity. In answering the question, for example, how far ahead a certain steel consumer should provide himself with steel, we first observed what industries consumed this particular type of steel, and then made a weighted average of the dates of the seasonal peaks of these respective industries. This average proved in the case mentioned to be the actual date of the high peak in the price of the given type of steel.

Like methods could be applied almost anywhere with sufficient data. It is known, for example, that when the bond market is approaching a peak, the general tendency is for the highest grade bonds to reach the peak first, and then the lower and lower grades in some sort of a succession. But there is practically no data as to just what the succession is, or how bonds should be classified in accordance with the timing of these movements. It is known that the shares of metal companies are rather tardy in comparison with the movement of the general stock market, and that their tardiness is partly a reflection of the tardiness of metal prices in responding to general trade. But there is no accurate information as to just how far metal prices serve to deflect the course of metal share prices away from the course of the general stock market.

It is known in a broad general way that the stock market moves crudely parallel to the course of trade, and that the particular feature of general trade with which stock prices sympathize consists of orders booked. Yet there is no accurate general knowledge of the booking of orders from month to month. If one knew these bookings for our manufacturing industries as a whole, he might perhaps be able to reliably forecast even the minor movements of the stock market; for the

manufacturer who is booking orders is an optimistic buyer of stocks and bonds and vice versa. However records of unfilled orders are extremely meagre, being available only here and there.

So it is that knowledge is the crying need of statistical interpretation. A sufficient knowledge of normal relationships would enable the trained economist to tell from a precise description of any one industry what the simultaneous condition of every other industry ought normally to be. A fairly complete knowledge of economic sequences would enable him to say what any important trade development in any single industry or section ought to signify to the business world as a whole. An accurate knowledge of psychology as applied to business would enable him to forecast the economic results of political changes.

My own belief, based upon our researches and advices and experiences now is that each and every development in the entire industrial and financial world is a wholly logical expression of cause and effect. With sufficient data and a wide enough area of observation, and a thorough enough knowledge of economic sequences and relationships—were these things attainable—I believe that every considerable business change could be reliably forecast.

Barometers

By McDonald H. Wilson, *consultant*, Brookmire Economic Service, Inc.

WHAT is a barometer? For what purpose can it be used? In the daily press and in various trade journals, appear charts labeled "Barometer of This," "Barometer of That." In the great majority of cases, these charts have no barometric significance whatever, and the term "barometer" is a misnomer.

The term "barometer" as used in economics is borrowed from the science of physics. A barometer is an instrument by which atmospheric pressure can be measured, and by which future weather conditions can be forecast. Studies based upon the records of finance and of industry in their various branches, have proven that current data, available at any given time, throw much light upon the probable course of events in finance and in industry several months in advance of the event; that the study of the current data affords a sound basis for conclusions with regard to probable future conditions.

As it was a matter of common knowledge that the barometer was used to forecast weather conditions, it was only natural that the term should be applied to data which were used as the basis of judgment concerning future conditions either in industry or in finance. Later, the term "barometer" became attached to the charts, which were merely the graphic representations of the conditions which obtained, during each given period, among the data upon which the conclusions were based.

Unfortunately, the analogy has not been carried further, resulting in the use of the term "thermometer" in connection with financial and industrial conditions. The thermometer is an instrument by which degrees of temperature are indicated. It is an invaluable instrument for the purpose for which it was designed, but it gives no evidence as to the temperature which may be expected one

hour or one week after the reading. Many of the charts published today are excellent measures of the height to which prices or volumes in various commodities and securities have risen, or the depth to which they have fallen, but they give no evidence whatever as to the movements, either in prices or in volumes, which may be expected in the future.

Index vs. Barometers

It is true that the term "index" can be used, and is properly used in lieu of the term "thermometer," and in all quarters in which the true significance of the factor then under consideration is recognized, the terms "index" and "barometer" are carefully employed. Unfortunately in many cases there appears to be a reluctance to use the more accurate term "index," and a tendency to use the term "barometer" irrespective of any barometric significance of the data under consideration.

Consider, for example, the question of merchandise imports and exports. If the value of merchandise imports during a given calendar month is expressed as a ratio of the value of merchandise exports during the same month, and if these monthly ratios over a period of years are expressed as a percentage of the normal ratio during that period, the result is a crude index of the merchandise imports-exports of the country. If the monthly data are corrected for seasonal variation, and if the resultant monthly ratios are expressed as a percentage of the normal ratio for the given period, the result is an improved index of the merchandise imports-exports of the country.

Such an index, however accurately prepared, does not at any given time give evidence as to what may be expected during future months, either in the imports or in the exports of the country. The ratio of imports to exports may be high, but that is no indication whatever that it will be lower or higher during subsequent months. In that respect it is exactly like a thermometer. But this index of merchandise imports-exports, when considered together with factors such as the volume of domestic production, has very valuable barometric significance with regard to the probable trend of the general price level within the country during the ensuing months. This index then becomes a valuable component of a barometer of prices.

Other examples might be cited. The extent to which available purchasing power is being

used during any given month is an excellent illustration. The best measure of the extent to which available purchasing power is being used lies in the rate of turnover of bank deposits, *i.e.* the ratio of bank clearings to bank deposits. When the monthly data over a period of years are properly corrected for seasonal variation, and are expressed as a percentage of the normal ratio for the period, the result is an excellent index of the extent to which available purchasing power is being used. But a low percentage one month is absolutely no indication that the percentage will be lower or higher next month or the month thereafter. Yet this index, based upon the rate of turnover of bank deposits, when considered with other factors such as the volume of domestic production, the condition of our foreign trade, etc., has great barometric significance with regard to future business conditions in the country.

Factors of Forecasting

We have referred to certain factors as having barometric significance, and of being valuable components of a barometer. It may be stated as an axiom of business or security forecasting, that no one factor alone can be used as the basis for sound judgment concerning probable future conditions. The greater the number of factors used, the broader the basis of judgment, the greater is the probability of the indications being verified by the course of events.

In the foregoing discussion the term "probable future conditions" has been used. Conclusions with regard to the future must necessarily be probabilities; certainty with regard to future conditions involves divine inspiration. Financial and industrial developments, considered together, may indicate very definitely indeed that a certain trend of events will be witnessed, but if one be honest both with himself and with his clients, he cannot state that the event is certain to occur. This is not a defect in economics or in the use of barometers, either of security prices or business activity. Every intelligent person, every association of intelligent persons is guided by the balance of probabilities in forming conclusions or in making and in executing plans. The economist or economic organization must be similarly guided, and the value of any barometric factor lies in the assistance which it affords in forming sound conclusions concerning the balance of probabilities.

Index Numbers

By Irving Fisher, *Professor of Political Economy, Yale University*

MOST people have at least a rudimentary idea of a "high cost of living" or of a "low level of prices," but usually very little idea of how the height of the high cost or the lowness of the low level is to be measured. It is to measure such magnitudes that "index numbers" were invented.

There would be no difficulty in such measurement, and hence no need of index numbers, if all prices moved up in perfect unison or down in perfect unison. But since, in actual fact, the prices of different articles move very differently, we must employ some sort of compromise or average of their divergent movements.

If we look at prices as starting at any time from the same point, they seem to scatter or disperse like the fragments of a bursting shell. But, just as there is a definite center of gravity of the shell fragments, as they move, so is there a definite average movement of the scattering prices. This average is the "index number." Moreover, just as the center of gravity is often convenient to use in physics instead of a list of the individual shell fragments, so the average of the price movements, called their index number, is often convenient to use in economics.

An index number of prices, then, shows the *average percentage change* of prices from one point of time to another. The percentage change in the price of a *single* commodity from one time to another is, of course, found by dividing its price at the second time by its price at the first time. The ratio between these two prices is called the *price relative* of that one particular commodity in relation to those two particular times. An *index number* of the prices of a *number* of commodities is an *average* of their price relatives.

Thus, if wheat has risen 4 per cent since last month and beef has risen 10 per cent, the *average* rise of the two together is between 4 per cent and 10 per cent. If we simply split the difference the average is 7 per cent, and 107 per cent is called the index number of the two prices compared with last month as a base of reckoning taken as 100 per cent. The derivation of the 7 and 107 may be

numerically expressed as follows:

$$\frac{4 + 10}{2} = 7$$

expressing the average *rise*, and

$$\frac{104 + 110}{2} = 107$$

expressing the *index number*, or average of the price relatives and both expressing the same fact as to the prices of today compared with the prices of a month ago.

The same method applies, of course, to more than two prices. Thus if three commodities, wheat, beef, and cotton, have risen respectively 4 per cent, 4 per cent and 10 per cent their average rise may be computed as $(4 + 4 + 10)$ divided by 3 or 6 per cent and the index number is 106 as compared with last month's price level taken as 100.

The preceding calculation treats all the commodities as equally important; consequently the average was called "simple." If one commodity is more important than another, we may treat the more important as though it were two or three commodities, thus giving it two or three times as much "weight" as the other commodity.

Thus, suppose that wheat is taken to be twice as important as beef. Then the average rise of wheat and beef, instead of being $4 + 10$

$\frac{\quad}{2} = 7$, as it was when the two commodities were regarded as equally important,

becomes $\frac{(4 + 4) + 10}{3} = 6$, just as though

there were three commodities, thus making the index number 106 instead of 107. In this average, wheat is weighted twice as heavily as beef. If, reversely, beef is given twice as much weight in determining the index number as wheat, the average is

$$\frac{4 + (10 + 10)}{3} = 8$$

and the index number is 108 instead of 107.

In the above illustrations only two or three commodities are included in computing the in-

dex number. In practice the number is almost never less than ten, seldom less than forty, often over a hundred. In my own *Index Number* published weekly the number is two hundred and four, in that of the United States Bureau of Labor Statistics, the number is over four hundred and four. The index number of the War Industries Board for the five years of war included over fourteen hundred commodities.

Some of these index numbers are computed by exactly the process above described. For instance the index number of *The Statist* of London is so computed, for the wholesale prices of forty-five commodities. This index number is one of the few survivors of the early attempts at computing average changes in prices. It runs back to 1846. It was first published in 1886, by Sauerbeck, a London wool merchant.

Improved Methods

But the simple arithmetic average has been largely superseded by better methods. The *London Financial Times* has an index number calculated weekly by Norman Crump, and begun shortly after my own *Weekly Index*, for which the geometric average is used.

In my book "The Making of Index Numbers" I have shown that the geometric index number is better than the simple arithmetic because the latter has an inherent tendency to exaggerate the true price level, an "upward bias."

To avoid such bias an index number should conform to the "time reversal test." The simple arithmetic index does not.

For instance suppose that the price of bread is twice as high as before the war (20 cents a loaf in 1925 as compared with 10 cents a loaf in 1913); while butter is half as high (30 cents a pound in 1925 as compared with 60 cents in 1913). In price relatives or percentages, taking the 1913 prices as 100 per cent, the figures are:

Bread:

1913, 100 per cent 1925, 200 per cent

Butter:

1913, 100 per cent 1925, 50 per cent

The simple arithmetic index number of bread and butter for 1925 becomes $\frac{200 + 50}{2}$

or 125 per cent, and would make it appear

that bread and butter are on the average 25 per cent higher in 1925 than in 1913.

But it is a poor rule that won't work both ways. If we reverse the process and take 1925 as the base, the price relatives become

Bread:

1925, 100 per cent 1913, 50 per cent

Butter:

1925, 100 per cent 1913, 200 per cent

This gives $\frac{50 + 200}{2} = 125$ per cent, making

1913 25 per cent above 1925.

Apparently the price level of each time, 1913 and 1925, is 25 per cent above the other! Yet this absurdity—usually in a much smaller degree, always attaches to the simple arithmetic index number. For this reason the simple arithmetic index number, once almost universal, is now almost obsolete, being superseded by the "geometric," as in the index number of the *London Financial Times* and the British Board of Trade, and still more by the "aggregative." My own *Index Number*, like that of the United States Bureau of Labor Statistics, the Canadian Department of Labor, the *Australian Index Number* and many others, is an aggregative.

Aggregative Index

An aggregative index number is very simple and easily understood. It merely compares the aggregate value, at different times, of a representative assortment of goods. We need simply to imagine a sort of Noah's ark containing a representative assortment, not of the animals of the earth, but of the commodities. My *Index Number* supposes the cargo to contain two hundred and four varieties of commodities in the proportions in which, according to the Census, these commodities actually enter into our country's trade, e.g. four billion pounds of raw cotton, one hundred and thirty million hundred weight of live beef steers, four hundred million barrels of crude petroleum, three hundred million tons of bituminous coal, seven hundred million bushels of wheat, one billion dozen eggs, one billion gallons of gasoline, one hundred million pounds of cheese, etc. Such a huge cargo of two hundred and four varieties of goods is very representative of our annual commerce.

The aggregate value of such a cargo naturally varies from time to time as its various constituents, while always the same in quantity, vary in price, some constituents becoming dearer and some cheaper. The aggregate value of this cargo, at the prices of November, 1923, was \$18,745,230,000. This was lower than today but higher than in 1913 which we take as the base.

Without going into the details by which my index number was spliced on to that of the United States Bureau of Labor Statistics, in effect we may imagine this cargo's aggregate value at different dates beginning with 1913 and, calling the 1913 aggregate 100 per cent, we find the aggregate above noted, for November 1923, to be 52 per cent higher, that is the index number for November 1923 was 152. Last week (ending February 13) the index number was 161.3. This aggregate method was strongly advocated some years ago by Sir George H. Knibbs of Australia and afterward endorsed by a statistical conference of the British Empire.

The "Ideal" Formula

It is the best method practically available in most cases, although a still better method, unfortunately seldom practically available, is that of the "ideal" formula shown in my "Making of Index Numbers." This can be used only when we have full statistics of quantities sold at various times as well as prices. It consists in applying the above aggregate first forward, using the quantities of various commodities applying to the earlier period, and then backward, using the quantities of the later period. The two results never differ much but their geometric mean affords the "ideal" index described. Since I advocated this index it has been employed in a few cases where the data needed were available, notably Bachi in Italy for an index of prices on foreign trade.

The reciprocal of an index number is the purchasing power of money. Thus to say that prices have doubled is to say that the dollar's purchasing power has been halved and to say that last week the price level was 161.3 (relatively to 1913 = 100) is the same thing as to say that the purchasing power of the dollar last week was $100/161.3$ of what it was in 1913, or 62 per cent. In short last week the dollar was worth 62 pre-war cents.

Purchasing Power of Dollar

By means of index numbers we may trace the changes in the purchasing power of the dollar. Thus in 1860, before the Civil War, the dollar was worth about what it was before the World War. So we may call this the pre-war dollar which ever war is meant. By 1865, however, the greenback inflation reduced the purchasing power of the dollar to 40 pre-war cents. Then it increased in value for a generation until in 1896 it was worth 152 pre-war cents, the highest it ever reached. The lucky possessors of a \$100 bill in those days could buy nearly four times as much with it as in 1865, or as in 1920, for then too, the dollar reached 40 pre-war cents. In January 1922 it touched 72 pre-war cents. In April 1923 it sank to 59.5. In July 1924 it rose again to 70.3. The last week in January 1925 it sank to 60.8 and last week it fell back to 62.

Evidently our dollar, while never as unstable as the mark, and today much more stable than in war time, is, nevertheless, far from a really stable standard of value. When we remember that every other unit in commerce, such as the yard, pound, kilowatt, has long since been standardized it is remarkable that we still have a stone age dollar.

There are two reasons, one is the "money illusion" which victimizes almost all of us. Just as we have the illusion that the sun "rises" and find it hard to realize that really the earth tips the other way, so we have the illusion that the cost of living "rises" and find it hard to realize that really the dollar moves the other way.

The second reason is that until the index number was devised and perfected we had no way of measuring the value of a dollar. Now that the index is so widely understood we are finding a growing desire to safeguard against the dollar's aberrations, either by mitigating them as through the credit control exercised by our Federal Reserve System, or by investors turning to stocks in place of bonds when dollars are losing their value—trying to escape the fate of the German holders of bonds expressed in marks.

Thus we find the index number an instrument of great practical importance. As a bank statistician recently remarked "we live in an Index Number Age."

Commercial Research Today

By J. George Frederick, *president*, Business Bourse, Research Organization, New York

THERE are now nearly five hundred business houses of importance which have definitely organized commercial research departments. In addition there are now institutions devoted entirely to business research. Even the universities have developed commercial research study courses and departments for making practical researches of business value. Many thousands of firms use researches, purchased from outside sources.

This, frankly, is a latter day development in American business, and is full of intense significance. Years ago the only exact methods employed in business were in the factory and engineering departments, and in accounting. All else was on a "rule o' thumb" basis, the judgment of individuals ruling rather arbitrarily.

The coming of commercial research is simply the outward token of a completely new frame of mind gaining rapid ground in business; the spirit of inquiry and more exact, as opposed to cocksure, arbitrary autocracy. An executive is no longer content to use merely his judgment and experience; he realizes the need of enlarging the effectiveness of his judgment by operating on fact.

Practically speaking, commercial research is divided into four main divisions, as seventeen years of continuous operation of the Business Bourse has indicated:

1. Industry research (the facts about the status of a given line of goods).
2. Field questionnaire research, among dealers, jobbers, consumers, etc.
3. General researches of business problems, such as paying salesman or selling direct to retailers.
4. Specific special researches of entirely individual problems, or special inquiries and statistical analysis.

Naturally these four types of research have many facets and angles; but these four classifications cover them all.

An industry research covers about the following headings:

1. General Survey of Industry.
2. Production.
 - a. Study of Present Production.
 - b. Volume of Entire Industry.
 - Estimated Volume of Principal

Manufacturers.

3. Consumption.
 - a. Analysis of Consumption Conditions.
4. Sales Methods.
 - a. Sales Methods of Leading Firms.
5. Distribution.
 - a. Distribution Conditions.
6. Advertising.
 - a. Methods Used in Advertising.
7. Brief Survey of Principal Companies.
8. Future Possibilities.

The field surveys uncover a great many things. The following are typical questions for research:

1. What kind and types of people purchase goods?
2. What individual influences them or has joint authority or activity in making the purchase?
3. What are the habits of mind and general conditions surrounding the purchaser?
4. What is the exact need the consumer feels, how does it arise, and what instinct, needs, desires and feelings does the article satisfy?
5. What pre-conceived ideas, prejudices and notions does the consumer bring to the purchase of the articles?
6. What are typical past experiences of consumers in endeavoring to purchase such articles?
7. What are the shopping or purchasing habits or modes of procedure of the average consumer?
8. What impression, reputation and general standing of brands prevail in the buyer's mind?
9. What standards in the matter of price and quality and service prevail in the mind of the consumer?
10. Analysis of consumer preferences for sizes, marking, types and chain stores, etc., models, etc.
11. Statistical study of consumer, from a quantitative basis, giving facts as to number, distribution, location and concentration of consumers.

12. Inquiry into possible manner and means of developing applications or uses of article.

Factors of trade and distribution which need analysis are about as follows:

1. Present channels of distribution, and percentage of distribution.
2. Statistics of distributors, by kinds, types, rating, etc.
3. Analysis of jobbing status.
4. Analysis of retail turnover, price, margins, average size of order, average yearly purchase, dealer cessations, etc.
5. Study of special outlets, such as department stores, mail-order houses, chain stores, etc.
6. Data on competitive methods! Investigation of relative status in distributors goodwill compared to other firms.
7. Dealer clerk situation, etc.

Commercial research covers a wide range, for example the questionnaire method may be used to obtain the facts required. For this purpose investigators call on farmers, interview moving picture theater owners, call on women in their homes, or on men in their

offices and even stop auto drivers in the streets.

Another form of research covers various lines of trade. An advertising agency may buy one to get acquainted with the conditions in a line of business in which he has a present or prospective client. A banker may purchase one to sum up conditions in an industry before deciding to underwrite a firm in that line.

Then there are the thorough-going merchandizing surveys of more complete detailed kind which are the real research jobs in which professional pride is taken.

Then there is the research of business method on the subject of standardization of salary in an organization, or the subject of the use of automobiles for salesmen, or the operation of the budget system in business.

Finally, the miscellaneous type of research service, as many people seem unable to get the kind of information they want from ordinary sources.

A central source of business research data is a highly desirable thing, but of course it cannot be run on any but a commercial basis, unless some day some one will endow it.

The Librarian and Statistical Research

By Harry Jerome, *research staff*, National Bureau of Economic Research, Inc.

THE research worker finds his reward neither in any thrilling adventure associated with his daily duties nor in the hope of great pecuniary returns; but, if he is blessed with the vision without which research becomes mere routine drudgery, he finds inspiration in the thought that he is "doing his bit" in the advancement of knowledge or in making possible the efficient conduct of human affairs. The librarian likewise works in comparative obscurity and receives his chief reward in the consciousness of worthwhile service.

The nature of this service varies, of course, with the type of library. The province of the research worker in special libraries falls largely in the field of current economic, social, and political matters, and the methods of his research are, consequently, those which are appropriate for the social sciences.

To an ever-increasing extent research in the social sciences is taking on a quantitative aspect. This change has been furthered by the perfection of mechanical computing devices

that materially lighten the burden of statistical analysis, and by the development of graphic methods as an aid in popularizing the presentation of statistical facts; but the increasing use of quantitative methods is due primarily to the natural evolution of the social sciences toward the more precise stage which was reached earlier by the physical and chemical sciences.

As the character of research changes, so does the character of the service which the research librarian is called upon to render. A certain minimum at least of statistical technique is now a requisite in his training for the most effective service.

Obviously, if the librarian is engaged in the preparation of statistical research reports for publication, he should be familiar with at least the simpler and more commonly used methods of statistical analysis and presentation as set forth in the elementary treatises upon the subject. Even if such reports deal only with quite simple compilations of statistical data, their effectiveness can be increased by

adherence to standardized rules for the presentation of numerical facts in tables and charts.

However, the bulk of the statistical research of the librarian is concerned, not with intricate analysis or with the presentation of statistical data, but with their collection from what the statistician calls secondary sources—that is, Federal and state publications, the reports of private industrial and commercial associations, trade journals, and the other innumerable sources of statistical data which are found on library shelves, as distinguished from primary sources which must be reached by correspondence or inquiry in person.

The librarian can render invaluable aid to the research worker in finding and appraising statistical data. The inexperienced user of the library—and it must be remembered that each of us begins as an inexperienced worker—often wastes much effort through ignorance of sources and the utilization of other than the best or the most readily available data. Even the experienced worker is apt to overlook some valuable sources of information, particularly in current publications. How can the librarian help? First, by being familiar with what statistics are available, and secondly, and this is the more difficult and hence the less frequently performed service, by being able to interpret the significance and appraise the accuracy of the available statistics.

Sources of Statistical Data

In organizing his information concerning sources of statistical data, the librarian should note the difference between the original publication of data and mere second-hand republications. The careful statistician will often wish to resort to the original sources, where he is most likely to find full explanations of the nature of the statistics and of any exceptions or qualifications which must be considered.

For important periodic series appearing currently without full explanation, the librarian is in a position to give valuable assistance to the research worker if he knows where the series is fully explained. This explanation is apt to appear at the inauguration of the series. Frequently, also, the data for such periodic series are intermittently republished for an extended period of time, thus saving the labor involved in consulting each single issue of the publication.

Unfortunately there is no complete bibliography of the sources of statistical data,

classified by subject matter. The New York University Bureau of Business Research has published a "Source-Book of Research Data" (1923), and in his textbook on "Statistical Method," pages 320-6, the present writer has given a "Classification of Periodic Statistics," with a partial bibliography. The librarian of a special library would, I judge, find it useful to work out a bibliography along similar lines for the particular field in which his library specializes.

Advice in the Appraisal of Statistics

Where the scope of a library is extensive, it may be asking too much to suggest that the librarian be in a position to give advice upon the relative reliability of such statistical data as are available, but he can at least make himself familiar with the tests which should be applied in appraising data from secondary sources, and make note of such information pertinent thereto as comes to his attention. For example, is the series homogeneous throughout the period for which it is available? Is there any known element of bias in the compilation of the data? Were the methods of collection such as to avoid error so far as possible? Has a change in administration or the transference of the collection of the statistics, for example, from one department of the state government to another brought any change in the significance of the data which is not apparent on their face? Has the publication in which the data appears been changed so that part of the series may not be utilized if the fact of change is not known? Such facts are more apt to be familiar to the librarian than to the research worker who chances to be making casual use of the statistics.

It would be ideal if in one publication were gathered together the important data from many publications over a long period of years, with explanatory notes to indicate the nature and limitations thereof. One of the members of the research staff of the National Bureau of Economic Research has been engaged for a year or more in assembling the available monthly and annual data for important series over a long period of time and it is hoped that much of this data, together with explanatory notes, may be published in some convenient form. But at best any such publication will be incomplete, and each research librarian must be in a position to give effective aid in finding statistics and also, if possible, in interpreting their meaning and appraising their accuracy.

Market Analysis and the Special Library

By Percival White, *research engineer*

PERHAPS there is no field served by the special library which it can benefit to greater extent than the field of market research. The focus of public attention upon the costs of distribution, the necessity of understanding what real purpose selling should serve, and particularly the need for understanding the rationale of advertising—we are faced by these needs, on the one hand, and, on the other, by a dense ignorance of them on the part of those who ought to know them best.

Some of the most successful business men are the most childlike. They want what they want when they want it, and rarely before. Only now are they beginning to realize that they want facts concerning markets and marketing. Soon they will want these facts badly, and will call to have them now.

The only way business men can expect such demands to be satisfied is by paying well for the facts. The willingness to pay has already given rise to a group of specialists whose aim it is to assemble marketing data, to interpret them so as to fit the individual case, and to apply the results constructively.

These specialists are little more than aggressive librarians, trained in business procedure. They are, or should be, librarians, and hence imbued with that attribute—whatever it is—which comes only through a long and loving contact with the printed word, an attribute which, beside giving the librarian a certain inimitable dignity and refinement, gives also that ability which is essential in every pursuit of knowledge—the ability to know where to look.

Librarians have this ability, as though by instinct. In market analysis work, I have invariably found it wise to turn to them first. The initial step in market research, as in any other scientific endeavor, is bibliographical. All facts of record should be assembled regarding the product which is under consideration, as well as those affecting the market for that product and those relating to the most efficient means for bringing product and market together.

But, as librarians know, and as most business men do not yet know, libraries are not built in a day. No amount of money, even,

will assemble all pertinent recorded facts overnight. The only recourse is hence to go out and build up new fact material, by first-hand observations; and this is what the market analyst is mainly occupied in doing.

Some of the more aggressive people who are concerned with marketing have learned the lesson that a working library, like the knowledge which it represents, can be acquired only just about so fast, and that hence continuous application to the constructive task of collecting material is essential.

Among the advertising agencies, Barton, Durstine and Osborn, J Walter Thompson Company, and George Batten Company have applied the lesson, and are profiting as a result. Each of these agencies has a highly efficient librarian in charge, and the work, instead of being spasmodic, is carried on as smoothly and uninterruptedly as that of a paper mill.

The inevitable result is that the library becomes the mainspring of all the marketing research. It is the starting point of every study. And it indicates the great opportunity for library-trained workers in every commercial organization which has marketing problems.

Need for Librarians

Among the advertising agencies themselves, there is still a crying need for good librarians. In the average agency, the waste of fact-material is appalling. Agencies are unusually adapted to utilize such material for the benefit of themselves and their clients. Magazines, newspapers, catalogs, reports, and literature of every kind pour into the agency every day, usually sent there gratis. If, instead of being allowed to go to waste, or merely turned over to a clerk with no knowledge of library practice, and no interest in the business, this material is carefully clipped, sorted, indexed, and filed, it can soon become a priceless fund of information.

My observation is that the librarians who have been most successful in such work have started in a small way, and have relied much on their own initiative. Any girl of twenty, who does have initiative and who has had a

library training, can make herself the keystone of a sales department or of an advertising agency if she will but apply herself, unbidden, to the task of using her library technique to the fact-material which she can get hold of. A filing cabinet is all that is needed to start with. Here should be grouped all data which bear upon the product and the method of marketing it. With such a heterogeneous collection as will soon be built up, a subject classification is probably best, with a certain amount of cross-indexing. Any device, in fact, which will give the business man

what he wants when he wants it, is worthy of consideration.

For a time, it may be necessary to guess as to what material is need, and to prepare samples of it for 'submittal to executives. This may be the best way to get them into the habit of using the library. In fact, the librarian should consider it a regular duty to send material to executives relating to those subjects which appear germane to the work being done by the organization. A librarian of this description is a priceless asset in market analysis work.

Population Estimating

By Frederick H. Stearns, American Telephone and Telegraph Company

THE use of the telephone both for business and social purposes has become so general in this country that the extent or direction of population growth has a decided effect on the growth of the business of the telephone companies. It is useful, therefore, that telephone companies should estimate population increases as accurately as possible in advance, in order that facilities may be ready when required, without losses due to improperly located or overbuilt plants.

Events which cannot be predicted in advance may have an effect on population contrary to the estimated trend. No one, one hundred years ago, for example, could have foreseen the effects of the railroads on the settlement of the west, nor could the social and economic influences of the telephone have been predicted a half century ago. The redistribution of population brought about by the automobile and good roads would probably have been overlooked in an estimate made even twenty years ago, while changes in the status of communities caused by the World War were perhaps unpredictable even a decade ago.

Events which could not have been foreseen, however, have been much less numerous in the past than those which could have been expected by any one with adequate information, and there is no reason for believing that the future will differ materially in this respect. Even when such events have happened, comparatively few cities or towns have had the direction of their growth materially altered. Most communities are thus growing because of factors which can be foreseen and

analyzed, and consequently estimates based on complete data and scientific reasoning will probably fall within the permissible margins of error much more frequently than will guesses unsupported by such evidence.

No comprehensive estimate can be made for any one community without considering many others. Modern cities are not surrounded by Chinese walls which keep their inhabitants from moving away, and outsiders from entering. On the contrary, the ease with which people can abandon one locality for another makes the growth of any community dependent on the growth of all other communities within the nation. Consequently, nation-wide studies of population are properly the basis for estimates for particular places.

It is evident that the United States can gain in population only if more people are born than die, or if there are more immigrants than emigrants. During the decade from 1910 to 1920, net immigration added two million seven hundred thousand inhabitants to the United States, while the number of births exceeded the number of deaths by nearly eleven million. During the previous decade the natural increase was less than ten million, while the net immigration exceeded six million. Perhaps an economist would tell us that there is considerable interdependence between these two sources of population gains over long periods of time, but such adjustments are so slow that estimates of each have to be made largely independently in forecasts for two or three decades, which is as far as the telephone engineer ordinarily goes.

A few years ago an estimate of immigration into the United States would have been extremely difficult, as the number of immigrants depended largely on the number who wanted to come, which would have been a very hard thing to gauge unless European conditions were intimately known. Now, however, we have a law which allows fewer foreigners to come to our shores than wish to settle here, a law which will limit the net increase from immigration to two million or less per decade.

The next question is whether declining immigration will be balanced by a larger excess of births over deaths. The answer to this question is complex because it involves both future birth rates and future death rates.

It might be argued here that an individual now has a better chance to live than an individual of the same age a decade ago, because preventative medicine and sanitary engineering are banishing many of the former plagues of mankind and because more people are following the laws of health. While this is probably true, it must also be remembered that the average age of the population of the United States is greater than it was a decade ago, so the total death rate may show little reduction.

The rate of natural increase in population depends on birth rates just as much as it does on death rates. Birth rates depend upon a variety of factors, such as the relative proportion of the sexes, the age distribution of the population and its economic status, marriage rates, and current social ideas. The possible births in the United States are limited by the number of females of child-bearing age and further limited by the number of these who marry, and also by the age at which marriage takes place.

Foreign-born mothers or those low in the economic scale tend to have more children than those of middle class American stock, and as immigration declines and the general economic well-being of the country improves, we may expect some tendency for birth rates to decline. Then there is "race suicide." If children are not so welcome as they used to be, what effect will that have on future birth rates? If we have relatively fewer children in the future, how much will this be compensated for if we let fewer of them die in infancy?

The future population of the United States will be the resultant of all these various forces.

Present indications point to a natural increase in the next two or three decades slightly larger numerically than that of the last decade, but smaller on a percentage basis. The mid-century population of the United States may be expected to be in the vicinity of one hundred and fifty million, a figure which represents a rate of increase considerably below any previously experienced by the United States.

A population of one hundred and fifty million will require a greater amount of food and clothing, of lumber, iron, and other materials from which to build dwellings and means of transportation than does the present population. Enough of the prospective increase will have to go to the farms, the mines, and the lumber camps to produce these needed raw materials. It is essential, therefore, to picture the requirements of the basic rural industries before making any estimates of the urban population or of individual cities.

The considerations involved in forecasting rural population are varied. More food can be obtained in several ways: by the use of more land, by more intensive cultivation, by withholding exports of foodstuffs, by substitution of power machinery for hand labor, by raising better varieties of crops, and by improving breeds of live stock. Some of these means may necessitate a considerable increase in farm population, while others may actually reduce the necessary number. It seems most probable, however, that there will be a moderate growth in farm population, which may be differently distributed, however, from that of the immediate past.

Similar analyses have been made of the prospects of the mining and lumbering industries, and on the basis of these it has been estimated that the rural population of the country may increase between six million and seven million before 1950, or at a considerably lower rate than in the past. This leaves a growth for all the cities of the United States of about thirty-eight million for the next thirty years. In a real sense, then, the growth of Boston, for example, is affected by conditions in the mines of Michigan, the forests of Washington, and the plantations of Mississippi.

In making estimates for particular urban communities it becomes most important to study those factors which determine why one city will grow rather than another. Just as is the case of the whole United States, the

growth of any city depends on the excess of births over deaths and of arrivals over departures. As city populations are now constituted, the rate of natural increase averages about 10 per cent or 12 per cent per decade, or, in other words, if no one moved either into or out of the cities of the country, they would have in 1950 approximately nineteen million more inhabitants than they have now. Each individual city may be pictured as in conflict with all others to hold its own share of this natural increase and to acquire as many as possible of those who will come from foreign shores or the rural districts, or who will be the descendants of such migrants. The real question then is what advantages has any particular city to attract people away from all the others.

Men move to a city either because they like it, or because they can earn a living there, or in some cases because they have little choice in the matter. In the latter class are those who are committed to jails or asylums, those who are sent to schools and colleges, and those who seek hospitals and sanitariums. People who go to a city because they like it are the independently wealthy, the retired, the adventurers, and others who choose a place to live first, and then adjust their occupations, if they have any, to what is available there. They are drawn by various features, such as the climate, seashore attractions, cultural and historic interest, social advantages, and a variety of allurements ranging from amusement parks to speculative markets.

The vast majority of migrants probably go to the place where they think they can get good jobs. The cities which are able to attract this class are those in which industries are likely to expand, those which serve prosperous trade territories, or those in which governmental institutions are located. In estimating the future population of any city, therefore, all these points must be carefully considered, not only for the city itself, but for all competing cities.

While the consideration of these influences will not eliminate all the possibilities of error in a population estimate, they undoubtedly result in more accurate predictions than would be possible upon the basis of guesses.

Special Libraries Directory

The second edition of Special Libraries Directory is now ready for distribution. It represents a distinct improvement over the first edition. It is a handsome volume, cloth

bound, identical in size with the first edition, and contains about 200 pages. In it are listed 975 special libraries. Librarians non-special in character have been omitted. Mr. John Cotton Dana, librarian of the Public Library of Newark, New Jersey, has written an introduction graphically setting forth the place of the special library in the world of information. Forty main divisions serve to classify the libraries listed into their proper special groups. Illustrative of these divisions one may select aeronautics, agriculture, architecture, arts, business administration, commerce and trade, education, finance, industrial, and medical sciences. The description of individual libraries includes the name and address, personnel, size of collection, purpose of organization, whom it serves, the important subjects in which the library specializes, and wherever it has been possible to secure it, the date of the library's organization.

All usual means have been availed to make the Directory easily used. A geographical index, for example, arranges each library alphabetically by states and cities; a title index arranges each library by the name of the library or organization maintaining it; and a personal index arranges alphabetically the names of all librarians of the libraries described. The Directory is completed with a full analytical subject index.

The typography has been selected with particular care as to attractiveness and legibility, while the arrangement of each item on the page will render reference to the Directory easy and agreeable. The press work and binding reflect credit upon the H. W. Wilson Company whose long experience in work of this kind is easily discernible in this product of their plant.

No such complete, quick, and ready guide to the highly specialized information sources of the United States has ever before been printed. It will undoubtedly have as it so well merits wide distribution. The Compiling Committee and their associates whose names appear at the beginning of the Directory have rendered valuable service not only to Special Libraries Association, but to users of information everywhere. The Association is particularly indebted to Miss May Wilson, chairman of the Compiling Committee, and to Miss Rebecca Rankin under whose immediate supervision the manuscript has been brought through the tedious processes of printing and proofreading.

National Plan of Research

Research, in this country, has received a strong impetus by the recent endowment of \$500,000 provided by Ambrose Swasey, of Cleveland, and by the recent bequest of \$50,000 from the late Henry R. Towne of New

The Engineering Foundation will have charge of a national plan of research, made possible by these large gifts and there has recently been appointed a group of one hundred and ninety prominent engineers to co-

operate with the Foundation in this plan.

The Foundation has also received large sums from industries and individuals, and the work of the Foundation will be notably enlarged during the year 1925. Various learned societies are co-operating with the Foundation, in addition to the affiliated engineering societies located at the national headquarters of the Foundation in the Engineering Building, 29 W. 39th St., New York City.

Educational Research

More than fifty cities, from Providence to Santa Ana, now include definitely organized research bureaus as an integral part of their school systems. This leaves out of account the large number of schools where research work is carried on under the direction of some near-by university, as well as all those city and town schools in which there is research activity not definitely organized in a separate department. In every school worth mentioning some form of research is being carried on, if only in the mind of some one teacher, or by those interested in some one department or function of the school.

Varied as are the purposes of such research bureaus, their support is based upon the hope of saving money for the taxpayer, through making more clear the aims of instruction and putting the school plant to more efficient use. Numerous national organizations such as the Educational Research Association, American Council of Education, and the American Association for the Advancement of Science are actively engaged in encouraging the establishment of bureaus of educational research. The Commonwealth Fund, the Carnegie Foundation, the Jeanes Fund, and several others are liberal contributors to this work. Already there are eighty research centers, announces Bird T. Baldwin in a bulletin issued late in 1923 by the Department of the Interior.

Twenty periodicals are reporting the progress of educational research. These publications constitute a veritable clearing house for the spread and exchange of research information. The studies most frequently reported relate to costs, buildings and equipment, school attendance, failures, school organization, methods of learning and teaching, methods of study and the curriculum.—*From American Private Schools, Ninth Edition. (1924-25) Porter Sargent, 11 Beacon Street, Boston, Mass. Page 38.*

Agricultural Economics

The recent report of the chief of the Bureau of Agricultural Economics is interesting to special librarians. It may be recalled that this bureau replaced the Bureau of Markets and Crop Estimates and the Office of Farm Management and Farm Economics.

The work of the bureau is divided into Production and General Divisions. Under Production Division is included farm management, crop estimates, marketing costs, dairy products, warehousing, livestock and various groups relating to special crops. General Division includes statistical research, agricultural co-operation, agricultural finance, farm population, including rural life, land economics, information and the economic library. The library is of special interest, because it is the consolidation of the libraries belonging to three bureaus under the charge of Miss Mary G. Lacy.

The report of the librarian, included in the report of the chief of the bureau, notes the heavy demand for bibliographical and reference work and mentions the most important single bibliography of the year as the one on marketing of agricultural products, consisting of one hundred and thirty-three mimeographed pages. The work of the Division of Information is of interest to librarians as its activities involve a large amount of publication work. An interesting group of studies was made in connection with the research in consumer demand. The Division of Farm Population includes studies on farm standards of living and changes in farm population, also co-operative research problems in connection with the colleges of agriculture. The Division of Statistical and Historical Research takes up the question of foreign competition and demand, agricultural trade statistics, world survey of agriculture, forecasting prices and special use of graphics.

Special Libraries

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Statistical Interpretation

THIS number is devoted to the subject of "Statistical Interpretation," as the literature of the subject has grown amazingly in the past few years. A recent bibliography, appended to Jerome's new volume on Statistical Method, presents a notable list of books upon the topic.

We are fortunate in being able to present to our readers articles by noteworthy authorities, and we are deeply indebted to these busy men of affairs for their great courtesy in thus contributing, without remuneration, to SPECIAL LIBRARIES.

The papers by Harry Jerome and by Percival White bear a special appeal to librarians and reflect the opinion of the library user, but the other papers are equally valuable to our membership in broadening the knowledge of this specific subject. Mr. Moody's article is particularly timely, wherein he notes the deluge of method and the famine of data.

SPECIAL LIBRARIES, in future, will strike out even more boldly into this realm of fact information, and our next number, under the topic "The Library and the Executive," will contain noteworthy articles by prominent men in the business and the professional world.

Answering Correspondence

A MEMBER writes as follows: "Again and again I find that librarians as a class are prone to delay answering letters. Sometimes they never do answer your letters. In talking over the matter with several other people in the profession, I find that their opinion is the same as mine, that common courtesy demands that an answer, no matter how simple or whether in longhand or dictated, be sent when a question is asked. I know that we all are busy and that some of us are busier than others, but it seemed to me this was a fitting subject for an editorial."

We do not entirely agree with the correspondent that librarians as a class are thus dilatory. We believe that librarians who do not have well-organized offices and who are doing a vast amount of library technique without adequate assistance, frequently fall behind with their correspondence. Many librarians have not, at their command, a competent stenographer and as a result, library routine takes precedence over library correspondence. A whole scheme of library training does not take into consideration the place of the stenographer in the library administration. Many librarians have found it advisable to procure a recent graduate from a commercial school and train her in the simpler forms of library work. The whole question is of great interest and we should welcome discussion on the part of our members.

President's Page

IN December word came to your President that a group of business librarians, most of them members of S.L.A., had petitioned the Secretary of the American Library Association for assignment to a place on the program of the A.L.A. meeting at Seattle. Your President did not have the names of the petitioners, but he did have information that among them were several people who had been active in Saratoga in an attempt to merge S.L.A. with A.L.A. This led him to hope that the Secretary of the American Library Association, before definite action was taken upon this petition, might do our Association the courtesy to inform its officers of what had occurred and ask them if it were their intention to meet with the A.L.A. at Seattle.

Time passed, however, and no word came from the Secretary, although meanwhile rumors somewhat disturbing in character came to your President from several directions. At its Executive Board meeting in January, the S.L.A. voted to approve the suggestion of the President of one of the Special Library Associations on the Pacific Coast that there be held in Seattle a sectional meeting of S.L.A.; and plans were inaugurated looking to the putting of this suggestion into effect.

Shortly afterwards to your President's surprise, and a little to his embarrassment, he learned through correspondence transmitted to him by the Secretary of the A.L.A. that twenty-one special librarians most of whom were members of S.L.A., had been given by the Program Committee of the A.L.A. a special place on the Seattle program and that our San Francisco associates had been advised that confusion would be avoided if they subordinated their proposed program to the program of this preferred group.

The situation was unique! Twenty-two members of an affiliated association were given preference on the program of the larger body and the affiliated association was invited to confer with this little group, some of whom had been for years plotting its destruction, in arranging for their customary program!

It seemed humorous; and your President might have been led to accept quite tranquilly the confident assurances of the Secretary of the A.L.A. that he saw in it nothing essentially different from similar situations in the past had it not come to him that some of the members of this group were travelling up and down the country particularly on the Pacific Coast telling special librarians that a "rift" had appeared in the Association and that plans were perfecting to lead some of the "riftees" back into the A.L.A. at a group meeting to be held at the A.L.A. Annual Meeting in Seattle.

A perusal of the list of names which appears in another column, does not indicate that S.L.A. has much to fear whatever this group may resolve to do. Some of the signers are loyal S.L.A. members and undoubtedly have not the slightest intention of being used to bring discord between the two associations. Others of them will not go to Seattle. Still others have not been particularly active in either association.

We may not overlook the situation as it has now developed; but it does not seem to your President essential that we be overconcerned about it. Whatever the original purpose of those who planned the meeting and of those who have aided them in making their preparation for it complete, it is evident that somebody in his zeal to see disruption an accomplished fact, has overreached himself.

DANIEL N. HANDY

The World of Business Print

Miss Ethel Cleland, Department Editor

(Concluded from February)

The war period of great industrial activity has greatly affected human relations in industry and this is the text of "Man Power in Industry," by Edward S. Cowdrick, Holt. An English view of "Factory Management, Wastes and How to Prevent Them," by James B. Whiteford, Van Nostrand, does not deal with the question of material waste, as to American ears the title might imply, but with wastes in efficiency in the ordinary routine which, he estimates, constitutes 80 per cent of the work in an average factory, the remaining 20 per cent, the technical part of production, being usually well-organized.

In "The Technical Organization," McGraw, the authors, J. M. Weiss and C. R. Downs, offer constructive suggestions to the scientific worker in industry—how he can build up his organization and what its relations to the larger organization should be. It is reminiscent of a McGraw publication of about four years ago, "The Organization of Industrial Scientific Research," by Mees.

On such an active topic as marketing, new books are constantly appearing but it has been possible to examine only two. The authors of "Marketing Practice," Doubleday, Percival White and W. S. Hayward have already produced jointly a notable book on chain store merchandising and Percival White, market counselor and industrial engineer by trade, is well known for his writing on marketing and merchandising. This volume, intended as a practical guide to marketing, presupposes preparatory reading or study in general economics and takes up definite problems such as marketing agencies, retail marketing, market analysis, forecasting, prices, sales methods, advertising, foreign markets. Designed to supplement just such texts, "Readings in Marketing," compiled by Fred E. Clark of Northwestern University School of Commerce furnishes collateral reading for the student on marketing methods, particular commodities, farm products, middlemen, raw materials, manufactured products, retail distribution, co-operative marketing, standardization, prices.

"The Auditing and Accounting Handbook," McGraw, on which the author, F. W. Kilduff, confesses he has been at work for seven years, does not quite follow the usual form of our so-called "handbooks" but is as informative.

It contains all sorts of tables, classifications, schedules, digests and formulas for the accountant and the auditor among which should be mentioned specifically a list of publications which give current prices on a big group of commodities, important reports and returns required by various states for corporations, interest units, description of direct and indirect materials, inventory records, property classifications, outline for plant survey. A unique book from London is Sir Gilbert Garnsey's "Holding Companies and Their Published Accounts," Gee. The holding company is a comparatively new form of organization and there is not much extant on accounting for it. Over half the book consists of forms, mostly British, but there are some examples of the actual balance sheets of holding companies of American incorporation. A work of reference for factory managers, engineers, cost accountants and students is "Factory Overhead," by Frank E. Webner, White, which includes a section devoted to forms with several large sample forms attached. William S. Krebs, in his "Outlines of Accounting," Holt, has written primarily to provide an elementary text for use at Washington University. He approaches his subject through the statement method and has distributed through the book many typical and specific problems, examples and forms. H. A. Finney's name is too well known in the accounting world for it to be necessary to do more than record the fact that his two volume work "Principles of Accounting" has been published by Prentice-Hall. Vol. 1 is devoted to principles and Vol. 2 to their application to special kinds of accounting.

A book that will do more to increase the use of good English than any number of textbooks on the subject of English grammar is S. Roland Hall's "Business Writing," McGraw, containing excellent advice on the actual writing of articles, reports, advertisements, and on methods of gathering data and of writing business copy of news, educational and promotional character. T. H. B. Whipple, author of "Principles of Business Writing," occupies the unique position of Literary Critic of the Westinghouse Electric and Manufacturing Company of East Pittsburgh, Pa., whose night school has published the volume.

Designed expressly for technical school instruction, in its conciser moments it deals with the writing problems of the young engineer but it also discusses the general principles and specific problems of business letter and report writing. Business writing confined to the not very narrow field of advertising is the topic of "Advertising Copy," by G. B. Hotchkiss, Harper. This author, who will be recalled for his other books on both business English and advertising has further enlivened his interesting text with plenty of illustrations of his points and samples of all kinds of advertisements.

Instead of the usual general discussions of office organization and management, there are two small books that treat of specific office problems. Lee Galloway's "Organizing the Stenographic Department," Ronald, based on a chapter of a more comprehensive text of his, recognizes that "in the control of correspondence are centered some of the most complicated problems of business management." Important is the presentation of the question of a single organized stenographic department versus each executive having such service under his individual control. Helen Elysell who has already contributed a book on purchasing to business literature, in her "Handling Callers in the Business Office," Purchasing Agent Co., treats of the function of reception in business, visualizing for the reader the attitude of the caller as well as that of the reception clerk and including suggestive forms and record blanks.

In the field of insurance literature are to be noted: Breiby's "Essence of Life Insurance," Spectator, an exposition of the scientific principles of legal reserve life insurance supplemented by some more general discussions of policies, extension of life insurance service, mortality expectation; "Credit Insurance," by Ackerman and Neuner, Ronald, a pioneer volume on the development of a form of insurance against business failures; and "Life Insurance Examination," edited by F. W. Foxworthy and published by Moseby, an expensive volume but one that will be welcomed in physicians' and insurance offices as an up-to-date adequate treatment of this subject a lack of which has been felt for some time.

Knopf who does not give us many business books has a most readable one this fall, "The Ethics of Journalism," whose author, Nelson A. Crawford, head of the Department of Industrial Journalism of a western college, is

ambitious to aid the young journalist formulate for himself an ethical philosophy of his profession. An interesting collection of such codes of ethics already adopted by newspaper organizations is appended. Devoted to more obvious phases of newspaper work is Norman J. Radder's "Newspaper Make-Up and Headlines," McGraw. He, too, is an instructor in journalism but has designed his book both for use with college classes and as a reference book for the seasoned newspaper man. Illustrations and samples are copious. An addition to the existing general discussions on the subject is "The Principles of Journalism," by Casper C. Yost, Appleton. The author, himself an editor, dedicates four out of the fourteen chapters to editorial work and duties, relates entertainingly the origin of the art of disseminating news and briefly summarizes the ethics of his profession. Journalists will especially enjoy Don C. Scitz's "Joseph Pulitzer, His Life and Letters," Simon, a most readable book of which Villard in *The Saturday Review* says, "He has been able to write critically and with genuine detachment. He has given us a clever biography which makes easy complete understanding of the character of a man who will remain one of the most interesting figures in American journalism."

From the research department of an advertising firm, "Advertising Response," by H. M. Donovan, Lippincott, is an attempt to analyze the influences that increase sales and is the result of tests made on one thousand high school pupils of Philadelphia as to their familiarity with twenty selected commodities. The names of the articles were given in the questionnaire with instructions to write down opposite each name the particular brand that first came into the mind.

A limited edition of a beautiful volume has been issued by Knopf, "A Book of American Trade Marks and Devices," compiled by Joseph Sinel, that will be of great interest to commercial artists and to any one planning an artistic trade mark. It consists of a short introduction, then sixty-two pages of notable examples, in colors and in black and white, of such devices, indexed by firm but with no key to the artists.

Aside from its general interest, "Light and Work," by M. Luckiesh, Van Nostrand, will be of especial value to those planning factories, stores and large offices as it is "a discussion of quality and quantity of light in relation to effective vision and effective work."

Events and Publications

Miss Rebecca B. Rankin, Department Editor

We are indebted to Miss Emily C. MacCormick for the article on the Seaboard Air Line which appeared in the February issue of *SPECIAL LIBRARIES*.

"Tone Topics" is the title of a little publication published "every once in a while" by the H R Hunting Company of Springfield, Mass.

The Association of Advertising Agencies has recently organized a department of original research under the directorship of Dr. Daniel Starch.

"Sewage Disposal for Detroit" is a clearly stated popular report on that problem, prepared by the Detroit Bureau of Governmental Research, January, 1925.

R. G. Dun & Co., 290 Broadway, New York City, has issued its "Record of Insolvencies, Covering a Period of Over Sixty Years for the United States and Fifty Years for Canada."

Copper and Brass Research Association, 25 Broadway, New York City, has issued "Annual Building Survey for 1924," a mimeographed leaflet of five pages containing figures for building construction in the United States.

A Library Committee of the United States League of Local Building and Loan Associations recently made a report, as printed in the 1924 Proceedings, recommending the establishment of a reference library for their League.

"The Government of Metropolitan Areas" by the Detroit Bureau of Government Research (*Public Business*, December 20, 1924) contains a concise resumé of the experience of all large cities in forming metropolitan districts.

The *Union Periodical List*, under the direction of Miss Mary Lynch, of the Pittsburgh Academy of Medicine Library, is becoming a

useful tool. When complete, it will show in one file, periodical resources of all Pittsburgh libraries.

A single sheet containing a useful tabulation of monthly rates that cannot always be found in comparable form over a series of years is published by Ogle, Dunn & Co., 60 Broadway, entitled "Monthly Average Money Rates, Demand and Ninety Day Loans, 1890-1924"

The December issue of the *Bankers Magazine* contains an article on "How Financial Libraries Serve Banks" by Margaret Reynolds, librarian of the First Wisconsin National Bank, Milwaukee. Several photographs of financial libraries are used to illustrate the article.

The Bank Director, January, 1925, page 91, contains a brief general article about the new general offices of H. M. Byllesby & Company, Chicago, located on the eleventh floor of the Illinois Merchants Bank Building, 231 South La Salle Street.

The library of the Merchants National Bank, Los Angeles, has recently installed new steel stacks to house its growing collection. The library is under the supervision of Mr. George G. Ellis, manager of the Public Relations Department.

Benjamin M. Anderson's "Income of the American People and the Ratio of Foreign to Domestic Trade, 1890-1924" appearing first in the *Annalist*, January 5, 1925 has been reprinted by the Chase National Bank. The annual figures of estimated income are based on index numbers.

Brooklyn, official organ of the Brooklyn Chamber of Commerce devotes its February 14 issue to "Guard Against Typhoid" articles. Included is one by President Jennings of the Medical Society of County of Kings, which includes reference to its splendid medical library of over one hundred thousand volumes.

Little Old New York, January, 1925, organ of the Thirty-fourth Street Midtown Association, contains an article on "The Municipal and Other New York Specialty Libraries;" the New York Municipal Reference Library, New York Historical Society Library, and the New York Genealogical and Biographical Society Library are briefly described.

The Office Economist, January, 1925, has a contribution from Eleanor Gilbert—"The Public Library and the Business Man;" The Chamber of Commerce Library is advocated, and descriptions of the Merchant Association Library, the New York Municipal Reference Library and business branches in several cities are included.

The Census Bureau publications on Wealth, Public Debt and Taxation, 1922, in four pamphlets entitled Assessed Valuation and Tax Levies, Estimated National Wealth, Public Debt, Taxes Collected, are a valuable series. The estimate of national wealth is especially welcome in order to answer a constantly recurring question.

"Wanted: A Municipal Research Bureau" is the plea made in the *Local Government News*—a monthly published by the Fabian Society and Labour Party in London. "It is a standing disgrace that there does not exist in England a single center where there is available to the public even such elementary documents as a complete collection of all the annual reports of the local medical officers."

A bibliography of Vocations for College Women, prepared by Fannie Dunlap and Alice Sarah Johnson of the University of Illinois Library, is now appearing serially in the bi-monthly *News Bulletin* of the Bureau of Vocational Information (2 West 43rd Street, New York City), beginning with the issue of January 1, 1925.

The library of the Los Angeles Chamber of Commerce is now located in the lobby of the new Chamber of Commerce Building where it will attract wide attention and become extremely useful to the membership. Miss Mabel E Gleason is in charge of the library room, but the library is under the direction of the Research Department, Guy E. Marion, manager.

The House of Longman of Paternoster Row celebrated its two-hundredth anniversary by the publication of a little pamphlet which describes the early beginnings of the well-known publishing house which really dates back to 1719 when a bookseller named William Taylor published the first edition of Robinson Crusoe. Five years later William Taylor died and his executors sold the business to Thomas Longman. The little pamphlet describes the publishing activities of the English firm in a most interesting manner. The first American contact came in 1887 when Longman established the New York branch, familiarly known as Longman, Green & Co.

An extensive use of the Library of the Department of Commerce is indicated by the report for 1924 by Hon. Herbert Hoover, Secretary of Commerce. The library numbers one hundred and ten thousand volumes and, while primarily for the use of research workers in the department, its use by other branches of the government and business men is steadily increasing. The circulation of books outside the library amounted to 15,346 volumes. An additional room on an adjacent floor was utilized to relieve the congestion in the library. This report is in striking contrast to the statement by a former Secretary of Commerce which we quoted in the October issue of SPECIAL LIBRARIES.

Maps of Interest

Some interesting new maps of varying interest are: "The Official Highway Service Map of Wisconsin, the Playground of the Middle West," showing type and condition of the state trunk highway system, issued by the Wisconsin Highway Commission; "Map of the Trunk Highway System of Minnesota" prepared by the Minnesota Highway Department; "Map of Virginia, Showing State Highway and County Highway Systems," from the Virginia State Highway Commission; "Map of the Forest Regions of the United States," with a table listing the principal trees of each region, distributed from the United States Forest Service; a "Food Source Map" from Armour and Company, Chicago, on which are shown graphically and entertainingly the parts of the United States from which our principal articles of food come; from the Board of Estimate and Apportionment, New York City comes a new official street map of that city issued in thirty-five sections, or it may be obtained as a wall map.

Associations and Groups

Plans for the Swampscott Conference take precedence this month in this department and as the time of the annual meeting approaches, SPECIAL LIBRARIES will have a section of the magazine devoted to plans for the conference.

Swampscott Conference

The Program Committee for the Swampscott Conference, Mr. William Alcott, chairman, has made commendable progress for the Sixteenth Annual Convention of the Special Library Association, which will be held at the New Ocean House, Swampscott, on Wednesday, Thursday and Friday, June 24-26.

The tentative program contemplates an opening session on Wednesday morning, which will include the organization of the convention and necessary business details. The afternoon will be devoted to group meetings, followed by a dinner, with speakers of prominence. Later in the evening a reception will be held.

Thursday morning will be devoted to group meetings and in the afternoon the delegates will be entertained by an automobile trip along the famous North Shore. The second general session will be held in the evening. Friday morning will be devoted to a business session, followed by group meetings in the afternoon. The final general session will occur on that evening.

There will be an opportunity on Saturday morning to visit the libraries of Boston and vicinity. The Program Committee consists of Mr. William Alcott, chairman, Miss Eleanor D. Cavanaugh, Miss Eleanor Kerr, Miss Ruth M. Lane, Mr. Clarence B. Lester, Miss Deborah Morris and Miss Margaret Reynolds.

Boston

The Special Libraries Association of Boston was invited by the Massachusetts Library Club to join it in its all day midwinter meeting on January 29 in the Gardner Auditorium at the State House. Many members were able to be present for one or more of the sessions.

Governor Alvan T. Fuller was introduced by Mr. Edward H. Redstone, state librarian and president of the Massachusetts Library Club. After welcoming the librarians and speaking briefly in appreciation of the fine work done by them for the citizens of the Commonwealth, he introduced Admiral Sims as "one of the great heroes of the navy."

The contrast between the sailors of the days of sailing vessels and the seamen of the pres-

ent time was vividly drawn by Admiral Sims. He said the sailor as portrayed in "Two Years Before the Mast" and similar stories no longer exists. Such men were usually illiterate and often spoke no real language, but an almost unintelligible mixture of many, yet they were expert sailors. With the passing of sails and sailing vessels their skill was useless and they could not be taught the duties on a modern steam vessel. Today the seamen of the navy and the merchant marine are young men, often from inland states, and preferably with some mechanical experience. These receive technical training to fit them for oilers, boiler-smiths, engineers, gunners, etc.

It is for such men as these that the American Merchant Marine Library Association is about to collect books to continue and extend its service in providing libraries for our ships. To show the demand for books and the appreciation of the men, Admiral Sims read brief selections from the many letters which come to the Association. One sailor offered to "send a taxi, if he could have another box of books for the ship." Their requests ranged from fiction to very technical works and a large number asked for text-books thus showing a desire not only for recreational reading, but for an opportunity to advance in their particular line. Of interest in indicating the progress of the work he gave statistics of libraries distributed at the port of Boston which showed that in 1922 nineteen thousand volumes were placed on two hundred and fifty-two ships, in 1923 twenty-six thousand volumes on three hundred and seventy ships and in 1924 thirty-four thousand on four hundred and sixty ships.

Mrs. Henry Howard of Cleveland, president of the Board of Trustees of the American Merchant Marine Library Association gave a short history of the work of providing libraries for the sailors. During the war it was carried on by the American Library Association, but in 1921 given up by it and the American Merchant Marine Library Association incorporated to carry on the much needed work.

The speaking was followed by a round table on cataloging for medium-sized libraries led by Mrs. Frances R. Coe of the State Library.

The afternoon session opened with an address by Mr. Daniel N. Handy, president of the Special Libraries Association, on the "Relation of Special to Public Libraries." Pro-

fessor Charles T. Copeland of Harvard read a paper on Dickens which he followed by selections from Dickens and Kipling.

Dinner was served at the 20th Century Club at 6 p. m. to one hundred and seven members of the two associations. In the evening Mr. and Mrs. John J. Cronan told stories at the meeting in the State Library. A few games and a social hour finished the day's program.

Pittsburgh

The Pittsburgh Association scheduled all of its meetings on the third Thursdays of each month at 8 p. m.

It was found that business and dinner meetings combined meant either that the meeting was too long; or that not enough business was transacted.

The members frequently meet informally for dinner before the meeting, however, and occasionally arrange brief committee meetings at this time.

Southern California

The Special Libraries Association of Southern California held their February meeting on the evening of February 9 in the office of the librarian, Los Angeles Public Library. The meeting was devoted to a discussion of ways and means of completing and financing the "Union List of Periodicals."

Regional Meetings

Besides the Forty-seventh Annual Conference of the American Library Association at Seattle, Washington, July 6-11, three important regional meetings will be held during the year.

The state library associations of Missouri, Minnesota, North Dakota, South Dakota, Nebraska, and Iowa will join in regional conference in Sioux City, October, 1925.

The state library associations of Indiana, Michigan, and Ohio will hold a joint meeting at Fort Wayne, October 20-23, 1925.

A regional meeting of the New England states will be held at the New Ocean House, Swampscott, Mass., June 22-27, 1925.

Financial Group

The Financial Group of the New York Special Libraries Association have prepared a tentative program which contemplates nine meetings between February 10 and June 10. In each case a centrally located financial library acts as host. The schedule is subject to possible change and anyone desiring to attend these meetings should get in touch with Miss Marguerite Burnett, chairman, Financial

Group, New York Special Libraries Association.

The meetings are held at 5:15 in the afternoon. The first one was held at the office of the Wall Street Journal, the second at the library of the National Bank of Commerce. The meeting at the Wall Street Journal was a great success with an attendance of thirty.

The meetings for March are arranged for the Federal Reserve Bank of New York, 33 Liberty Street, March 18, and the National City Bank, 60 Wall Street, March 31. April meetings will be held at the library of the Standard Statistics Co. and the library of the Irving Bank-Columbia Trust Co.

Of Passing Interest

A group of twenty-two business librarians, two men and twenty women representing fifteen institutions, members of the American Library Association, petitioned the executive board of that Association at its meeting in Chicago in December, 1924, requesting a place on the program at the Seattle meeting of the A.L.A. for a round table meeting. This request was promptly granted by the executive board of the A.L.A. The petition was headed by Miss L. Elsa Loeber of the Chamber of Commerce of the State of New York. Most of the petitioners are members of the Special Libraries Association, but several have never been identified in any way with the S.L.A. Two of the persons on the list were not members of the A.L.A. in September 1924, when the handbook was issued. The list follows:

Elsie Bacchtold
Lyda Broomhall
Jeanie M. Bulmer
Julia Elliott
Jeanne B. Foster
Laura R. Gibbs
Audicne Graham
Josephine M. Hefron
Carlos C. Houghton
Ursula K. Johnstone
Louise B. Krause
L. Elsa Loeber
Berger Lundell
Louise S. Miltimore
Alma C. Mitchell
Gudrun Moe
Grace B. Morgan
Alice L. Rose
Ethel M. Shields
Ann D. White
Jane White
Marguerite Boucher Wickwire

Personal Notes

Margaret Wells, Department Editor

Mr. Carlos C. Houghton spoke before the San Francisco Special Libraries Association on February 17.

Miss Henrietta Kornhauser has been appointed assistant on the Staff of Mellon Institute Library.

Mrs. H. S. Goff (Marie Simon), is assistant librarian in the technical library of E. I. du Pont de Nemours Company, Wilmington.

Major General Robert E. Noble has retired from his position as head of the United States Surgeon General's Library and is succeeded by Colonel James M. Phalen.

Mr. George G. Ellis is manager of the Public Relations Department of the Merchants National Bank, Los Angeles, and also head of the library of that bank.

Mr. Miles O. Price, librarian of the United States Patent Office is editor of the public documents section of the *American Political Science Review*

Mr. H. H. B. Meyer, president of The American Library Association, has contributed an interesting article on "The Library and Adult Education" to the February number of *Public Librries*.

Miss Rebecca B. Rankin, librarian of the New York Municipal Reference Library addressed the Annual Meeting of the District of Columbia Library Association in Washington on February 20.

Mr. Dorsey W. Hyde, Jr., chief of the National Civics Bureau of the Chamber of Commerce of the United States has been appointed Washington Secretary of the American Statistical Association

Miss Katharine Sparks has been appointed assistant to Frances Fairbanks in the Library of the Hercules Powder Co., Wilmington, Del She was formerly in the Wilmington Institute Free Library.

Mr. Francis S. Parsons has retired after many years of noteworthy service and Mr. Frederick E. Brasch has been appointed as his successor as custodian of the Smithsonian deposit in the Library of Congress.

Miss Norma Seaman, special cataloger at the Business Branch of the Newark, N. J. Library for the past year has resigned to accept a position as cataloger in the Frick Art Library, New York City.

Miss Katherine Calhoun, formerly with the library of the University of Alberta, Alberta, Canada, is taking the Special Librarians Course at the Library School of the New York Public Library.

Mrs. Vivian G. Smith, for a long time associated with the Security Trust & Savings Bank of this city, has just severed her connection with that company to go north for a period of rest with her people.

Miss Rose L. Vermelker has accepted the position of business librarian with the White Motor Company of Cleveland beginning February 16. She was formerly in the Technology Department of the Cleveland Public Library.

Miss Laura A. Thompson, librarian of the United States Department of Labor, is the author of "Woman and Child Labor," a 31-page bibliography reprinted from the January, 1925, issue of the *Monthly Labor Review*.

Mr. Mangum Weeks, appointed a number of months ago as librarian of the United States Department of State, has called in Miss Ellen A. Hedrick to assist in reorganizing and cataloging the collection of the State Department Library.

Mr. W. I. Swanton, librarian of the United States Reclamation Service, has been making a fine record as president of the Columbia Heights Citizens Association of Washington since his election to this office about a year ago.

Foreign Field

The editor has received the following communication from the Sir Ganga Ram Business Bureau & Library, reference to which appeared in the November issue of SPECIAL LIBRARIES. We trust that our readers will follow the request of the honorary secretary. The editor has on file a circular issued by the Bureau & Library at Lahore, India, which lack of space will not permit us to reproduce. The letter follows:

Dear Sir:

I thankfully acknowledge the receipt of your letter dated the 28th. November, 24. I am pleased to find your attitude towards this institution in your making a mention of this library in the columns of your paper for which please accept my thanks. In this connection I may add that this institution has been organised to help young men to find careers for themselves and to guide them in settling in India. It is located at Maclagan Road, Lahore, and not at LACAGAN Road, as has been misprinted in your columns. I hope you shall rectify this mistake in the next issue.

Moreover I would be greatly obliged if you would very kindly insert in your columns the following notice in a place to attract attention:

THE SIR GANGA RAM BUSINESS BUREAU & LIBRARY, MACLAGAN ROAD, LAHORE, INVITES CATALOGUES AND PRICE LISTS OF BOOKS DEALING WITH THE FOLLOWING SUBJECTS: TRADE, COMMERCE, INDUSTRIES, (PARTICULARLY HOME INDUSTRY), ARTS, CRAFTS, CHEMISTRY AND REFERENCES.

I hope you would not refuse this privilege to this philanthropic and charitable institution, serving the public free of any charge.

Also please supply me the following of your books per v. p. p. In case it may not be possible, the same may be supplied under registered cover with the bill when the amount will be remitted.

1. Handbook of commercial information services.
2. Workshop for assembling business facts.

In the conclusion I hope you shall similarly favour me by enrolling the name of this institution on your mailing list for the supply of SPECIAL LIBRARIES.

Thanking you in anticipation and hoping for an early compliance,

I am,

Yours faithfully,
LAJPAT RAI SAHNI,
Honorary Secretary.

* * *

The *Liverpool Post and Mercury* has recently reprinted an article from its supplement for January 19, 1925, relating to Liverpool's Commercial Reference Library. The article contains a photograph of the library rooms and a picture of the chief librarian, George T. Shaw, F.L.A., Liverpool Public Library. The librarian in charge, Mr. G. Halsall, has planned his library for "the man in a hurry."

The business men of Liverpool apparently make full use of the library and attest the spirit of enterprise which caused the Liverpool City Council to establish a commercial reference library.

* * *

If present plans are carried out, the League of Nations will establish at Geneva a bureau of municipal research to serve all the countries affiliated with that international association. Charles A. Beard writing in the *American City* for January states that the idea was brought before the fifth Assembly of the League last September, by the Cuban delegate, who based his action on a recommendation of the Fifth Pan-American Conference, held in Chili in 1923. The project for establishing such a bureau was cordially received by the Assembly. Delegates from several countries spoke in favor of it. All recognized the advantages that might come from pooling the world's experience in municipal administration. After a very illuminating discussion of the idea, the Assembly of the League passed a resolution instructing the Secretariat to prepare a grand plan and report it to the next Assembly for action. This resolution was adopted on September 20, 1924, and the Secretariat immediately began to collect materials and study the problem. Those who have anything to do with municipal affairs, either as practitioners or as students, will watch with the keenest interest the action of the Secretariat and the League of Nations on this significant project.

Pages 101-102 deleted, advertising.

Supplement to SPECIAL LIBRARIES

MARCH, 1925

Recent Technical Bibliographies

Compiled by Raymond N. Brown of the Engineering Societies Library, New York

This list includes the more important bibliographies that have come to our attention during 1924. All entries are made from the originals in the Engineering Societies Library.

Aeronautics. History

J. E. Hodgson. The history of aeronautics in Great Britain from the earliest times to the latter half of the nineteenth century. H. Milford. London. 1924. 436p.

p. 387-415. Bibl.

A selective bibliography arranged according to the chapters of the text.

Africa, Portuguese East. Geology

E. O. Teale. The geology of Portuguese East Africa between the Zambesi and Sabi Rivers. *In* Geological Society of South Africa Transactions, 1923, Vol. 26, p. 103-29

p. 129. Bibl.
20 references.

Aluminum. Corrosion

H. F. Whittaker, comp. Corrosion of aluminum. Research Information Surveys on Corrosion of Metals No. 2 National Research Council. Washington. 1923. mimeo., various paging

108 references arranged chronologically

Aluminum-copper alloys

A. Portevin and F. Le Chatelier. Heat treatment of aluminum-copper alloys. *In* American Society for Steel Treating Transactions, 1924. Vol. 5, p. 457-78

p. 477-8. Bibl.
17 selected references.

Also in *Revue de Métallurgie* Vol. 21, p. 245-6.

American Engineering Council

Industrial coal, purchase, delivery, and storage. A report of the American Engineering Council. Ronald Press. New York. 1924. 419p.

p. 387-405. Bibl.
About 300 classified references.

Atoms, space lattice, solid solutions

O. E. Harder. Atoms, space lattice, solid solutions, etc. Bibl. in *General Electric Review*. 1924. Vol. 27, p. 457-8

About 50 references.

Bentonite

H. S. Spence. Bentonite. Dept. of Mines, Mines Branch. Ottawa. 1924. 36p.

p. 32-5. Bibl.

About 120 references on bentonite and colloidal clays.

Benzol

Bibliography of benzol. *In* National Safety Council Proceed.... 1923. p. 213-19

About 190 references, mostly on benzol poisoning.

Beryllium or glucinum. See Mercury

Boilers, superheaters, and economizers

National Electric Light Association. Boilers, superheaters, economizers. Serial report of the Prime Movers Committee. (1923-24). National Electric Light Association. New York. Sept. 1924. 57p.

p. 56-7. Bibl.

About 50 references, mostly for 1923.

Boiling point and vapor pressure

C. v. Rechenberg. Einfache und fraktionierte Destillation in Theorie und Praxis. Schimmel & Co. Leipzig. 1923. 814p.

p. 272-308. Literature zur Dampfdruck und Siedepunktstabelle.

To accompany a table showing boiling points of 489 elements and compounds there are here listed from one to twenty references about each of these elements or compounds.

Boston. Transportation

Reference list of literature on electric railway transportation in Boston as of February, 1924. N. P., N. D. mimeo. 12p.

About 190 references arranged by author.

Cement. Storage

D. A. Abrams. Effect of storage of cement. Lewis Institute, Structural Materials Research Laboratory. Chicago. 1924. Bull. 6 38p.

p. 35-8. Bibl.

About 60 references, many with descriptive notes.

Ceramic industry. Heat economy

W. M. Cohn. The problem of heat economy in the ceramic industry. *In* American Ceramic Society Journal. 1924. Vol. 7, p. 359-76, 475-88, 548-62

p. 558-62. Bibl.

130 references largely in German.

Chemistry, Colloid

Jerome Alexander. Colloid chemistry. 2nd ed. Van Nostrand. New York. 1924. 208p.

p. 195. Bibl.

A short list of the standard works in English, French and German.

The Svedberg. Colloid chemistry. Chemical Catalog Co. New York. 1924. 265p.

p. 251-7. Bibl.

332 references with author index.

Chromium

Chromium. *In* Mineral Industry. 1924. Vol. 32, p. 109-19

p. 118-19. Bibl.

About 20 references for 1923-24.

Chemistry, Early

J. M. Stillman. The story of early chemistry. D. Appleton & Co. 1924. 566p.
p. 541-54. Bibl.
About 250 books in various languages are listed. Articles in serial publications are not included.

Clays, Florida

Florida State Geological Survey. 15th annual report 1922-23. For the State Geological Survey. Tallahassee. 1924. 266p.
p. 259-60. Bibl.
33 references.

Coal

The price of coal, anthracite and bituminous. Annals of the American Academy of Political and Social Science. 1924. Vol. III. No. 200. 387p.
p. 345-62. Bibl.

Several hundred references, mostly to reports and books.

Coal, Pulverised

L. C. Harvey. Pulverised fuel, colloidal fuel, fuel economy, and smokeless combustion. Macmillan Co. New York. 1924. 466p.

p. 424-49. Bibl. on pulverised coal.
Hundreds of references classified.

Coal industry

E. H. McClelland. Literature of the coal industry for 1923. *In* Coal Industry. 1924. Vol. 7, p. 39-42

About 110 references. "A classified list of the more important books, serials and trade publications which have appeared during the year. . ."

Coal tar

P. E. Spielmann. The constituents of coal tar. Longmans, Green & Co. London. 1924. 219p.

p. 193-207. Bibl.
525 references with subject and name indexes.

Coal washing. *See* Ore dressing

Cobalt ores

Edward Halse. Cobalt ores. J. Murray. London. (Imperial Institute Monographs on mineral resources with special reference to the British Empire.) 1924. 54p.

p. 50-4. Bibl.
69 references.

Colorado. Geology

J. H. Johnson. Bibliography of the geology of northwestern Colorado. Colorado School of Mines; Circular of information. Golden, Col. 1924

183 references with subject index.
Same for southwestern Colorado. 148 references with subject index.

Concrete and cement in sea water

W. G. Atwood and A. A. Johnson. Marine structures, their deterioration and preservation. . . National Research Council. Washington. 1924. 534p.

p. 496-521. Bibl. on cement and concrete in sea water
Hundreds of references arranged by author.

Condensing equipment

National Electric Light Association. Condensing equipment. Serial report of the Prime Movers Committee (1923-24). National Electric Light Association. New York Sept. 1924. 60p.

About 150 references for 1922-23 with descriptive notes.

Copper

Watson Davis. The story of copper. Century Co. New York. 1924. 385p.

p. 365-80. Reading references on copper. Consists of lists to accompany the various chapters.

Copper. Corrosion

H. F. Whittaker, comp. Corrosion of copper. Research Information Surveys on the Corrosion of Metals No. 3. National Research Council. Washington. 1923. mimeo., various paging

187 references arranged chronologically.

Corrosion

W. S. Calcott, J. Whetzel, and H. F. Whittaker. Monograph on corrosion tests and materials of construction for chemical engineering apparatus. American Institute of Chemical Engineers. For sale by D. Van Nostrand Co. New York. 1923. 182p.

p. 85-103. Bibl. of chemical corrosion.
Hundreds of references classified by metals.

Crystal structure

Ch. Mauguin. La structure des cristaux déterminée au moyen des rayons X. Librairie Scientifique. A. Blanchard. Paris. 1924. 281p.

p. 267-74. Bibl.
156 references.

Crystal structure

R. W. G. Wyckoff. The structure of crystals. Chemical Catalog Co. New York. 1924. 462p.

p. 423-49. Bibl.
Hundreds of references arranged chronologically 1912-23 inclusive.

The Dakotas and Montana. Geology

W. T. Thom, Jr., and C. E. Dobbin. Stratigraphy of cretaceous-coecene transition beds in eastern Montana and the Dakotas. *In* Geographical Society of America Bull. 1924. Vol. 35, p. 481-505

p. 500-5. Bibl.
101 references.

Dielectric losses

Mary Z. Demerec. Review of literature on dielectric losses and the cause of breakdowns of solid dielectrics. *In* Sibley Journal of Engineering. 1924. Vol. 38, p. 86-91, 96

p. 96. Bibl.
31 references.

Drawing, Engineering

T. E. French. A manual of engineering drawing for students and draughtsmen. McGraw-Hill Book Co. New York. 1924. 409p.

p. 380-4. Bibl.
About 90 classified references.

Dust and fumes. Precipitation.

W. E. Gibbs. Clouds and smokes. J. & A. Churchill. London 1924. 240p.

p. 157-61. Bibl. on precipitation.
About 120 references.

Dyes

P. W. Cunliffe. The action of light on dyes applied to cotton fabrics. A summary of the literature. *In* Textile Institute Journal. 1924. Vol. 15, p. T173-T194

p. T192-4. Bibl.
85 references.

Electric furnaces

A. E. White. The use of electric furnaces in heat treatment. American Electrochemical Society. Preprint of paper at meeting Oct., 1924

p. 402-16. Bibl.
About 70 references. Important items have long descriptive notes.

Electric heating

Industrial electric heating bibliography. In National Electric Light Association Bull. 1924. Vol. 11, p. 764-5

55 references of recent date.

Electric insulation

W. A. Del Mar. Electric cables, their design, manufacture, and use. McGraw-Hill Book Co. New York. 1924. 208p. p. 184-99. Summarized history of published knowledge bearing upon the performance of insulation under electric stress.

About 125 references with abstracts.

Electrical interference

S. C. Bartholomew. Power circuit interference with telegraphs and telephones. In Institute of Electrical Engineers Journal. 1924. Vol. 62, p. 817-58.

p. 855-7. Bibl.

About 50 references.

Electric utilities accounting

F. W. Herbert. Accounting bibliography of National Electric Light Association, 1907-23. In National Electric Light Association Bull. 1924. Vol. 11, p. 59-61

About 210 classified references to National Electric Light Association publications.

Engineering and applied science

Analytical bibliography of the history of engineering and applied science. 1900-24. In Newcomen Society Transactions. 1923-24. Vol. 2, p. 141-55, Vol. 3, p. 122-9

Hundreds of references. A list of works published in the last 24 years. Arranged alphabetically by subject.

Engineering failures

Edward Godfrey. Engineering failures and their lessons. Copyright, E. Godfrey. New York. 1924. 270p.

p. 254-62. Bibl.

About 300 references in periodicals and proceedings

Explosives, Liquid oxygen

Leopold Lisse. Das Sprengluftverfahren. J. Springer. Berlin. 1924. 109p.

p. 104-7. Bibl.

About 120 references.

Ferromagnetism

L. W. McKeehan. Ferromagnetism and its dependence upon chemical, thermal and mechanical conditions. In Franklin Institute Journal. 1924. Vol. 197, p. 757-86

p. 783-6. Bibl.

140 references.

Forest mensuration

H. H. Chapman. Forest mensuration. 2nd ed. J. Wiley & Sons. New York. 1924. 577p.

p. 525-6. Bibl.

About 60 selected references classified.

Fuel

W. F. Goodrich. The utilisation of low grade and waste fuels. E. Benn, Ltd. London. 1924. 368p.

p. 358-60. Bibl.

About 50 references including only important books and reports

L. C. Harvey. Pulverised fuel, colloidal fuel, fuel economy, and smokeless combustion. Macdonald & Evans, London. 1924. 466p.

p. 424-49. Bibl.

Hundreds of references arranged in various classifications.

R. T. Haslam and E. W. Thiele. Recent progress in the field of fuels and fuel technology. In Industrial & Engineering Chemistry. 1924. Vol. 16, p. 749-53

p. 752-3. Bibl.

About 100 references.

National Electric Light Association. Pulverized fuel. Serial report of the Prime Movers Committee (1923-24). New York. 1924. 32p.

p. 30-2. Bibl.

About 50 references with descriptive notes, mostly for 1923.

Fuller's earth

United States Geological Survey. Fuller's earth in 1923. Mineral Resources of United States. 1923 Pt. II, p. 99-107

p. 105-7. Bibl.

About 80 references.

Fumes, smokes, etc. Industrial treatment

W. E. Gibbs. Clouds and smokes. J. & A. Churchill. London. 1924. 240p.

p. 157-61. Bibl.

About 100 references as part of chapter on industrial treatment of fumes.

Gas rates

American Gas Association. Proceedings. . . . Fifth Annual Convention, 1923. American Gas Association. New York. 1924(?). 1251p.

Appendix F. p. 188-230. Bibl on rates (1876-1923) by O. E. Norman.

Pt. I, Books.

Pt. II, Articles in journals arranged chronologically.

Gases

E. Berl and H. Fischer. Untersuchungen an Explosiblen Gas-und Dampf-Luft-Gemischen. In Zeit. fur Elektrochemie. 1924. Vol. 30, p. 29-36

p. 35-6. Bibl.

90 classified references.

Eugène Bloch. The kinetic theory of gases. Translated by P. A. Smith. E. P. Dutton & Co. New York. n. d. 178p.

p. 176-8. Bibl.

About 50 classified references.

W. Jones and others. Bibliography on flammable and explosive limits of common combustible gases and vapors. In Industrial and Engineering Chemistry 1924. Vol. 16, p. 355

46 references.

Gelatin

H. R. Proctor and J. A. Wilson. Report on collagen and gelatin. In British Association for the Advancement of Science. Fifth Report on Colloid Chemistry. London. 1923. 130p.

p. 19-21, 30-1. Bibl.

About 75 references.

Geological literature

Bibliographie des sciences géologiques publiée par la Société Géologique de France. . . . No. 1, July, 1923. Paris.

A new quarterly aiming to list by country all works on geology, including contents of periodicals, currently received at certain French libraries.

Each number has many hundreds of references.

Geological Society Geological literature added to the Society's library during. . . 1923. Geological Society. London. 1924. 131p.

Thousands of items, arranged by author, mostly published in 1922 and 1923. Includes contents of journals and transactions.

Glass

W. J. Sutton and A. Silverman. The electrical conductivity of sodium chloride in molten glass. In American Ceramic Society Journal. 1924. Vol. 7, p. 86-104

p. 102-4. Bibl.

About 65 references.

Gold placers

C. S. Haley. Gold placers of California. California State Mining Bureau Bull. 92. 1923. 167p.

p. 160-2. Bibl.
About 100 references covering many years.

Gypsum

Gypsum. *In* Mineral Industry. 1924. Vol. 32, p. 325-31

p. 331. Bibl.
14 references for 1923-24.

Gypsum, Persia

J. V. Harrison. The gypsum deposits of southwestern Persia. *In* Economic Geology. 1924. Vol. 19, p. 259-74

p. 273-4. Bibl.
19 references.

Hudson River bridge

Ada S. Couillard. Bridging the Hudson River at New York City. Annotated bibliography. *In* Municipal Reference Library Notes. [New York], 1924. Vol. 10, p. 21-40

About 175 references classified.

Idaho. Minerals

Idaho. Inspector of Mines. 25th annual report of the mining industry of Idaho, for the year 1923. [Boise, Idaho. 1924] 121p

A bibliography of 10 to 50 items is given for each county of the state. They "constitute the most complete bibliography on the mineral resources of Idaho that has ever been published."

Industrial management

A European library of American management literature *In* Taylor Society Bull. 1924. Vol. 9, p. 186-8

A select list of books and other publications presented to the Masaryk Academy of Work at Prague.

Insecticides and fungicides

C. C. McDonnell. Recent progress in insecticides and fungicides. *In* Industrial and Engineering Chemistry. 1924. Vol. 16, p. 1007-12

p. 1011-12. Bibl.
132 references.

Iron

N. T. Belaiew. The granulation hypothesis and the delta-gamma change in iron-carbon and iron-nickel alloys. *In* American Society for Steel Treatment Transactions. 1924. Vol. 5, p. 549-70

p. 568-70. Bibl.
32 selected references.

Iron, Acid-resisting cast iron

Rustless cast iron. *In* British Cast Iron Research Association Bull. 1924. Vol. 1, p. 275-8

p. 277-8. Bibl. on acid-resisting cast iron.
27 references.

Iron and steel. Foreign countries

Bibliography in Mineral Industry. 1924. Vol. 32, p. 379-80

About 30 references for 1923-24, mostly on the industry in foreign countries.

Iron and steel, 1923

E. H. McClelland. Review of iron and steel literature for 1923. *In* Blast Furnace and Steel Plant. 1924. Vol. 12, p. 13-17

About 130 references. "A classified list of the more important books, serials and trade publications."

Iron and steel. Pickling

V. S. Polansky. Pickling of iron and steel; a bibliography. *In* Blast Furnace and Steel Plant. 1924. Vol. 12, p. 326-8, 368-71, 431-4.

About 400 references classified, many with descriptive notes.

Joints, riveted

Bibliography on riveted joints. American Society of Mechanical Engineers. New York. 1924. 12p.

About 230 references arranged by author with subject and chronological indexes.

Kentucky. Bibliography

W. R. Jilison. Geological research in Kentucky. A summary account of the several geological surveys of Kentucky, including a complete list of their publications and a general bibliography of 806 titles pertaining to Kentucky geology. Geological Survey. [Series 6, Vol. 15.] Frankfort, Kentucky. 1923. 228p.

Lead

Lead. *In* Mineral Industry. 1924. Vol. 32, p. 386-425.

p. 412-13, 420-1. Bibl.
About 45 references for 1923-24.

Lead. Corrosion

H. F. Whittaker, comp. Corrosion of lead Research Information Surveys on the Corrosion of Metals No. 6. National Research Council. Washington. 1924. mimeo. various paging

213 references arranged chronologically from 1789 to 1924

Lead and zinc. Pennsylvania

B. L. Miller. Lead and zinc ores of Pennsylvania. Pennsylvania Topographic and Geologic Survey Bull. M5. 1924. 91p.

p. 4, 6. Bibl. of lead and zinc deposits of Chester and Montgomery counties.
34 references.

Luminescence

Maurice Curie. Photoluminescence des solutions solides. *In* Le Journal de Physique et le Radium. 1924. Vol. 5, p. 65-83

p. 83. Bibl.
About 40 references.

Magnesite refractories

Bibliography of magnesite refractories. American Ceramic Society. Columbus, Ohio. 1924. 41p.

Several hundred references arranged chronologically from 1873, with notes describing each item.

Magnesium—See Mercury

Magnetic analysis

R. L. Sanford. The present status of magnetic analysis. *In* American Society for Steel Treatment Transactions. 1924. Vol. 5, p. 577-89

p. 587-8. Bibl.
40 references for 1914-24.

Magnetism

L. L. Campbell. Galvanomagnetic and thermomagnetic effects. Longmans, Green & Co. New York. 1923. 311p.

p. 273-308. Bibl.
618 references arranged by author.

Marine borers

W. G. Atwood and A. A. Johnson. Marine structures, their deterioration and preservation. Report of the Committee on Marine Piling Investigations . . . of the National Research Council. National Research Council. Washington. 1924. 534p.

p. 462-74. Bibl. on marine borers.
Several hundred references arranged by author.

Measuring instruments

F. J. Schlink. Bibliography for measuring instruments with special reference to instruments and methods of metrology used in mechanical engineering. *In* Optical Society of America Journal. 1924. Vol. 9, p. 309-21.

Several hundred references classified.

Mercury

J. W. Mellor. A comprehensive treatise on inorganic and theoretical chemistry. 4 vol. Longmans, Green & Co. London. 1922-23

Vol. 4, Chap. 31. Mercury p. 695-1074.

Thousands of bibliographic footnotes at the end of the sections are supposed to cover most of the literature about mercury.

There are also in this volume very extensive bibliographic footnotes in the chapters on radium, on beryllium or glucinum, on magnesium, and on zinc and cadmium.

Mercury vapor rectifiers

M. Giroz. Les redresseurs à vapeur de mercure. *In* Société Française des Electriciens Bull. 1924. Vol. 4, p. 463-513

p. 510-13. Bibl.

About 80 references mostly in French and German.

Metallography

W. C. Roberts-Austen. An introduction to the study of metallurgy. 7th ed. by F. W. Harbord. C. Griffin & Co. London. 1923. 478p.

p. 240-4. Bibl. on metallography.

About 150 references for period before 1909.

Metal spraying

T. Henry Turner and W. E. Ballard. Metal spraying and sprayed metal Institute of Metals. Advance copy of paper at meeting, Sept., 1924. 17p.

p. 14-17. Bibl. on metal spraying (Schoop process) 80 references.

Metals, Electro-deposited

D. J. Macnaughtan. The hardness of electro-deposited iron, nickel, cobalt and copper. Iron and Steel Institute. Advance proof of paper at meeting, May, 1924. London. 16p.

p. 15-16. Bibl.

20 selected references.

Metals, Fatigue of

H. F. Moore and T. M. Jasper. An investigation of the fatigue of metals. Series of 1923. . . Univ. of Illinois, Engineering Experiment Station Bull. 142. Urbana. 1924. 86p.

p. 82-6. Bibl.

55 references covering 1921-23.

R. Maillander. Ermüdungserscheinungen und Dauerversuche. *In* Stahl und Eisen. 1924. Vol. 44, p. 585-9, 624-9, 657, 661, 684-91, 719-25

p. 721-5. Bibl.

225 references.

Metals, non-ferrous and other minerals of the British Empire

N. M. Penzer. Non-ferrous metals and other minerals. The resources of the Empire series. E. Benn, Ltd. London. 1924. 264p

p. 221-55. Bibl

33 different lists of references are given for as many metals and minerals. "Larger lists will be found in the different monographs issued by the Imperial Institute and the Imperial Mineral Resources Bureau."

Metals and wood. Strengths, etc.

Physical properties of materials. I. Strengths and related properties of metals and wood. United States Bureau of

Standards, Circular No 101. 1924. 20 pp

p. 194-8. Bibl.

212 references

Nevada. Geology

H. G. Ferguson. Geology and ore deposits of the Manhattan District, Nevada United States Geological Survey Bull. No. 723 1924. 163p.

p. 10-14. Bibl. on geology and mining in Nevada 46 references with descriptive notes.

Nevada. Minerals

F. C. Lincoln. Mining districts and mineral resources of Nevada. Newsletters Publishing Co. Reno, Nevada. 1923. 295p.

Bibliographies: Yellow-Pine District p. 31-3, about 70 references; Goldfield District p. 70-3, about 150 references; Eureka District p. 92-3, about 100 references; Yerington District p. 135-7, about 60 references; Tonopah District p. 190-3, about 140 references; Comstock District p. 229-33, about 160 references; Ely District p. 248-51, about 100 references. Also many shorter lists.

Nickel. Corrosion

H. F. Whittaker, comp. Corrosion of nickel. Research Information Surveys on Corrosion of Metals No. 1. National Research Council. Washington. 1923. mimeo various paging

49 references.

North America. Geology

J. M. Nickles. Geologic literature on North America 1785-1918. Pt. I Bibliography. United States Geological Survey Bull. No. 746. 1923. 1167p. Pt. II Index, Bull. 747

This is an accumulation of the series of bibliographies of North American geology issued by the United States Geological Survey as bulletins from time to time since 1886. The arrangement is by author.

Office buildings

A list of publications or articles . . . which deal with different phases of office building design, construction and maintenance. *In* Architectural Forum 1924. Vol. 41, p. 159-60

About 60 references.

Oil shale

Victor C. Alderson. Oil Shale bibliography, 1923. *In* Colorado School of Mines Quarterly. 1924. Vol. 19, p. 20-9

About 180 references.

Ore dressing

Progress in ore dressing and coal washing in 1923. *In* Mineral Industry. 1924. Vol. 32, p. 735-90

p. 784-90. Bibl.

About 200 classified references for 1923-24.

Paints

J. Gauld Bearn. The chemistry of paints, pigments and varnishes. E Benn London. 1923. 277p.

p. 255-6. Bibl.

About 60 references, mostly books.

Paper making

C. J. West. Rubber latex in paper making. *In* Paper Trade Journal. Aug. 14, 1924. Vol. 79, p. 41-2

About 35 references.

C. J. West and A. Papineau-Couture. Bibliography of papermaking for 1923. *In* Paper Trade Journal. April 24, 1924. p. 52-4 and continued in each number to June 19

Hundreds of references classified by subject.

E. C. Tucker and others. The manufacture of pulp and paper. . . . McGraw-Hill. New York. 19-. 5vol.

Vol. 4, Sect. 3, p. 71-7. Bibl. on heating and refining.

About 100 references.

Paper pulp

C. J. West. Chlorine in the manufacture of paper pulp. A reading list. *In* Paper Trade Journal. 1924. Vol. 79, p. 43-4
33 references.

Patent reference sources

J. F. Smith *In* Industrial and Engineering Chemistry. 1924. Vol. 16, p. 527-8

Lists (a) countries which give patent protection, (b) official publications of patent offices, (c) other patent publications, (d) periodicals abstracting chemical patents, (e) libraries having patent publications, and others.

Petroleum

Great Britain. Imperial Mineral Resources Bureau. The mineral industry of the British Empire and foreign countries. Petroleum and allied products. H.M. Stationery Office. London. 1924. 296p.
p. 271-96. Bibl.

About 600 references arranged by country.

L. C. Uren. A Textbook of petroleum production engineering. McGraw-Hill Book Co. New York. 1924. 657p.

About 200 references arranged chronologically with Each chapter has a selected bibliography on the subject which it covers.

W. W. Cutler, Jr. Estimation of underground oil reserves by oil-well production curves. United States Bureau of Mines Bull. No. 228. 1924. 114p.

p. 110-11. Selected bibliography on estimation of reserves and valuation of oil properties
15 references.

Petroleum. Foreign countries

Current bibliography of foreign petroleum resources. *In* American Association of Petroleum Geologists. 1924. Bull. Vol. 8, p. 352-61, 678-82, 834-7

About 160, 46, and 80 references

Petroleum. Origin

L. D. Burling. The origin of petroleum. *In* Mining and Geological Institute of India Transactions. 1924. Vol. 18, p. 119-67

p. 160-7. Bibl.

About 200 references in many languages arranged by author.

Photography, Color

W. B. Gamble. Color photography: a list of references in the New York Public Library. *In* New York Public Library Bull. 1924. Vol. 28, p. 475-98, 557-77, 611-56, 688-719

2355 references arranged chronologically with separate author and subject indexes

Physics. Bibliographies

K. K. Darrow. Classified list of published bibliographies in physics 1910-22. National Research Council Bull. No. 47 1924. 102p.

A subject index is provided.

Platinum

Great Britain. Imperial Mineral Resources Bureau. The mineral industry of the British Empire and foreign countries. (War period). Platinum and allied metals. H.M. Stationery Office. London. 1922. 84p.

p. 78-84. Bibl.

About 160 classified references

Potentials, Critical

K. T. Compton, and F. L. Mohler. Critical potentials. National Research Council Bull. No. 48. 1924. 135p

p. 128-35. Bibl.

180 references.

Pumps, Air lift

C. N. Ward. Experimental study of air lift pumps and application of results to design. Univ. of Wisconsin Bull. Engineering Series. Vol. 9, No. 4. Madison. 1924. 165p.

p. 96-9. Bibl.

About 50 references.

Quicksilver

United States Geological Survey. Quicksilver in 1923. Mineral Resources of the United States Pt. I. 1923. p. 35-46

p. 42-6. Bibl.

About 60 references of recent date with descriptive notes.

Radio fog signals

G. R. Putnam. Radio fog signals and their use in navigation in connection with the radio compass. (United States Department of Commerce, Lighthouse Series.) Gov. Printing Office. Washington. 1924. 28p.

p. 27-8. Bibl.

27 selected references.

Radium

H. H. Barker. Experiments on the extraction and recovery of radium from typical American carnotite ores. . . .

[Univ. of Missouri Bull. Vol. 24, No 26] Columbia, Missouri. 1923. 87p.

p. 75-7. Bibl.

62 references.

Radium—See Mercury

Railroads. Electrification

List of selected references to material emphasizing the economic aspects of electrification of railroads in the United States. Bureau of Railway Economics Library. Washington 1924. mimeo. 19p.

About 200 references arranged chronologically with an index of names and an index of railroads.

Railway accounting

A list of references on American railway accounting. Bureau of Railway Economics Library. [Washington. 1924] mimeo. 159p.

Classified and arranged chronologically in each class with table of contents and name index. Covers 1836 to 1924.

Relativity

G. Temple. A generalisation of Prof. Whitehead's theory of relativity. *In* Physical Society of London Proceedings. 1924. Vol. 36, p. 176-93

p. 191-2. Bibl.

28 selected references.

Safety lamps

J. W. Paul and others. Flame safety lamps. United States Bureau of Mines Bull. 227. 1924. 212p.

p. 198-201. Bibl.

About 80 references.

Scales and weighing

Herbert T. Wade. Scales and weighing; their industrial applications. Ronald Press. New York. 1924. 473p.

p. 459-63. Bibl.

About 50 references.

Selenium and tellurium

Selenium and tellurium. *In* Mineral Industry. 1924. Vol. 32, p. 610-12

p. 611-12. Bibl.

About 25 references for 1923

Septic tank

W. A. Hardenbergh. Home sewage disposal. J. B. Lippincott Co Philadelphia. 1924. 274p.

p. 169. 18 selected references on the small septic tank.

Silica refractories

Bibliography of silica refractories. American Ceramic Society, Columbus, Ohio, 1924. 125p.

Several hundred references arranged chronologically from 1837 but mostly of recent date. Copious notes describe each item.

Silk. Artificial

E. Wheeler. The manufacture of artificial silk in relation to colloid chemistry. In British Association for the Advancement of Science. Fifth Report on Colloid Chemistry. London, 1923. 130p.

p. 70-1. Bibl.
53 references.

Simplification in industry

A new movement takes hold. A bibliography of articles on simplification. In Factory. 1924. Vol. 32, p. 318-20

About 140 references.

Smoke abatement

L. H. Cannon. Smoke and smoke abatement. Effects, economics, remedies. A selected list of books and articles, chiefly those printed since 1913. In St. Louis Public Library Bull. Aug.-Sept. 1924. p. 305-12

About 325 references arranged by author.

Smokes, clouds, etc.

W. E. Gibbs. Clouds and smokes. The properties of disperse systems in gases and their practical applications. J. & A. Churchill. London, 1924. 240p.

p. 55-6. 30 references on movements of particles
p. 84-6, 127-8. About 100 references on aerosols.
p. 157-61. About 100 references on industrial treatment of fumes.

Also other shorter lists.

Steel, manganese

E. H. McClelland. Bibliography of manganese steel. In Blast Furnace and Steel Plant. 1924. Vol. 12, p. 548-52

About 160 references with descriptive notes.

Steel. Open hearth works

Hubert Hermanns. The planning, erection and operation of modern open hearth steel works. E. Benn. London, 1924. 307p.

p. 289-301. Bibl.
About 450 classified references.

Sucrose

A. J. Wallis-Taylor. Sugar machinery. W. Rider & Son. London, 1924. 410p.

p. 398-9. Bibl. of sucrose
About 60 references.

Surface tension

A. Ferguson. The measurement of surface tension. In British Association for the Advancement of Science. Fifth Report on Colloid Chemistry. London, 1923. 130p.

p. 12-13. Bibl.
53 references.

Surveying instruments

K. Lüdemann. Einige Mitteilungen über die Entwicklung der Beleuchtung für Meszstellen an geodätischen Vermessungs-Instrumenten. In Zeit. für Instrumentenkunde. 1924. Vol. 44, p. 33-43

p. 42-3. Bibl.
57 references.

Telephones, automatic

F. A. Ellson. The automatic telephone. I. Pitman & Sons. London, 1924. 215p.

p. 211-13. Bibl.
About 35 selected references.

Textile fabrics, Waterproofing

H. P. Pearson. Waterproofing textile fabrics. Chemical Catalog Co. New York, 1924. 112p.

p. 65-97. Bibl. of processes and formulae for waterproofing textiles patented in United States, Germany, Great Britain, and France since 1900.

Textile fibers

J. M. Matthews. The textile fibers, their physical, microscopical and chemical properties. 4th ed. J. Wiley & Sons. New York, 1924. 1053p.

p. 1021-34. Bibl.
About 600 references, largely in French and German, arranged by author.

Tin. Corrosion

H. F. Whittaker, comp. Corrosion of tin. Research Information Surveys on the Corrosion of Metals, No. 5 National Research Council. Washington, 1924. Various paging

130 references arranged chronologically from 1850 to 1924.

Titration, Electrometric

G. A. Shires. Electrometric titration. An investigation of its methods and application to certain metallurgical analyses. In Chemical, Metallurgical and Mining Society of South Africa Journal, 1923. Vol. 24, p. 129-45

p. 144-5. Bibl.
33 selected references.

Tungsten

Tungsten. In Mineral Industry. 1924. Vol. 32, p. 682-96

p. 695-6. Bibl.
About 25 references for 1923-24.

Turbines. Draft tubes

J. M. Dymond. Draft tubes for hydraulic turbines. In University of Toronto Engineering Society Transactions. No. 37. 1924. p. 63-81

p. 80-1. Bibl.
25 references.

United States Patent Office

G. A. Weber. The Patent Office; its history; activities and organization. Johns Hopkins Press. [Institute for Government Research Service Monographs No. 31] Baltimore, 1924. 121p.

p. 113-21. Bibl.
About 130 references

Vacuum and vacuum pumps

L. Dunoyer. La technique du vide. A Blanchard. Paris. 1924. 225p.

p. 217-21. Bibl.
About 175 references classified.

Valence

G. N. Lewis. Valence and the structure of atoms and molecules. Chemical Catalog Co. New York, 1923. 172p.

p. 166-7. Bibl.
About 115 references.

Varnishes

R. S. Morrell. Varnishes and their components. Henry Frowde. London, 1923. 361p.

p. 349-50. Bibl.
49 books are listed. Also each chapter has a bibliography of 17 to 55 references to journals.

Ventilation. Ozone

Ozone in ventilation. Bibl. In American Institute of Architects Journal, 1924. Vol. 12, p. 45-6. Taken from Reprint No. 591 from the Public Health Reports of the United States Health Service

25 references.

Vibration

J. Frith and F. Buckingham. *Vibration in engineering*. Macdonald & Evans. London. 1924. 123p.

p. 117-18. Bibl.
11 references.

Vocational education

A. F. Payne. *Administration of vocational education*. McGraw-Hill Book Co. New York. 1924. 354p.

p. 333-43. Bibl.
About 200 references arranged as supplements to the various chapters.
p. 315-7. A list of bibliographies on industrial education.

Water bacteriology

S. C. Prescott and C. A. Winslow. *Elements of water bacteriology with special reference to sanitary water analysis*. 4th ed. J. Wiley & Sons New York. 1924. 211p.

p. 171-99. Bibl.
About 500 references arranged by author.

Water. Purification

G. D. Norcom. *The purification of colored water at Wilmington, N.C.* In *American Water Works Association Journal*. 1924. Vol. II, p. 96-117

p. 116-17. Bibl.
17 selected references.

Water supply

W. Donaldson. *The action of water on service pipes*. In *American Water Works Association Journal*. Vol. II, p. 649-62

p. 661-2. Bibl.
30 selected references.

F. E. Turneaute and others. *Public water supplies*. 3rd ed. J. Wiley & Sons. New York 1924. 766p

Each chapter has a select list of references. Some of the more important are p. 297-9, 63 references on works for the collection of ground water; p. 314-6, 14 references on earthen dams; p. 544-6, 53 references on water pipes.

Water supply, Manganese in

J. R. Baylis. *Manganese in Baltimore water supply*. In *American Water Works Association Journal*. 1924. Vol. 12, p. 211-33

p. 232-3. Bibl.
22 references.

Welding—electric

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