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PROCEEDINGS

YORKSHIRE SECTION

Meeting at Bradford, 1st December, 1921, Mr. John F. White in the Chair.

TELEPHONE SERVICE EFFICIENCY

By Brevet Lieut.-Colonel W. A. J. O'MEARA, C.M.G.

In this paper, the author, who gave evidence before the Select Committee of the House of Commons to inquire into the telephone service of the country, reviewed the evidence given before that Committee, and traversed the evidence contained in the "Report from the Select Committee on the Telephone Service" (H.C.191 of Session 1921) with a view to securing information as to the standard of reference by which telephone service efficiency might be measured. The evidence, the lecturer stated, did bring out, to some extent, the conclusion that the first requirement for the promotion of efficiency in the telephone service relates to matters which lie wholly in the domain of the engineer. Neither skilful operating nor clever management can ever overcome shortcomings on the engineering side. Moreover, the records of investment and earnings per telephone are not *per se* either adequate or suitable standards by which to compare telephone service efficiencies in the different quarters of the globe. A clear understanding of the meaning to be attached to the term "telephone service efficiency" is desirable. Briefly, then: A telephone service must completely meet the needs of the whole community without showing favour to any section thereof; it must be the most perfect of its kind, furnished at rates which are reasonable when judged by the particular conditions to be met, and framed upon a tariff scheme which is equitable by reason of its being suited to meet the legitimate requirements of the would-be users of every class in the community; it must be economically conducted and skilfully managed.

Having submitted the foregoing definition, the author proceeded to deal with cost of providing telephone services under the three main heads of engineering expenditure, operating costs, and administration costs. As regards the effect of development on costs, the Departmental Committee in this country takes up an attitude which amounts practically to this: it admits that with development economies in plant construction follow, but says whatever savings there may be on the engineering costs they are all neutralised by the extra cost entailed in operating a system as the density of the telephone users in a locality increases. It argues, therefore, that there is no net reduction in costs as development proceeds. Inquiry, however, does not confirm these views of the Departmental Committee. The Swedish Telegraph Administration has for years published a most valuable annual report containing highly important statistical data in relation to the telephone services under its care. The figures therein presented show clearly and definitely that traffic costs per subscriber's line are in no way connected by a law with the number and density of telephone users in the exchange area. The figures prove that factors other than the number of lines terminated in an exchange often tend to increase operating costs, and, consequently, the very small exchanges are as a rule as costly to operate per line as the largest exchanges; and, further, that as telephonists' wage rates rise the

cost of operating the larger exchanges increases in a higher ratio than is the case in the small exchanges. It is thought that an examination of operating costs, in detail, of the 2,909 P.O. exchanges under postmasters, as is done in the case of the small exchanges in Sweden, would disclose the fact that in this country also many of the very small exchanges are quite as costly to operate per line as the large exchanges in London, and that the larger exchanges in the provinces are less costly to operate than those in the Metropolis—not because fewer operators are required, but because the wage rate for telephonists is lower in the provinces. Nevertheless, the tendency of late has been for operating costs to rise, owing to the higher payment to the woman worker. Development, in the sense of technical progress, has pointed to the remedy, however, and it lies in a more extended use of machine switching equipments, either in the form of semi-automatic or full-automatic installations. Automatic types of equipment represent no new invention, for this type of equipment was first brought into use in the U.S.A. more than 20 years ago. Considerable progress in the use of this type has been made on the continent of Europe, particularly in Holland and Bavaria, and many important cities and towns were provided with this type in pre-war days—Munich, Dresden, Posen, Amsterdam, etc. Development in the case of a telephone undertaking should affect administration costs in a way similar to that produced by expansion of an industrial business. The ratio of administration costs to total costs should be a decreasing figure, the extent of the decrease depending upon the organisation and methods of administration pursued.

Being an engineering enterprise, the telephone undertaking should be endowed with an engineering organisation. In the days of the National Telephone Company an engineering organisation existed, but with the transfer to the State the old organisation was scrapped and the telephone service was somehow squeezed into the hybrid organisation of the G.P.O. That things have not worked out well is not to be wondered at. How anybody can expect to get efficient management where an organisation is provided to run three enterprises with such diverse characteristics as the P.O. Savings Bank, Posts and Telegraphs, and Telephone under the directive control of a single permanent head passes comprehension—an organisation, too, which requires a Secretary's Department with an establishment of 940 officials of all ranks, an Accountant General Department with a headquarters establishment alone of 2,585 individuals, and in which the Chief Technical Officer is outside the central organisation and has a status of the fourth or fifth grade instead of being one of the principal and most important officers in the organisation.

After dealing with the matter of standards of efficiency, the lecturer discussed the question of tariffs, and said that the fact which stands out clearly is that, generally, in foreign countries, the rates have been framed on the principle of the value of the service to the subscriber and not on the actual cost basis which so much took the fancy of the Departmental Committee on Telephone Rates; further, that the measured rate system (the "message rate" in America) is the basis upon which subscribers pay.

In a lengthy conclusion, the lecturer said:—It is quite possible to establish a certain number of standards of reference for the comparison of telephone service efficiency. The question arises—Are there just grounds for the complaints that are rife in regard to our telephone service? Now, the extent to which a service is used by the public is often the most reliable test as to whether the service is provided on lines to meet public needs or not, and it is a test which has been held to be peculiarly appropriate in the case of a telephone service. The following figures, taken from Mr. Kingsbury's book on the Telephone, indicate the position at the time of the outbreak of the Great War:—

Telephone stations per 1,000 of population.					
U.S.A.	97	Sweden	41	German Empire	21
Canada	65	Norway	34	Great Britain	17
New Zealand	46	Australia	28	Netherlands	14
Denmark	45	Switzerland	25		

According to the above figures, the user of the telephones in the U.S.A. before the war was five times as great as in Great Britain, and in Norway twice as great. Since the war there has been an increase in the number of telephones per 1,000 of popula-

tion, and in England the figure is now 22, *i.e.*, there are now $5\frac{1}{2}$ times as many telephone users per 1,000 of population in the U.S.A.

The foregoing figures clearly indicate that there are causes militating against an extensive use of telephones in this country. What are they? The evidence given before the Select Committee on the Telephone Service shows that important sections of the community have not been able to avail themselves of the service, not because any favours have been, or are being, conferred upon a particular class, but because of the costliness of the service and of the narrow lines upon which the general policy of the General Post Office is framed and run.

One of the official witnesses informed the Select Committee that the automatic equipment had "proved in," as the Americans say, and, in consequence, the introduction of this type of equipment would tend not only to bring about improvement of service from the technical standpoint but would also reduce costs. But, in view of the knowledge it possesses, how is our telephone administration shaping its policy? When the Leeds Automatic Exchange was opened some time ago by the Postmaster-General, it was reported in the newspapers that the Chief Technical Officer of the Post Office, in the course of a speech extolling the system, added: "But if you want it you must agitate for it"! What would be thought of such a statement from the management of a private undertaking owning a monopolistic business?

What are the remedies to correct the various matters which have come under criticism so far as our telephone service is concerned? President Taft, 17th January, 1912, submitting to Congress the report of his Commission on Economy and Efficiency in the Government Service, stated: "Only by grouping services according to their character can substantial progress be made in eliminating duplication of work and plant and proper working relation be established between services engaged in similar activities. Until the head of a department is called upon to deal exclusively with matters falling in but one or very few distinctive fields, effective supervision and control is impossible."

Here we have the key to the initial reforms required in the organisation of the G.P.O. A complete separation should be made of the services which are largely administrative in character from those that are largely technical, and each should be endowed with an organisation, a system of administration, and a staff suited to its own individual needs. The Telegraphs and Telephones should be run in combination. It is imperative that a higher standard of qualifications should be exacted in the technical staff, and this must necessarily be accompanied by a very considerable improvement in the status of the officers employed in the technical branch of the service in order that suitably qualified men of a professional stamp may be attracted into the public service. It is by reforms of a very drastic order alone that it will be possible to provide telephone services in this country of the quality that telephone users have a right to expect, and that the needs of every section of the community will receive proper consideration and be adequately met. The Minister who has the courage to re-model the organisation of the General Post Office in order to enable it efficiently to meet its present-day obligations would be taking the most essential step requisite to promote telephone service efficiency in this country, and by achieving his purpose he would earn the sincere gratitude of the business community of these islands.

SOUTH OF SCOTLAND SECTION

Meeting at Galashiels, 16th December, 1921, Mr. John Hutcheson in the Chair.

SCOURING AND MILLING

By J. SCHOFIELD, B.Sc., A.R.C.Sc.

It is possible to classify the various methods of textile scouring in more than one way. On the wool side of the textile industry, piece scouring might be divided, according to the materials worked on, as:—(1) Scouring of high-grade woollens; (2) scouring of worsteds; (3) scouring of low-grade goods. These differ primarily in respect of the kind and quantity of oiling applied to the fabrics. Thus on the better class woollens there would be heavy oiling of, say 10% on the weight of the wool, and consisting of good quality wool lubricant containing in general much

free fatty acid. Contrasted with these are the good quality worsted cloths carrying light oiling of 2–3%, and of a neutral or nearly neutral type. In the low-grade goods, the oilings are again heavy and of a worse type, often with large percentages of mineral oil; here, also, there are the special difficulties of these fabrics to be detailed later.

SCOURING METHODS.

- (1) Solvent scouring, in which oily and fatty matters are extracted from the fibre by the direct solvent action of benzene, petrol, &c.
- (2) Saponification scouring, in which the free fatty acids of the oils are converted into soaps in the scouring machine by the action of the alkali.
- (3) Emulsification scouring, in which the greasy dirt is removed mechanically by the formation of a frothy lather or emulsion; the wetting-out power of this lather causes the breaking up and detachment of the oil, &c., from the surface of the wool fibre. This is obviously a physical process as contrasted with the chemical process of scouring by saponification.

These methods are ideal statements of types of scouring to which practical methods conform more or less. Thus, most scouring of raw wool in the usual bowls is of the emulsification type. The scouring of fancy worsteds by weak alkali and some soap is a further example of emulsification working.

On the other hand, good woollens carrying oil with large percentages of free fatty acids may be scoured throughout—and well scoured—by alkali alone; sufficient soap is formed in the machine to use up the oiling both directly as soap and indirectly as emulsion. This is a typical saponification scour. The scouring of low-grade goods has usually to be of a composite kind which we shall consider later.

It is most useful to discuss first the saponification scour, as it well illustrates the principles concerned, is scientifically justifiable at all stages, is easy to carry out in practice, and, finally, is thoroughly efficient in its results. It is completely described on p.120 *et seq.* of my book on "Scouring and Milling" as a standard scour on heavily oiled woollens. It is an obvious truism that the oiling for wool lubrication at the spinning end and the subsequent scouring operations must be intimately connected. In the present case of good woollens it is assumed that the spinning oils are the usual "Oleins"—*i.e.*, crude oleic acid of high saponifiable quality with some mineral oil, say, 20%—commonly employed in the trade. In this case, the wool oils will have large amounts—possibly 40 to 60% or even more—of free fatty acids; that is, these fatty acids will not be combined, as in the neutral animal and vegetable oils, with glycerine, but are free to enter into chemical union with the soda carbonate to form soap. This is a reaction which is possible at moderate temperatures and hence the scouring of such goods is quite practical by alkali alone as follows:—

Stage 1.—Run in soda ash solution of 5–6 Tw. at about 90° Fah., using, say, 20 gallons per 100 lbs. of wool. Let this saponify, running for ten minutes or so, and then without addition of water open the sud box and let the dirty emulsion away to the drain. When the machine is thus emptied:—

Stage 2.—Add alkali as before, about five gallons per 100 lbs. of wool, scour for twenty minutes or so, and:—

Stage 3.—Wash down; warm water at first, and slowly, then stronger and colder.

The principles of this saponification two-stage scour are:—

- (1) Attack by alkali on the free fatty acids of the spinning lubricants with formation of soap.
- (2) The resulting emulsification detaches the superficial dirt of the fibre, and this is removed at an early stage from the machine.
- (3) This stripping action is intensely assisted by the generation *in situ* of carbonic acid gas by the action of the fatty acids on the alkali in forming soap—an extremely powerful detergent factor peculiar to saponification as contrasted with purely emulsification scouring.
- (4) The use of a clean and unexhausted scour, of good diffusibility, for the deeper penetrated dirt of the fibre, which requires longer continued action for its

saponification and emulsification. It must be remembered that colloids do not diffuse through colloids; soap as soap is not a penetrant of the wool fibre. But a crystalloid substance like soda carbonate possesses high diffusibility and can pass into the actual tissue. The method here described is probably the most efficient of all scours on wool goods in point of cleanliness in the resulting fabric. Seeing that much of the free fatty acid of the wool oil is oleic acid, the resulting soap formed in the machine is a Sodium Oleate. Such soaps are known to be particularly soluble at comparatively low temperatures, hence their scouring properties are enhanced, and, further, their easy removal from the fabric is assured. It is instructive to consider this scour as an ideal to be followed as far as practicable in other cases.

Consider now the scouring of high class worsteds. Here, the oiling is not only much lessened in quantity but is usually of a more neutral character. Now the saponification of a neutral oil, even when of animal or vegetable origin, cannot be effected by carbonated alkalis at ordinary scouring temperatures. Hence, a straightforward saponification scour is not feasible on these goods, and the usual process is as follows:—

Fancy Worsteds Scour.—Alkali of 2—4 Tw., in accordance with the reduced oiling, together with some soap from the outset, the idea being to work up an emulsion which, by diminished surface tension or increased wetting-out capacity, will detach the oil and dirt and float them away from the fabric.

It would be interesting to know the practical reasons, if any exist, why worsted spinners do not use oils with large fatty acid content as do their brethren on the woollen side. The addition of small amounts of free fatty acid to mineral oil for machine lubricants has been found to increase their efficiency, diminishing the friction in some cases to one-half that of mineral oil alone. In the textile case, the presence of free fatty acids enormously facilitates the work of the scourer, and it is therefore important to know what are the objections on the worsted side. It is, however, an actual fact that many worsted "oleines" contain moderate percentages of such acids. In these cases, it is possible, and often superior in practice, to conduct a worsted scour thus:—

- (1) Run on alkali 2—4 Tw., warm, for ten minutes, and then, without any addition of water, lead this off to the drain.
- (2) Add more alkali—preferably weaker—and some soap, and complete the scour.
- (3) Wash off, warm and gently at first, colder later.

It must be noted that over-strong alkali solutions prevent the proper solution of the soap; it is far preferable to work with weaker solutions and in more than one stage.

The "Low-goods" Scour.—In this class of trade, the unfortunate scourer meets with all his difficulties in their worst forms. There may be excessive bleeding of colour due to lose dyeings, poor dyestuffs, dyeing in the grease, &c., low-grade oilings often with much mineral oil, sizings, recovered wools, flock wastage, and the rest. In many cases, the conditions to be met are incompatible, e.g., the necessity of scouring at low temperatures to prevent bleeding, thus losing the advantage of the decreased surface tension (i.e., enhanced wetting-out power) of a warm scour.

The surface tensions of water at various temperatures are given in a paper in Science Abstracts, Oct., 1921:—

Temperature, °C.....	0	...	18	...	36	...	69	...	89
Surface Tension	76.7	...	75.6	...	70	...	64.8	...	60.9

Thus, taking 36°C. or 97°F. as a scouring temperature, there would be a gain of nearly 10% in lowered surface tension as compared with ice-cold water. Perhaps, however, the bleeding of colour must be prevented even at the expense of some perfection in the scour.

The low grade oilings offer in these goods the maximum of difficulty. There is often much mineral oil which tends to prevent the formation of proper emulsions, and, being itself unsaponifiable, is removable only by a process of emulsification. There is usually an undue proportion of other unsaponifiable matter and a correspond

ing lack of free fatty acids; a sufficiency of these would in many cases simplify the scouring of the goods, enabling at any rate the first stage of a saponification scour to be effected. Many so-called "black oils" are excellent from the scourer's point of view owing to their high content of free fatty acids; much of the scouring of low-grade goods would be vastly improved by a judicious addition of suitable black oil to the spinning lubricant. It is undoubtedly desirable that wool oils should be specified in terms of free fatty acid, in addition to—or in place of—total saponifiable matter. It is free fatty acid and not merely neutral saponifiable oil which is of primary importance at the scouring end.

It is, therefore, not possible at present to lay down the exact lines of a low-goods scouring operation. If the oiling can be modified in the direction of securing a proper quantum of free fatty acids, then a two-stage scour of the following type may be practised:—

- (1) Run in warm alkali 5–6 Tw. if the colours do not bleed; otherwise, cold. Scour for 10–15 minutes, and, without added water, open the sud box and pass this away to the drain.
- (2) Add further alkali, weakened, together with some soap, to build up an emulsion; scour out.
- (3) Wash down, preferably with warm water at first, if the dyeings will permit.

There are some special points in the practice of low-goods scouring which merit further discussion.

It is possible that slight additions of caustic soda to the first stage of the scour may be found useful. Caustic as against carbonated alkali will saponify free fatty acid in the cold; it is, further, more active in the softening of possible hardness in the water. But the concentration of such caustic alkali must be small in view of its strong tendering action on the wool fibre; a strength of perhaps not more than two ounces in ten gallons of the scour may be tried. Further experiments are necessary. Ammonia in scouring is invariably used in the form of hydrate and never as carbonated alkali.

Another question bearing on the low-grade scour more particularly is the use of the so-called "Solvents." There are a number of substances capable of dissolving oil or grease quite freely, *e.g.*, Ether, Chloroform, Carbon Bisulphide and Tetrachloride, Alcohol, Benzine, Petrol, Turpentine, and certain chlorinated hydrocarbons such as Trichlorethylene and Tetrachlorethane. When the various physical and chemical properties of these bodies are compared, it is seen that only a few, *viz.*, Alcohol, Carbon, Tetrachloride, Tetrachlorethane, &c., are adapted for employment as adjuncts to a textile scour. And it further appears that their true utility is not the dissolving of oil or grease but their property of lowering the surface tension of the scour. If experiments by the drop pipette or by soap bubbles are conducted with solutions containing these bodies, it will be found that there is a reduction of the surface tension of the scouring liquor beyond that attained by the use of soap. Hence, there is scientific justification for their use under proper conditions, and further experience is necessary to determine which substance, and under what conditions, the highest efficiency is obtained. Other things being equal, the property of perfect miscibility with water possessed by a substance like alcohol is to be desired as against bodies like tetrachlorethane which require emulsifying agents such as sulphonated oils to assist their dissemination throughout the scouring liquor. The whole question is one requiring further investigation.

Some useful notions respecting the principles of scouring and the proper modes of procedure may be gained by considering certain extreme cases not necessarily met with in practice. Suppose fabrics lubricated as follows:—

- (1) Oiled with pure mineral only.
- (2) Oiled with pure neutral animal or vegetable oil only.
- (3) Oiled with pure free fatty acids only.
- (4) Lubricated with dilute glycerine.

Taking the last case first, a simple steeping and working in warm water would cleanse the fabric. The cloth oiled by free fatty acid could be completely scoured by the use of alkali alone. The fabrics having either mineral oil or neutral

glycerides would require soapy emulsions, perhaps repeated several times; or, alternatively, extraction by solvents.

There are many other points in scouring theory worthy of close attention. The subject of detergent materials is in itself a wide one, embracing such questions as :—

- (1) The proper strength of alkali solutions; and of soap solutions.
- (2) The temperature of scouring.
- (3) The best kinds of soaps for textile work.
- (4) The function of ammonia in the scour, and its utility.
- (5) The limits of mineral oil in wool lubrication; the penetration of such oils as compared with oleins, &c., into the fibre tissue.
- (6) The use of Resin, Silicate of Soda, &c., in soaps.
- (7) The limits of hardness of water for textile purposes.
- (8) The consistency of the scour : should a scouring liquor be thick and creamy, or thin and sloppy ?

DISCUSSION.

The CHAIRMAN, who had undertaken the reading of the paper in the unavoidable absence of the author, introduced a discussion in a most effective manner, calling upon Mr. D. K. Colledge to offer replies to questions submitted.

Messrs. GIBSON, GRIERSON, HAYWARD, Dr. OLIVER, and the CHAIRMAN raised questions and contributed to the discussion which turned mainly on the eight questions presented at the end of the paper.

The first point raised was as to the temperature of the scour. It was stated that when using oil such as Price's it could be scoured cold at a strength of 6 deg. Tw. This seemed to be the general opinion of the meeting, although Mr. Colledge pointed out that this was only possible when using an oil containing a large percentage of free fatty acid. He pointed out that, as the lecturer had already stated in his paper, the value of alkali as a scouring agent depended upon its ability to form a soap with free fatty acid, and obviously if the oil contained little or no fatty acid, as was commonly the case, then there was no value in using alkali.

The effect of scour on colours was also touched upon by one speaker who stated that the bleeding of colours noticed by him invariably took place in the milling and not in scouring.

After some discussion on this point, Mr. Colledge pointed out that anyone with an elementary knowledge of the properties of acid dyes would know that this was bound to take place because the effect of the scouring liquor would be to neutralise the acid in the fibre and would thus bring about the conditions under which the acid dyes would bleed.

The CHAIRMAN at this point very ably summed up the matter by stating that from the discussion it was evident that although bleeding did take place in the milling yet the cause of bleeding may be found in the scouring.

A question was then put to Mr. Colledge as follows :—" If two pieces received the same treatment in scouring and one was afterward milled in the stocks and the second in the milling machine did he think on theoretical grounds the results should be the same? "

Mr. COLLEDGE replied that if the processes differed at all in any way 'e would never under any conditions imagine the results to be the same.

The relative advantages and disadvantages of Fuller's earth was then dealt with, two opposite views being held by different members about the effect of Fuller's earth in milling. The one view was that Fuller's earth gave a loftier handle to the goods than soap when used in milling and the other view was the direct opposite of this.

NOTES AND NOTICES

EXHIBITION OF YARNS AND FABRICS

As previously announced, this Institute is organising an exhibition of Yarns and Fabrics—to be opened at the Institute premises on the day of the Annual General Meeting, which has been fixed to take place on Tuesday, the 25th April. It has

been decided to promote the exhibition for the reason that a similar event, held at the time of the World Cotton Congress at Manchester in June of last year, proved of quite exceptional interest. On that occasion the aim was to secure a collection of latest productions in yarns and fabrics, with particular reference to the cotton industry in which so many of the American visitors were specially interested. This year, it is hoped to cover an altogether wider field, and invitations have been issued to possible exhibitors in various branches of the textile industry. It is felt that it would be an enormous advantage if opportunity can be provided for representatives of the various branches of the industry to witness examples of most recent tendencies and developments in the respective branches. Members of the Institute are invited to offer suggestions as to possible exhibits, and, in this connection, it is important to note that available space is now being rapidly taken up. In the case of last year's exhibition, particular interest attached to new finishes, special designs, and developments in yarn production for particular requirements. In the matter of finishing, the announcement may now be made that a special exhibit this year will be presented in the form of a collection of grey cloths exhibiting faults from the point of view of the finisher. The examples will also show defects thereby created in the finished fabric. The whole problem of these faults will be discussed and further announcement will be made in this connection. At the moment, there is every prospect that the exhibition in April will prove of substantial interest and service to the industry generally. The exhibition will remain open from the 25th to the 29th April inclusive.

BRITISH COTTON INDUSTRY RESEARCH ASSOCIATION

The new research laboratories of this Association, at the Shirley Institute, Didsbury, near Manchester, are to be formally opened on the 28th of the present month by H.R.H. The Duke of York, K.G. The Shirley Institute is the name which has been given to the mansion formerly known as The Towers, and which was acquired by the Research Association. The residential premises have been converted into offices, library and other apartments, whilst the new laboratories have been erected in the grounds. The institution is being most thoroughly equipped, and the investigatory work of the staff is in the charge of the Director, Dr. A. W. Crossley. It is expected that the opening ceremony will be largely attended, as the membership of the Association embraces the bulk of the firms in the cotton industry. Mr. Kenneth Lee is Chairman of the Association, and, in view of the large number of invitations which have necessarily been issued, the wish will be general that fine weather may prevail for the ceremonial proceedings.

INDUSTRIAL CONCERNS AND "HOUSE" MAGAZINES

From time to time we have received copies of publications—nowadays familiarly known as "house" magazines or journals—from various firms associated with the textile industries. In one or two instances, attention has been directed to special features of activity denoted by the information recorded in these publications. It has been suggested that considerable mutual benefit might accrue from exchanges of copies of the publications in question on the part of the various firms who publish them, and it is believed that exchange is now more frequently practised than hitherto. We have received a copy of a recent issue of the "Northrop" Journal, issued in connection with the works of the British Northrop Loom Co., Ltd., which is particularly interesting in that a prominent feature is made of full and illustrated descriptions of products of the firm. The interest of the publication is thereby extended even beyond the limits of the circle of employes. Even within these limits, it may be highly useful to have all employes fully informed as to the firm's productions, more particularly in these days when employment is highly specialised and the employe has often to devote his whole attention and effort in one particular direction contributing to a given product.

TRANSPORTATION OF GOODS

In the years immediately preceding the war the volume of traffic passing over the lines of a railway company operating in an industrial area was regarded very much in the light of an index of the existing state of the principal industries of the

area. That was in a time when the railways held, more or less, a monopoly of the inter-town traffic, and it would be interesting to learn to what extent the introduction of a greatly developed and commercially organised system of road transportation of goods has affected the returns of the railway companies. At the annual meeting of the Lancashire & Yorkshire Railway Company recently, Mr. Edward B. Fielden, the Chairman, made an interesting comparison of the amounts of tonnage of merchandise, coal, and minerals carried by the Company in the years 1913 and 1921. In each case the comparison was unfavourable to the year just ended. The tonnage of merchandise was stated to be 4,739,663 as compared with 7,240,472 in 1913; coal, 10,781,349 as compared with 15,978,854; and minerals 2,110,119 as compared with 3,499,524. These figures show a reduction in volume of traffic of 9,087,719 tons, and the reduction represents a decrease in the total tonnage of 30.29 per cent. The decrease is formidable, and an analysis of the causes to which the decreases are attributable would prove instructive reading. That the slump in trade has been the most influential factor there may be little doubt, but it is evident that road transport has claimed a considerable amount of tonnage that would under pre-war conditions have fallen to the lot of this particular railway company. To re-capture the bulk of the short-distance traffic, the railway companies operating in industrial districts will have to offer greater rapidity in the handling of goods consigned, and, what is more important still, a reduction on the prevailing freightage rates.

CO-ORDINATING THE TEXTILE TRADE

The spirit and what may fairly be termed the driving force which the World Cotton Conference introduced into the trade, is being continued in an interesting fashion. Eventually, it will prove to be a profitable fashion also. It will be remembered that at the conference in Manchester a resolution was brought forward, the object of which was to bring about closer co-ordination between the manufacturing and finishing sides of the industry. This co-ordination was to operate in such a way that in any and every of the numerous processes of manufacture through which the cotton goes from the bale to the marketable article, more attention should be paid to the linking up of each process with the subsequent one. In other words, manufacturing and finishing were to be regarded as a whole, and not as water-tight compartments in which each section puzzled out its own difficulties. A paper which contributed no little to a sympathetic reception of the idea was one jointly presented by Mr. S. H. Higgins, of the Bleachers' Association, and Mr. Andrew Hodge, of the Calico Printers' Association. The paper dealt with the preparation of cloth for finishing, and showed how much manufacturers could contribute in their own work to the work of the finisher. Since the Conference, these two gentlemen have gathered a good deal of data of a practical kind. Co-ordination is a question for the industry itself to solve and bring into being, and the fact that something is being done, even in an unofficial manner, will all count when the matter comes to be discussed officially, as it must be. The cotton industry cannot afford to sit down and dwell on its past. Times have changed, competitors are springing up, conditions have altered greatly, and good judges say that the cotton industry will have to fight as never before. This is possibly true, but there is nothing alarming in it. The trade has shown itself adaptable in the past and will do so again. What is encouraging is that it is showing a greater disposition than ever to call in science to its aid, and to consider its problems as a whole—R. C.

TEXTILE MACHINERY EXPORTS

Pessimists and non-optimists—there are two grades—are shaking their heads over the fact that whilst the depression in the cotton trade continues, textile machinists as a whole are very busy on foreign orders. That activity exists whilst textile houses are recording losses, and even other engineering concerns, including the motor vehicle manufacturers, are disclosing adverse balance-sheets. It means, they say, more competition and concentrated competition for the cotton industry to face, and frankly they are not happy about it. It is pretty obvious that the export of this textile machinery and the buying up by foreign users of second-

hand looms, means more competition. But there is the other side to the picture, and in all fairness that ought to be taken account of. After all, we are not going to be put down and out by the mere thought that others are coming into competition with us. It is a question of brains and energy and the will to do things, and in the past Lancashire has shown that she possesses these qualities in a striking degree. In the circumstances, the optimism of a man like Sir Edwin Stockton is a valuable asset. It may not yet have justified itself in fact in the way of a pronounced move in business, but none the less it helps to keep up the tone of things and gives heart to the industry as a whole. Therefore, let him continue to be an incurable optimist; he will have his reward in the long run, and he is doing the cotton trade a good service. There is nothing in the textile machinery situation to shake the position of Lancashire if she will only utilise her own material and mental resources to further her great export industry. The situation, of course, will none the less have to be visualised and we shall not have to underrate the powers of our foreign competitors. Nor shall we have to overrate them; of the two, the latter is perhaps the greater danger.

—R. C.

GENERAL ITEMS AND REPORTS

FIRST ANNUAL MEETING OF EMPIRE COTTON GROWING CORPORATION

The utterances at the first Annual General Meeting of the above-named Corporation, held in London, on the 8th February, under the chairmanship of Mr. Stanley Baldwin, were of an interesting character, and there were some pointed observations in favour of a compulsory levy on the industry. Supporting the Chairman were Lord Derby, Lord Emmott, Mr. Walter Runciman, Lord Colwyn, Sir Hy. Birchenough, Sir F. Lugard, The Hon. Sydney Peel, Mr. Percy Ashley, Mr. J. W. McConnel, Mr. J. A. Hutton, and others, including the Secretary, Mr. Killby.

In moving the adoption of the report, the Chairman said he desired to pay a tribute to his two predecessors in office, Mr. Runciman and Lord Ashfield (better known as Albert Stanley) each of whom did all they could officially to help this great scheme. Hard and unseen work had been done by the Committee, and especially by the Chairman, Sir Hy. Birchenough, and Mr. J. W. McConnel. Great obstacles had been overcome and the Corporation as it now existed reflected the thoroughness of the work done. He was proud to see the result of co-operative individual effort, which was the kind of effort that had made this country. "Our trade has never been and never will be made by Governments," he added. In this Corporation they had the combined effort of all those interested in one of the greatest trades of the country. It represented a great act of faith and a great piece of pioneer work which would be an example and encouragement to every business in the country. It was the first great practical attempt of a great industry to cultivate our own Empire and to bring into production great tracts in the world not hitherto utilised. It seemed to him that if we devoted our brains and money to developing our Empire—and especially perhaps, to-day, the tropical parts—and cultivated the enormous markets in the East, we should be doing much better for our people than by fiddling with re-construction in the East of Europe. In the work of the Corporation, he saw an attempt on those lines which would be of the greatest help to all, quite apart from the development in the material sense. The fact ought not to be lost sight of that the cultivators of raw materials became potential customers. Turning to the annual report, he said he regarded the matter of the levy as a domestic affair, and he would like Government interference in this matter to be avoided. "All I would now say," he added, "is that if you come to me and tell me that on your deliberate opinion it is necessary for the success of your Corporation that legislative power should be taken, and you convince me of that, I will do my best to induce the Government to give it their earnest consideration." The annual report touched upon the position in the Soudan. Recognising the importance of the status of that country being made clear and definite, he would undertake to do all he could to get the matter considered by the

Government and some conclusion arrived at as soon as possible. The first report of the Corporation was a document full of interest and full of hope for the future.

Lord DERBY seconded, and said that both the British Cotton Growing Association and now this Corporation recognised that it was absolutely essential that there should be cheap and free raw material for the great cotton industry. It was obvious that, with America's growing demand and, he thought he was right in saying, lessened production, we must look further afield. And where better could we look than to our own dominions and dependencies? He ventured to hope that as time went on and the Government got richer—if ever it did—they might get even more money for developments to assist in something which would bring the Government a return in the form of employment and markets for goods. Regarding the question of the levy, he was convinced that the fairest and the right thing to do was to make it compulsory. In conclusion, he ventured to thank Mr. Baldwin for all he had done for the Corporation, and also Mr. Percy Ashley.

Mr. WALTER RUNCIMAN, in supporting, said the Corporation was one of the few good things which had come out of the war. The problem which it had to meet was one of the most serious which could fall to the organisation of a great industry. He did not believe the British Empire could be entirely self-supporting in this matter, but, unless we were to learn from recent experience the necessity of not being almost entirely dependent on one source, we should be extremely foolish. Regarding the matter of a levy, the time might arrive when compulsion would be necessary, but he hoped it would not be necessary. It was to be hoped that all in the cotton industry would realise that the levy was in their own interests and also in the interests of the Empire. He detested the interference of Government in industry, and one of the great advantages of the Corporation was that it was to govern itself. The less Government control and parliamentary intervention, the better. He hoped the small minority would realise that it was their duty, both public and private, to get this matter on a sound basis. Under the careful scrutiny of the men who formed the Corporation, he had no doubt that the money available would go further than if it were controlled by Government officials.

Mr. JUDSON, speaking as representative of half-a-million operatives, declared unhesitatingly in favour of a compulsory levy and said the operatives would have to share as it was a levy on the trade. The operatives were just as keen as employers with regard to the success of the endeavours of the Corporation.

The Report was unanimously adopted.

INDUSTRIAL FATIGUE RESEARCH BOARD

The second annual report of the Industrial Fatigue Research Board recently published (H.M. Stationery Office: Price 1/6) covers the period from 1st April, 1920, to 30th September, 1921. The report states that, in consequence of the discontinuance by the Treasury of the financial provision, progress in some directions has been delayed. The proposal to transfer any important work in hand to the independent support of industrial or other voluntary associations—a proposal the Board had had no previous reason to expect—appeared likely to have most unfortunate results, and the Board made the strongest representations to the Medical Research Council against the abrupt termination of any parts of their work without inquiry into their value to industrial health or economy, or, again, into the practical possibilities of voluntary support being forthcoming from industries or elsewhere at short notice. The Board recognise that the steps taken by the Council to ensure continuance of the work have not only enabled them to avoid the sacrifice of many data already collected by them, but that they will permit of fresh investigation, though on a more restricted scale than previously. The Board are fully in agreement with the view that part of the executive and financial responsibility for their work should be undertaken by industries themselves. Steps are already being taken to bring about the formation of associations, constituted from groups of allied trades, to co-operate with the Board, and great hopes are entertained of agreements being reached in the case of certain important industries. It would, however, be over-sanguine to expect, the report says, any widespread response at the present time. In the first place, existing circum-

stances are unfavourable for the initiation of schemes based on ideas which in this country are almost entirely new. Again, industries for the most part are not yet fully alive to the importance of the human factor in production and to the still greater part this is destined to play in the future, and, until this is realised sufficiently to induce the spontaneous formation of organisations for the special study of this subject, some initial research must be undertaken by the Board alone with the object of indicating the methods to be applied and the problems suitable for future investigation. The practical value of the work must be clearly demonstrated before collaboration on the part of the industries can be hoped for. But in research of the kind undertaken by the Board, initial progress is necessarily slow and some time must elapse before the practical bearing of the results obtained can be fully developed. The Board have hitherto refrained from initiating research solely with the object of arriving at immediate practical results; they have, instead, preferred to study the more fundamental issues in the belief that by so doing such practical recommendations as may hereafter be made may be on surer ground. The difficulties of industrial research of this kind are formidable, and can only be fully realised by such as have had actual experience of it. Almost the whole of the investigations deal with a number of variables, none of which can be wholly controlled, and consistent results can only be secured by taking immediate advantage of opportunities as they offer, which under the industrial conditions of the last few years may suddenly lapse before investigation is complete.

The report, in conclusion, states that the Board are unwilling at the present stage to formulate any detailed schemes dealing with the method and extent of co-operation by industries. They suggest, however, that for the successful development of the work on the industrial side due regard must be had to the following considerations:—First, the Board are disposed to think that industries themselves should have a full and even predominant share in the supervision of such investigations, and in deciding upon the problems to be studied. The Board are concerned primarily with the acquisition of scientific knowledge; in the practical application of such knowledge, industries are the best judges of their own needs. Secondly, the Board regard it as important that responsibility for initiation and prosecution of the work should be shared as far as possible equally between employers' and workmen's representatives, acting together.

Part II. of the Report presents, in simple form and on a systematic plan, the principal facts contained in the published reports of the Board, collated and combined into three groups—(a) Hours of labour, (b) other conditions of employment, and (c) methods of work.

REVIEWS

YARN COUNTS AND CALCULATIONS. By T. Woodhouse. (Henry Froud, Hodder and Stoughton.) Eight chaps., 116 pp., 6/- net.

This publication deals with yarn numbering for single, two or more folded yarns, and the conversion from one system into another. One chapter is devoted to the solution of material costs and another to those of mixture yarns. The last two chapters are confined to a consideration of the variation of the number of turns per inch in different yarns, based chiefly upon the square roots of the yarn numbers—a subject in which some writers delight to indulge and formulate and evolve problems interesting in themselves but possessing little or no practical value. Of the eight chapters which the volume contains the first six have hitherto been extensively treated by various textile writers—and published in book form—including the author of the above volume, but under a different title. The treatise is well written, and should prove useful to those who chiefly require information on the various methods of counting single and folded yarns.

—F. B.