Proceedings

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To cite this article: Charles S. Myers C.B.E., M.D., Sc.D. & W. Watson (1922) Proceedings, Journal of the Textile Institute Proceedings and Abstracts, 13:1, 1-12, DOI: [10.1080/03684504.1922.11673710](https://doi.org/10.1080/03684504.1922.11673710)

To link to this article: <http://dx.doi.org/10.1080/03684504.1922.11673710>

Published online: 22 Feb 2016.

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THE JOURNAL OF THE TEXTILE INSTITUTE

Vol. XIII.

JANUARY, 1922.

No. 1.

PROCEEDINGS

This issue of the Journal of the Institute marks the onset of an important development in the production of the publication. The change in size has been effected in order that it shall be in conformity with the size officially associated with publications of Research Associations connected with the textile industries, thereby facilitating co-operation in the matter of publication of scientific communications. In this connection, co-operation is already in process of establishment, and, with a view to development in this direction, a special scientific section of the Journal has been created under the heading of "Transactions." Of late, this Institute has experienced a growing tendency towards the utilisation of its journal for the publication of scientific contributions both from investigators attached to research associations and to research departments of individual firms. It is intended to encourage this movement, and thereby foster publication and the spirit of co-operation. It is hoped that the "Transactions" feature of our Journal will become equal in importance to similar features of journals connected with other industries, and the magnitude of the textile industries is certainly sufficient to make this object attainable. Contributions will be welcomed and carefully considered with a view to publication.

This Journal now comprises three distinct Sections—Proceedings, Transactions, and Abstracts. The pages of the respective sections are to be numbered separately, whilst, at the year end, separate indexes will be provided. The "Proceedings" will embrace the papers and lectures submitted before Institute meetings, Notes and Notices, General Items and Reports, and Reviews of books. Each section will be capable of separate binding (with indexes of authors and subjects) on the completion of each year of issue. The Abstracts Section, as a result of co-operation and assistance on the part of the Research Associations for the Woollen and Worsted, the Cotton, and the Linen industries, respectively, has been considerably extended during the past two years, and effort will be continued in the direction of completeness of compilation. In this connection, the Abstracts Editor would be glad to hear of the possible services of abstractors familiar with the reading and translation of foreign journals.

As the scientific sections attain greater importance the Journal will appeal to a wider circle of readers, and, from the point of view of advertising, it offers a particular field for appeal. With the reduction in size of page, corresponding adjustment of charges for advertisement space has been effected and, notwithstanding the generally unfavourable conditions of trade, advertisers have readily availed themselves of space available. Advertisement rates and particulars as to special positions may be obtained on application to the Managing-Editor, Journal of the Textile Institute, St. Mary's Parsonage, Manchester.

YORKSHIRE SECTION.

Meeting at Bradford, 17th November, 1921, Mr. John F. White in the Chair.

INDUSTRIAL AND COMMERCIAL APPLICATIONS OF PSYCHOLOGY
AND PHYSIOLOGY.

By CHARLES S. MYERS, C.B.E., M.D., Sc.D.

As Director of the National Institute of Industrial Psychology, Dr. Myers said he felt he could best deal with this subject by enumerating the activities of the Institute named, which was incorporated so recently as February last.

The difference between the Industrial Fatigue Research Board and the Institute in question (he continued) is that the former is a Government Committee and is concerned with the problems of each industry as a whole, whereas there are, in addition, a vast number of problems connected with individual firms and people which are dealt with by the new Institute. The first aim of the Institute is the study of the requirements for different industrial and commercial occupations, and the satisfaction of these requirements. Knowing the requirements, to satisfy them opens up the whole problem of vocational guidance and vocational selection, which is becoming more and more important. There are institutes in connection with vocational guidance at Geneva, Paris, Berlin, Brussels, Barcelona, and various places in the United States of America. This guidance has relation to boys and girls of school-leaving age—as to whether they are fit to engage in the employment they propose to take up, or as to what occupation they should take up. All this kind of work is, relatively, in its infancy, but it is developing with experience, and, like surgery, without practice it cannot develop. Vocational selection enters in the selection of the best fitted individual from among a number available for a particular post, or in conditions where persons are engaged in work for which they are unsuited or where people may be hiding their lights under a bushel. In connection with vocational guidance and selection there are an enormous variety of tests now being standardised. In Barcelona, I saw children being examined as to health, height, strength, etc., that aspect of physique being gone into in special detail in connection with the particular vocations they might adopt. Then, the examination of character was considered of great importance. In this connection, a good deal can be done in interview by those who are expert in the process of interviewing. Lastly, there are psychological capacities to be sought for—specific abilities concerned with the work contemplated, for each of which appropriate tests are being devised. For each occupation special abilities are required. For salesmanship, for instance, tests are available for some of the special qualities desired. The same thing applies to telephone operators, compositors, motor-car drivers, tram drivers, etc. There are two broad methods of applying tests—either by using tests of actual employment which are applied, say, to a typist, or by analysing the occupation into its elementary psychological factors and applying tests which will test the elements. Tests for memory, speed of observation, dexterity, appreciation of form weight or surface can be thus applied. It has been found that both forms of test have correlated very highly with the order of rank in which individuals have been actually performing their work.

After giving several instances of differences observed in the skill of workers under varied circumstances, the lecturer proceeded:—A great deal of money is spent on training men who afterwards proceed to another job. For the most part, firms do not realise this, and no adequate records are kept of the cost in wages due to labour turnover. One firm discovered, however, that no less than £50 per head was lost in one year in labour turnover.

Again, much investigation is possible with regard to the best methods of applying human energy and the elimination of needless movements. This might be done, as in the past, by the efficiency engineer, or, far better, by the trained physiologist and psychologist, who does not make the mistake of regarding the worker as a mere machine. It is, for example, an error to assume that there is only one best way of doing a thing. One man's best way is not necessarily another man's best way. There are usually several good styles and, of course, many others extremely bad. Neither is it always a good thing to time a complex movement and divide it up with

the hope of securing a better complex movement by combination of the best parts selected from among a number of workers.

On the side of distribution of work, the rest pause has been applied with good effect. Different kinds of work require different kinds of pauses. In a boot-making factory three girls instead of two were put on to a double press. Each worked forty minutes and rested twenty minutes, so that two were always working. The result obtained by the Fatigue Board investigator was an enormously increased output—over 44 per cent.

In the matter of length of working shift, no attempt should be made to apply data derived from one industry to another. On altering the length of working hours the effect is not reached at once. Introduction of new conditions might need months to reach a maximum improvement, though frequently it only requires a week or two for workers to re-adapt themselves. The interesting thing is that though workers slowly adapt themselves to the new conditions of shorter hours by increasing output, yet if overtime is added they very speedily adapt themselves by reduction of output.

Conditions tending to maximum contentment of the worker need to be carefully considered—the effect of labour representation, of effort to dispel monotony in occupation—while on the physical side there is the question of conditions producing maximum health. We have now an instrument, devised by Dr. Leonard Hill, to determine whether ventilation is sufficient or not. Temperature and lighting are also important considerations.

All these factors are now being scientifically measured by the psychologist and physiologist. Indeed, one of the most important aspects of the work of the Institute of Industrial Psychology will be that of research in connection with these problems. It has a strong Scientific Committee, consisting of thirty members—university professors and lecturers interested in psychology and physiology as applied to the human side of industry. It is starting as a central concern, but it hopes to develop local interest and to have various branches. The difficulty is to get men who have had training for this work, but, fortunately, the Fatigue Board has generously lent the Institute several of their ablest investigators. The Institute welcomes individual applications for the investigation of special problems.

There is a feeling that Labour is against this work, but the more the Labour people get to know about it the more are they inclined to take active interest in it. The Carnegie Trust, founded for promoting the welfare of the masses, has given the Institute a very substantial donation. The work is undoubtedly going to be of enormous importance. In the past we have been making the men fit the machine rather than making the machine suitable for the man who is to use it. In future, we have to select people for the work for which they are best suited, to discover how they can best be interested in their work, to arrange hours and conditions which suit them best, and, by that means, to get contentment and health in the worker and increase in the quality and quantity of their output.

Answering questions, the Lecturer said he did not think the selection of foremen could ever be decided merely by a few simple tests of a psycho-physiological kind. Character was an important consideration.

Asked if tests could be applied for salesmanship and how it was that an apparently unpromising individual often proved a born salesman, the lecturer said that there must be some psychological reason for this, and that a good deal of investigation had been carried out at the Carnegie Institute, Pittsburg, and elsewhere on the subject.

Mr. George Garnett (Bradford), moving a vote of thanks to the Lecturer, said that through the medium of the Works Committee opportunity is provided for bringing before workpeople the benefits of adoption of new methods. A great deal of educational work could be carried on through supervisors and heads of welfare departments. The highest efficiency ought to be the aim of all in industry.

Mr. R. J. H. Beanland (Clayton West) seconded, and said that in the past, so far as selection was concerned, there had probably been too much reliance on hereditary instinct. There was great scope for investigation in regard to the sequence of operations on particular machinery.

The vote was heartily accorded.

DESIGN AND STRUCTURE OF FABRICS.

INSTITUTE'S CROMPTON SCHEME PRIZES PRESENTED AT BRADFORD
TECHNICAL COLLEGE.

The prize awards made under the Crompton Prize Fund Scheme of the Institute, and secured by students at the Bradford Technical College in the 1920-21 Competition, were presented at an assembly at the Bradford Technical College on Wednesday, 7th December. The prize winning albums were on view, and considerable interest was taken in the specimens of work submitted by the competitors.

Mr. John F. White, as Chairman of the Yorkshire Section Committee, presided, and he was supported by Mr. John Crompton, Col. F. R. McConnel (President), the Deputy Lord Mayor of Bradford (Councillor Siddle), Alderman Guy, Mr. J. Sugden Smith, Mr. J. H. Halliday, Mr. H. Richardson (Principal of the College), Prof. E. Midgley, and Mr. E. T. Holdsworth (Hon. Secretary to the Yorkshire Section Committee).

The CHAIRMAN said he had always desired that a much closer link should be formed between the technical colleges and the Institute. He wanted the link to be forged much firmer than it had been in the past. When he suggested that the prizes secured by Bradford competitors should be presented in Bradford, he had in mind a thought that Mr. Crompton's example might lead some of their friends in the woollen and worsted industries to follow the example and institute a similar scheme in respect of woollen and worsted fabrics. He had pleasure in asking Mr. Crompton to present the prizes.

Mr. JOHN CROMPTON said he would like to compliment the people in Bradford, and Prof. Midgley in particular, on their success in having gained three prizes out of eight offered in connection with the scheme. He was delighted twelve months ago when Prof. Midgley expressed himself with regard to the scheme, and said that although it was primarily intended for cotton he felt they, in Bradford, could participate in it with great profit.

Continuing, Mr. CROMPTON said he would like to see Yorkshire have its own scheme, under which students could compete in those fabrics common to the district. He could assure any person interested, and with money to spare for a similar object, that it would be well worth while.

Mr. Crompton then distributed the prizes, and complimented the successful competitors who had secured prizes, as follows :—

Arthur Woodhead, 2nd Prize (£25 and Parchment Certificate); Edgar Robinson, £5 award; and Richard Eric Dudley, £5.

Mr. J. SUGDEN SMITH, in proposing a vote of thanks to Mr. Crompton, said the scheme had brought the trade into closer contact with the technical schools.

Mr. J. H. HALLIDAY seconded, and said the prizes had been given with the object of encouraging and developing a higher standard of design, colour, and structure of fabrics. We had strenuous times ahead, and to hold our own we should have to develop a standard of manufacture and design higher than that of any other country. We should require a very high standard of workmanship, with the British workman giving of his best, and if he would give of his best there was no better workman in the world. We should require a higher standard in the matter of design and colour, and the employer must get his organisation right.

Alderman GUY said that, as Chairman of the Bradford Education Authority and Chairman of the Bradford Technical College, it gave him great pleasure in welcoming the members of the Textile Institute. He hoped that meeting would prove the means of a closer union between the Institute and the College.

The PRESIDENT (Col. F. R. McConnel) thanked Ald. Guy for the welcome. The Crompton memorial scheme formed a link between the Institute, the manufacturers and technical institutions and students, and had banded them together in one common object of trying to improve things. A teacher must feel great pleasure and pride in his pupils taking the prizes. It was for the good of the country that the young

men should have their minds focussed on that which was most satisfactory in art, colour, and design. It must eventually make its mark on the art and manufactures of the country, and so tend to keep our old country in the forefront of the manufacturing countries of the world.

At the conclusion of the proceedings, the members were conducted over the Textile Department of the College, and great interest was taken in the excellent equipment of the various sections.

NOTES AND NOTICES

EXHIBITION OF YARNS AND FABRICS.

As announced in our previous issue, it has been decided to hold an exhibition of special yarns and fabrics in the early part of this year. The Committee appointed to deal with the matter have recommended that the exhibition be organised with a view to opening on the day of the Annual General Meeting of the Institute, which is fixed to take place at the Institute on Tuesday, 25th April next. The recommendation has been approved by Council, and it is hoped that the event will be of first-rate importance and interest. The whole suggestion has been the outcome of the success of the exhibition organised by the Institute at the time of the holding of the World Cotton Congress at Manchester last year. It was felt that that exhibition was of a quite exceptional character and aroused unusual interest for an event of the kind. For the forthcoming fixture, however, it is proposed to widen the scope of the display. Whereas last year's exhibits were mainly connected with the cotton industry, it is hoped next time to include yarns and fabrics of novel and special character from various branches of the textile industry. The various Sections of the Institute have been invited to co-operate and to suggest names of probable exhibitors, whilst instructions have been given for the announcement to be made here that suggestions from individual members of the Institute will be gladly welcomed on the part of the Committee. The desire is that collections should be secured of as large a variety as possible of the newest products in yarns and fabrics. In the latter connection, the matter of finishing takes a prominent place, and firms concerned with finishing processes are asked to consider the proposition from the point of view of helping to bring about a display of really special interest.

THE INDUSTRIAL OUTLOOK.

It may be true that there are no definite, tangible evidences of trade revival as yet, but it is the fact that men are becoming more optimistic about such revival. It is true of the textile trade, and it is interesting that it should be so, for opinions have been voiced of late that the Lancashire cotton industry will never again be what it has been. But this represents what may be termed the old school of thought. We have developed now a higher criticism. Its exponents and their disciples take a larger, longer, fresher outlook. They see that the world has been keyed up to a higher pitch of living and that the productive industries must follow, or even be a little in advance. Certainly, the manufacturers who are just a little in advance will be those who flourish in the future. And that state is to be arrived at by improving technical efficiency and by turning to science and employing her as a handmaid. In many directions progress is being made towards the application of things scientific and technical to the industry, whilst, slowly but surely, steps are being taken to see that supplies of raw material are not to be obtainable from one source only. The present time of depression provides the opportunity for survey of future prospects, and the fullest use of all that scientists and technicians can give the trade should produce substantial results. The research movement in connection with the textile industries is beginning to assert itself more obviously and the ground is now thoroughly covered.

—R. C.

TRADE SQUABBLES.

The recent campaign against the finishing side of the cotton industry, in reference to their charges is to be deplored. There may be some ground for it; on the other hand the answer of the trade, which would seem to be borne out by the report issued by the Bleachers' Association, on their trading, may put the circumstances in their true light. That is not so much the point as is the fact that these squabbles do not lead to that harmony in an industry which is all the more desirable when the processes of manufacture are so highly specialised that each section is a distinct trade in itself. From the raw material to the marketable article, each process of manufacture is linked on to the succeeding process, and there ought to be liaison, not detachment, between the two sections. That liaison should be something more than friendly relations between firms; it should be a technical, a scientific link which will blend the processes one into the other. The first step is to establish those friendly relations, and it is, if not impossible, at least the more difficult when charges and counter-charges about excessive costs are being exchanged. At the recent World Cotton Conference a suggestion was made by one of the speakers that the various sections should come together and establish something in the nature of a joint committee or body that should discuss trade matters from this point of view of technical co-operation. Sooner or later something of this kind will be done; the new conditions of industry demand it. But there is a certain awkwardness in taking the first step when the atmosphere has been disturbed by all these charges. After all, every section is more or less dependent upon every other section; the prosperity of one means the prosperity of the other, and there can be no question of fighting for one's own hand. That is economically out of date now. To-day, we are tackling trade problems from a new and very much wider angle.

—R. C.

WOOL AT MANCHESTER.

There is a good deal of inertia to be overcome before Manchester becomes a wool port. It is not a question alone of established custom in the West Riding, or the dead impassive weight of London, but also of the convenience of foreign buyers. When the matter cropped up some time ago, the view was expressed by a wool buyer that it was these representatives from foreign houses who would turn the scale, and he inclined to the belief that they would turn it in favour of London—that is the existing system in Coleman Street—because of the convenience of getting to London. But after all this presents itself as rather a small factor in the business. A good many old ideas have been cast overboard since the war, and men are more ready to try out new schemes, more ready to adopt new methods when they can be shown to be valuable and economical. And to-day it is the factor of economy that counts. Here, in a great measure, is where the Port of Manchester scores. It is within such easy road and rail distance of the West Riding that transport costs must sooner or later count, and they will count sooner rather than later, for it is being recognised that cheap transport is one of the keys to a revived industry. Rail freight charges will probably fall before long. More to the point is that road transport, which in many ways is more convenient, can also be made very much cheaper. There is a producer-gas device now on the market—it is running, and running successfully, attached to industrial motor vehicles—which makes gas whilst the vehicle runs and that gas fuel is obtained at a cost claimed to be equivalent to petrol at 3d. or 3½d. per gallon. What a saving that means in a week's running alone can easily be calculated; it is equivalent at least to a good profit. It means very much cheaper transport, and the more transport is cheapened the nearer we get to the day when Manchester becomes a wool port.

—R. C.

LECTURES TO ENGINEERING FOREMEN.

In connection with the Department of Industrial Administration at the Manchester College of Technology, a course of lectures for engineering foremen and supervisors has been arranged. The lectures will take place each Tuesday evening,

commencing on 24th January, and the syllabus indicates that great care has been taken in order to provide for a really interesting course of study. The first lecture will be by Mr. A. P. M. Fleming, who will deal with "Records and Statistics: Their Value and Use." Other subjects offered include "Labour Aspirations," "Works Committees," "Unemployment," and "The Selection of Workers," the last-named subject to be dealt with by Mr. Dempster Smith, Acting-Director. The fee for the course of ten lectures is 17s. 6d. The Department of Industrial Administration at the College now offers a two years' full-time course, both in industrial administration and in industrial and social welfare work. In the prospectus, it is pointed out that as a rule much study is given to technical qualification for management, and the science of administration calls for consideration, the contention being that "a fuller knowledge of economic problems and of their inter-allied and psychological reactions will be a necessary equipment for the manager of the future." The two years' full-time course for industrial and social welfare work is intended to meet the requirements of persons desiring to qualify for employment as welfare supervisors, employment managers, social workers, secretaries, etc. Part-time courses are also provided for students already in employment.

GENERAL ITEMS AND REPORTS

TEACHING OF ART IN RELATION TO COMMERCE.

A report has been issued by the British Institute of Industrial Art on the Teaching of Art in Relation to Commerce (H.M.S.O., 1921, pp.16, 4d. net). Although the arrangements contained in the report are chiefly designed to meet the needs of intending artists, craftsmen, or teachers, it is stated that it is also vitally important to the advancement of both British art and of British industry and commerce that those who, though not themselves intending to become artists, or craftsmen, are destined to fill responsible positions in commerce and industry, where they will be concerned with organising the distribution or production of works of industrial art, should have more adequate opportunities of obtaining an art training suitable to their special requirements.

A request from the Vice-Chancellor of the University of London, that the Institute should advise on the subject and teaching to be included in the "Commercial Art" option for the new Degree in Commerce, led to the appointment of a special committee of Governors and Fellows of the Institute.

It is the considered opinion of the Committee that the art training of the buyer and seller is a matter of great national importance in view of the great influence which they are in a position to exercise in the direction of elevating or degrading the standard of public taste. With these things in view, recommendations have been made and outlined in a scheme which suggests that the principal branches of industrial art might be grouped under heads such as (1) Textiles, (2) Ceramics, (3) Printing, (4) Metal-work, and (5) Wood-work.

The report contains details of the proposed scheme.

—A. E. G. B.

PRACTICAL AND TECHNICAL DYEING DIFFICULTIES.

A discussion on this subject took place under the auspices of the Huddersfield Section of the Society of Dyers and Colourists at Huddersfield on Friday, December 9th, Dr. L. Gordon Paul presiding.

Mr. EDMUND STAPLETON said that one of the greatest problems facing the dyer was that of listed pieces. Twenty or thirty years ago the trouble was unknown, because it was not looked for. At that period, if the required shade were produced, the goods would pass, and the list or selvedge was not compared with the middle. A listed piece was one in which the list or selvedge was darker or lighter in shade—usually darker—than the middle of the cloth. The immediate cause was difficult to find. It was an old saying that "a good scourer makes a good dyer," and although the dyer was sometimes too hard on the scourer, part of the blame often rested on the scourer. Certain oils and sizes were used in making a worsted cloth, and were

difficult to remove by scouring. It had also been suggested that the cause was sometimes a mechanical one. In some goods, such as venetians and satin-faced cloths, he had noticed slackness at the sides and the ends, which caused a perceptible difference in shade, especially in light shades. Milling made the shade darker. Some pieces rolled up at the side when wet, through bad weaving and tight warps, and the dye could not get through. The remedy was to "bag" the piece—*i.e.*, to sew the edges so that it formed one continuous tube. Listed and flecked pieces were sometimes caused in the dyehouse, and were generally due to (1) entering goods into liquor too hot; (2) reaching the boiling point too soon; (3) not boiling thoroughly either in chroming or dyeing. It was the harder twists which were usually subject to listing, and there was seldom any trouble with soft goods.

Mr. MORTON (Halifax) said they had come to the conclusion that most of the trouble was caused in the preparing of the pieces, and by exercising great care in the crabbing, blowing, milling, and scouring processes they had effected a great improvement.

Mr. R. F. WHALLEY said that he knew of a case in which the dyer was also the manufacturer, and he put the fault down to faults in manufacture. If the warps were not beamed and woven properly, the piece was slacker on the list than in the middle, and this caused more dye to be taken up. In the case in question, the manufacturer would not have any warps made outside, and he claimed to have removed the trouble of listed pieces.

Mr. J. HOLLINGWORTH said that in a listed piece the fault was so very regular from one end of the piece to the other that it was difficult to see how it could be caused in a dyeing machine, where the piece went through in rope form, twisted about in any shape. It seemed to him there were about half-a-dozen different causes, some of them due to manufacture, some of them to scouring and finishing. One of the greatest causes was the crabbing and blowing process, and if it were not done thoroughly the pieces would be either listed or cloudy.

Mr. G. F. COPILEY said that in cotton gaberdines, where very exact shades had to be obtained, he had found that the tension of the yarn had a good deal to do with the shade, and he believed the same applied to wool goods. If there was too much tension in worsted spinning, or the yarn were wrapped too tightly on the cop, it would show weft marks.

Mr. STAPLETON said that crabbing would not explain all cases, because although they crabbed the coarse goods and lighter weights they did not often crab a good botany cloth of 18oz. weight, and yet the same trouble occurred. —M.

WELFARE WORKERS' INSTITUTE.

The annual report 1920-21 of the Manchester Branch of the above-named Institute records a small decline in membership—53, against 67. It is gratifying to note (the report says) that firms who have once created welfare schemes regard them as an essential part of industry, and as one of the last of activities with which they would willingly dispense. Nevertheless, owing to trade conditions, schemes for progress and improvement have had to be delayed until a more opportune time. Mainly as a result of this Branch's advocacy of courses of training for welfare workers, a scheme of training has been formulated by the Manchester College of Technology and approved by the Institute's executive. The Branch continues to hold its meetings at the Textile Institute.

COTTON SPINNING DIVIDENDS IN 1921.

Mr. Frederick W. Tattersall, of Manchester, has prepared his usual tables of cotton spinning companies showing the dividends paid during the twelve months ending 30th November, 1921. All the firms dealt with confine their operations to spinning yarn, and no names are included of weaving concerns. Particulars have been obtained of the reports of 230 companies, and of these 23 have not been able to make a distribution to shareholders during the year. Thirty-six have paid a dividend at the rate of less than 2½ per cent. per annum; thirty-eight between 2½ per cent. and 5 per cent.; twenty-seven between 5 and 7½; twenty-four between 7½ and 10; twenty-two between 10 and 12½; eighteen between 12½ and 15; eight between 15 and 17½; ten

between $17\frac{1}{2}$ and 20; three between 20 and $22\frac{1}{2}$; six between $22\frac{1}{2}$ and 25; nine between 25 and 35; four between 35 and 40; one $47\frac{1}{2}$, and one 50 per cent. per annum. These 230 companies have a total paid-up ordinary share capital of £25,330,393, and the average dividend per company is 9.97 per cent. per annum. A sum of £1,929,386 has been absorbed by the payment of the above dividends. The mills contain 21,511,799 spindles, consisting of 18,616,993 mule and 2,894,806 ring.

Owing to the fact that during the boom of 1919-1920 many mills were sold and refloated on an increased capital basis, it is not possible to give true comparisons of the trading for the previous twelve months in each case, but figures for this purpose have been secured for 150 of the 230 companies. These 150 companies have a total paid-up ordinary share capital of £15,935,893, and the average dividend per company for the year ending 30th November, 1921, works out at 12.10 per cent. per annum, against 40.21 per cent. per annum for the same concerns for the twelve months ended 30th November, 1920.

In order to ascertain the effect of the buying of mills and refloating at enhanced capital values on the dividend-earning capacity of the companies, Mr. Tattersall has prepared separate tables of the trading results for what may be described as old mills (those which have not been sold), and the new firms which changed hands and had their capital increased. Of the 230 companies, 57 which have kept their original capital intact and have a total paid-up ordinary share capital of £2,951,596 have paid an average dividend per company for the year ended 30th November, 1921, of 20.52 per cent. per annum, whereas the average dividend per company for the remaining 173 reconstructed concerns, with a total paid-up ordinary share capital of £22,378,797, is only 6.50 per cent. per annum.

FUTURE DEVELOPMENT OF THE POWER LOOM.

Addressing the members of the Blackburn Textile Society on Friday, the 16th December, Mr. William Wilkinson, head of the Textile Department of the Blackburn Technical College, dealt with the future development of the power loom for ordinary fabrics and for special fabrics. He said that the human element was the greatest factor in the efficiency of any process, and it was when the efficiency of the machinery used was at the greatest that the work of the operative was at the least. Eighteen years ago the power loom weaver had to separate the warp threads behind the rods with a small comb, had to move the temples after weaving a breast of cloth, had to adjust the weights, change the wheels, and spend a lot of time regulating various processes to make a saleable cloth. Even with those disadvantages, and with inferior industrial organisation, the weaver produced twelve pieces, or about 360 yards, per week. By reducing the work of the operative and increasing the efficiency of the process, the weaver of to-day could produce twenty-eight pieces, or 840 yards, from yarn inferior in weaving quality, and with a reduced working week. The question was as to how production could be increased. The power loom in its present form was not capable of higher speed and, therefore, they must look for some other solution. Was it not possible to so improve the weaving process as to enable a weaver to work six looms with the same or less effort than was now required to work four looms? To render this possible, he advised greater skill in the selection of yarns, greater attention to the preparatory processes which played a great part in the efficiency of weaving, and standardisation of machinery. The false policy of cheapness should be dropped and the loom constructed on a sound mechanical basis. Improvements should be encouraged and endeavour made to eliminate strain and frictional abrasion of both warp and weft yarns. The young weavers should be trained under conditions which would give them a fair chance to compete favourably with the experienced weavers. Overlookers should be trained on sound lines, and men of superior ability encouraged to occupy important positions. A greater interest in the industry should be encouraged by welfare schemes. If those measures were taken, the Lancashire weaver would soon show a greater productive capacity and would be happy and comfortable. What was wanted was less work for the weaver and greater production—not brawn, but brains. It was

necessary that Lancashire should excel on the special fabric which required accurate machines and skilled workers. In this connection there should be the hall mark of quality on every yard of cloth produced and a standard established that would characterise the Lancashire goods. Here was a wonderful field for development which they would be well advised to foster—the production of fabrics which were beyond their lower skilled competitors who were attempting to capture foreign markets on the low grade ordinary fabrics. The increased tendency was for fabrics with new and novel yarns. The spinner, working in conjunction with the weaver, could find an unlimited field in that direction.

REVIEWS

DRESS, BLOUSE, AND COSTUME CLOTHS: DESIGN AND FABRIC MANUFACTURE. By Robert S. Beaumont, M.Sc., and Walter Geoge Hill. (Sir Isaac Pitman and Sons, Ltd., London. Price, 42s. net; 579 pages, and eight coloured plates.)

In this book it has been sought, in reference to dress, blouse, and costume cloths, "to interpret (1) the commercial and industrial aspects of the trade; (2) the nature, structure, and the qualities of the yarns employed; (3) the weaving principles involved; (4) the design and colour schemes elaborated; and (5) the systems of fabric build and manufacture practised."

The work is divided into ten chapters, and contains over 700 illustrations.

Chapter I. treats on industrial and commercial aspects, and deals with schemes of dress fabric manufacture, the influence of fashion, style transitions, etc. Fig. 19 in this section is described as "Embroidered voile," although it has the appearance of either a swivel effect or a cut-off extra weft style. The chapter concludes with useful remarks on standardisation in the dress industry, the shipping trade, prestige of French fashions, phenomena affecting trade in the Near and Far Eastern countries, Board of Trade intelligence and foreign trading, and British industrial centres.

In the second chapter, which is entitled "The Yarn Unit," the characteristic features of cotton, linen, and metallic threads, and of various kinds of worsted, woollen, union, and fancy yarns, are described. Exception may be taken to the statement on p.56 in reference to worsted yarns, that "the combed slubbings, on the English practice, receive, at each operation in the drawing sequence, a quota of false twist and a percentage of oil." Silk (thrown, spun, and artificial) is treated separately in Chapter III. Technical terms applied to silk textures, and sources of silk and silk waste supplies, are detailed, and an interesting description of the various processes employed in producing spun silk yarns is given, which, however, would have been improved by the introduction of a few additional line drawings. The section on Artificial Silk has been contributed by the late Mr. Leonard Wilson, F.I.C., of Messrs. Courtaulds, and is a clear and concise exposition of the methods employed in producing different classes of artificial silk. Their qualities, relative properties, and values are described, as well as the treatment of the material as regards dyeing, sizing, storing, winding, spooling, twisting, warping, and weaving; and the new product "fibro," defects in fabrics, and the trend of development are discussed. "The Yarn Unit Applied" is the heading of Chapter IV., in which different kinds of yarns and the fabrics made from them are compared.

In Chapter V., which is headed "Weave Elements and Cloth Construction," a number of simple and fancy weaves are given in a somewhat promiscuous order of arrangement, pure sateen weaves, for example, being preceded by weaves based upon sateens. Chapter VI. is headed "Drafted Patterns: Stripes," and Chapter VII. "Geometric Design Bases—Weave Compounds." Spotted and Mosaic Patterns are dealt with in Chapter VIII., and a number of illustrations of figure printed fabrics are given as suggestions of woven designs which would be very difficult to reproduce on account of the fineness of the details. Figuring with warp and weft, with extra warp and weft, and with double weaves is included.

"Practice in Figure Designing" is the heading of Chapter IX., and includes a brief reference to Historic Ornament, and Chinese, Japanese, and Indian styles. The transference of a sketch design to point paper is illustrated, and a number of examples

of figured fabrics, with corresponding sectional plans, are given, but cloths composed of one warp and weft are mixed indiscriminately with different kinds of compound textures. In the last chapter pile, lappet, and gauze structures are dealt with, the pile section including cotton velveteens, weft plushes and curls, and plain and figured warp pile textures, with some excellent illustrations. In the case of two illustrations of velveteen plans, it is stated that "marks=weft" when warp is meant. The section on lappet weaving contains many errors, as, for instance, in the description of the loom mounting about the bottom of p.535, and in the statement on p.537 "that the floating ends, between one row of effects and another, are on the reverse side of the cloth." Fig. 330 is described as "lappet and swivel-woven texture," and Fig. 332 as "lappet and gauze striping," although both are simply lappet effects; also stripe C in Fig. 332 will not require a front and back frame, as stated. Further, it is very improbable that an effect such as that illustrated in Fig. 328 would be woven with the frames moving in opposite directions to each other at the same time.

Gauze weaving is somewhat briefly dealt with, but the illustrations have been well selected.

Many of the illustrations of weaves, designs, and fabrics are quite as suitable for suitings, mantle cloths, or decorative fabrics as the textures mentioned in the title of the book. Chief consideration is given to the heavier classes of cloths, and sufficient prominence is not given to the light and dainty types of dress and blouse fabrics which have been so prominent a feature of the trade during recent years. In certain parts of the book the text is well and concisely written, but in many places there is a lack of simplicity of expression and a redundancy of words which confuse the meaning and make the book difficult to read. As an example, the following, which refers to piece-dyeing of grey cloths composed of different classes of materials, is extracted from p.34:—"While the employment of yarns, made of special sorts of fibre, either plain or pattern-decorated textiles are also obtainable with each yarn, in the finished texture (woven in the grey), distinct in tone, tint, or hue, that is, as identical in colour, freshness, and property as if the yarns applied were hank, top, slubbing, or material dyed and prior to weaving."

The get-up of the book is excellent in every way, but it is doubtful if, at the price, it will appeal to the ordinary textile student, although manufacturers will find something of interest within its pages.

—W. WARSON.

PATENTS AND CHEMICAL RESEARCH. By Harold E. Potts, M.Sc. The University Press, Liverpool. Price 8/6.

Although written in relation to the chemical industry, this book deserves study by all concerned with the protection of their manufactures by patents. It would be difficult to find a better statement of the essentials of patent law and practice generally. Different aspects of important points being separately considered are brought out more forcibly and clearly than they could be in closely knit sequences of proposition and qualification, especially as regards the fundamentals of proper protection by patents—to determine what is the real invention in any case, and its range of application, to give ample and accurate indication of its nature, to make full disclosure of how best to carry it out, and to prepare valid claims which shall be wide enough to prevent evasion.

Three pleas are put forward with cogent argument:—that endeavour to work a manufacture as a secret is generally futile, that consequently proper endeavour should be made fully to take advantage of the protection afforded by the patent law, and that for full advantage to be taken a manufacturer should have a policy of wide outlook and regard patents as a protection for his own manufacture against infringement and competition, as a weapon against competition, and as a means for negotiating concessions in the broadest sense nationally and internationally. In so far as the compulsory working clauses of the patent laws of some important countries make it practically impossible to hold a patent for long without establishing internal manufacture, it may be urged that the possibility of exchanging concessions internationally merits more consideration than it commonly receives.

In regard to secret processes, there is little chance—as the author points out—of the result of one research being undiscoverable by other research, and even in the rare case of a secret process founded on a lucky and unlikely accident there are many dangers probably amounting to certainty of eventual disclosure. The author suggests an injunction might be granted against an employé intending to disclose a secret, but if the injunction should be disobeyed or disclosure should have been made already it seems impossible to restore the secrecy.

On page 16, reference to those inclined to under-value patent protection as “opponents of the patent system” is temporarily misleading.

The author is to be commended for forcibly indicating the minute care which ought to be taken to ensure that everything relevant, though it may arise from accident, convenience, or even carelessness, should be considered in preparing the specification of an invention, lest any essential should escape attention, as, for example, the unsuspected influence of containing vessels in making a process work. The author is to be commended, too, for emphasising that the much used saying “a principle can not be patented” ought for practical purposes now to be forgotten, the word “principle” having become ambiguous in this connexion.

The author very strongly urges that patents both as means of protection and as obstacles to be avoided should be taken into consideration even before research begins and that thenceforward there should be collaboration with the patent agent. While this is emphatically necessary in chemical cases, such collaboration is to be recommended generally.

This is a book to read, and to read through.

—H. C.

BLEACHING. By S. H. Higgins, M.Sc. The University Press, Manchester, and Longmans, Green & Co., London. Price 10/6.

The author has given a very complete résumé of the most important researches, bearing on the bleaching of celluloses, which have been published during the period 1908-1920. He, like others engaged upon research in connection with cellulose bleaching, no doubt experienced the difficulty of obtaining all the publications relating to the subject, particularly those which appeared in foreign journals during the period of the war.

The difficulties which present themselves in “textile chemistry” are alluded to in the introduction, and the author quite rightly points out that definite conclusions should not be drawn from one or even two experiments, and that reliable results are only to be expected if experiments are conducted under industrial conditions.

Abstracts from the publications by various authors are given under “Constituents of Vegetable Fibres” and the “Eliminations of the Non-cellulose Constituents,” such as wax and proteins.

The application of hypochlorites in the bleaching of vegetable fibres is very fully dealt with in Chapters VII and VIII.

A very complete résumé is given of the publication relating to water in celluloses, the action of strong alkalis, of acids and of oxidising agents, and this is followed by abstracts dealing with work on the finished product and on the effect of fermentation.

The last two chapters are devoted to different bleaching processes and to faults in bleaching.

The research student and the chemist in the works will find the book a most valuable help in their work. The experienced investigator will have no difficulty in determining the value of the different researches discussed in the book, but to the research student it should be pointed out that, in many cases, a large amount of systematic investigation will still have to be carried out before it is safe to arrive at final conclusions. The subject of cellulose in all its different branches is becoming so unwieldy that books like “Bleaching,” which deal with one branch only, will be welcomed by many. It may be suggested that the value of the book would have been enhanced and the cost of production but little increased, if some of the most important publications had been more fully abstracted. The book is well printed on a good substantial paper.

—J. H.