Vol. III.—No. 8.

Oct. 15, 1928.

The Textile Journal of Australia

A Financial, Commercial, and Industrial Review of the Textile Industries of Australia. Circulating throughout the Commonwealth of Australia and Overseas throughout the World.

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The Woollen Textile Trade---Its Progress and Importance

Specially written for this Journal by "Ultimo"

The total quantity of wool produced in Australia for the season 1927-28 was 744,654,931 lb., and its value £60,873,662. Of this quantity, according to Messrs. Dalgety's Annual Wool Review, just published, only about 7 per cent. was purchased by local manufacturers. Even if all the goods made from wool used by the Australian people were manufactured locally, the percentage of the clip which could be used locally would be small. It is of interest, however, to ascertain whether the industry is making satisfactory progress, and if that progress could be further accelerated.

The following table shows the position with regard to progress in 1926-27, compared with 1916, or for a period of 10 years:—

Year.	No. of Factories.	Hands employed.	Wages Paid.	Value of Output.
1916	23	3927	£357,137	£1,888,115
1926-27. . .	50	8735	1,222,596	5,758,267

It will be seen that the number of factories and number of employees has more than doubled. Owing to changes in values both of wages and output, the comparison of these items cannot be definitely made. The increase in the number of employees, however, is a sufficient indication of the progress of the industry.

The manufacture of woollens has now reached an important position among the manufacturing industries of Australia. The latest available information is for the year ended June, 1927. Since that date there has been some further expansion, but to what extent it is impossible to say, though an examination of the production shows that there is still room for considerable expansion before the supply overtakes the usage of the kind of goods manufactured.

Taking the population of Australia at just over 6,000,000, the production of cloth and tweeds amounts to less than one yard per head of the population, and of flannels to approximately one yard per head. The production of Australian-made boots and shoes is equivalent to two pairs per head per year. Surely the woollen industry should show progress equal to that shown by the boot and shoe industry, which now practically supplies the whole of Australian requirements, the total imports for the years 1926-27 amounting in value to only £488,000.

The value of woollen piece goods manufactured by the Australian mills in 1926-27 was £5,758,267, but in the same year woollen piece goods to the value of £2,450,573 were imported, in addition to quantities of made-up garments, both for men and women.

It will be seen that, given effective protection, there is room for a 50 per cent. expansion, without taking into account the expansion necessary to provide for the increase in population. This increase averages about 2 per cent. per annum.

The woollen manufacturing industry has become of considerable importance to Australia, and any interference with its progress would be disastrous. Every support should be given to ensure continuance of that progress. This assistance can be given by the Government through the Customs, for, owing to the heavy expenditure necessary, due to many causes, such as high cost of plant and machinery, high wages, short hours, lack of skilled labour, etc., some protection is necessary, but the people themselves can do far more to assist the progress and expansion of the industry by insisting, as far as possible, on being supplied for their clothing requirements with material made in Australia.

The Australian manufacturers are now producing cloth equal in every respect to that being imported from abroad. The variety of colour, design and qualities is sufficient to meet the demands of the most fastidious wearers.

The following interesting table shows the relative importance of the woollen industry, when compared with some other manufactures of articles and commodities mainly locally consumed:—

Industry.	Value of Output.	Value of material.	Wages Paid	Value of Plant and Machinery.
Confectionery	£6,993,566	£3,884,045	£1,391,114	£2,199,860
Breweries	7,842,180	3,577,212	1,194,424	2,595,955
Tobacco, etc.	6,892,332	4,589,301	800,615	508,100
Boots and shoes	10,206,520	5,059,516	3,304,152	1,055,470
Clothing—Tailoring and ready-made	11,274,588	5,582,354	3,634,760	376,509
Woollen mills	5,758,267	3,400,316	1,222,596	3,247,602

The value of the output and of material used is less for the woollen mills than for any of the industries specified, while the value of plant and machinery is the highest in the group. Wages paid compare favourably with the other groups.

Surely the value of locally-made woollen goods should equal the value of any other of the commodities included in the above table, and the Government and the people should encourage the use of locally-made cloth in every possible way. We have the best wool grown; the plant and machinery used are equal, if not superior, to those used by manufacturers in other parts of the world; and the experts engaged in the industry have shown that they can produce goods equal in every respect to those produced in other countries. The extension of the industry is of importance to the woolgrower, as it gives him an increasing local demand for his product, and to the community in general, as it will provide employment for an increasing number of people.

If all the people would insist on being supplied with Australian-made material for their clothing, the industry would soon show further substantial expansion.

The World's Textiles

IV.—The Cotton Industry in the United States

Specially written for this Journal by
G. L. Wood, M.A., F.R.G.S.

The cotton industry presents one of the world's great industrial puzzles. It deals with a product that becomes more important with every year that passes, not only because of its growing volume, but also because of the many new uses to which it is being put. Yet this is the industry which steadily resists modern tendencies, more particularly in its industrial and financial organisation. Where other great industries have passed through all the stages leading to integration and amalgamation, cotton almost alone remains indifferent to modern business methods. It has been called with some degree of justification "an antiquated industry," and many are wondering how long this indifference can be maintained in the face of modern competitive conditions.

The size of the American industry is impressive enough. The official statistics of the United States show that in 1923 the industry ranked "third in number of wage-earners, fifth in cost of raw materials, sixth in the value of product, and seventh in value added by manufacture." In value of production the cotton industry was surpassed only by the motor industry, iron and steel, meat packing, engineering and printing. The cotton industry, if primary production and manufacture be aggregated, is thus heir to no small estate in its own right. Its place in the nation's commerce is well established, and it heads the list of exports from U.S.A. with a yearly value of about £200,000,000. But it is more particularly with the manufacturing industry that this article is concerned, and very few people realise the vast importance that it has attained in the last few decades. Every year goods to the value of £400,000,000, or more than three times the total output of Australian factories, are turned out from American cotton mills. And a great and growing variety of new uses, many of them discovered and for the first time applied in America, makes larger and ever larger demands on the spindle and the loom. From sky-scraper to Atlantic liner, from the electric generator to the wheat harvester, from the hospital to the hotel, there is represented a great range of demands upon the cotton mill that is scarcely realised in these days of specialised production by even the great bulk of cotton manufacturers themselves. The motor car industry alone is an insatiable devourer of cotton, while, in the form of synthetic ivory, cotton stares at us in a thousand forms from our shop windows. Finally, its use in the production of a competitive textile—rayon—to which 50 million pounds of "linters" go annually, presents a piquant situation that is surely without parallel in the industrial world.

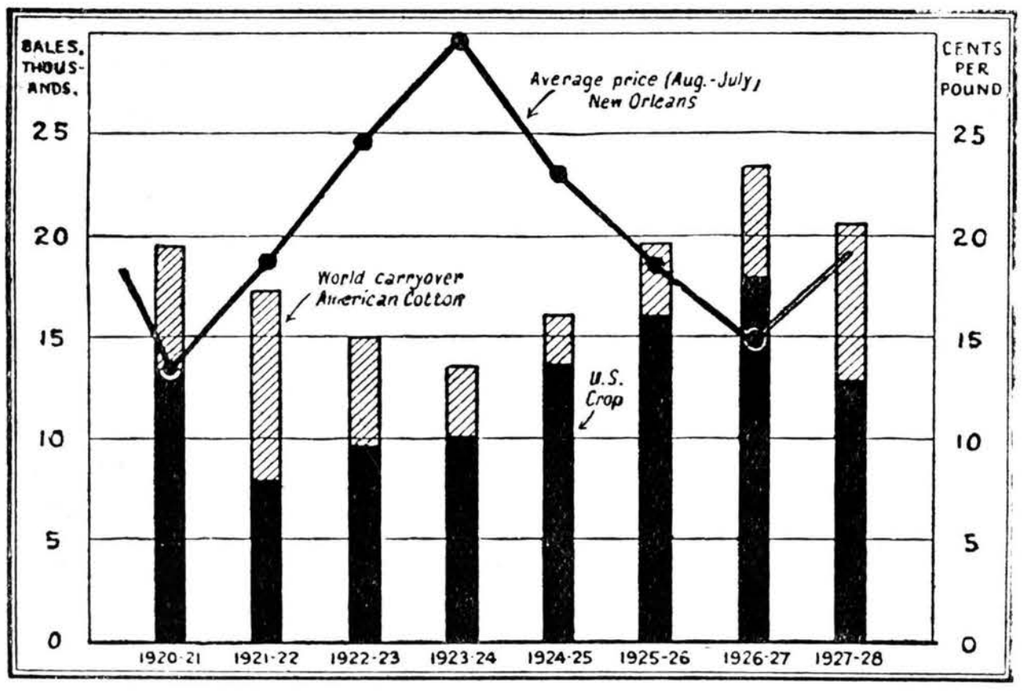


Fig. I.—Relation Between Supply, Price and Consumption of Cotton.

Nothing could demonstrate more vividly the part played by the United States in the cotton trade than this graph produced by the U.S. Bureau of Agricultural Economics.

A brief history of the cotton textile industry in the United States will not be out of place at this stage. The first factory was established at Beverley, in Massachusetts, in 1787, or in the very year that the British Government was preparing for the occupation of Australia. Three years later, an English immigrant named Samuel Slater, set up a more efficient plant on the Arkwright model at Rhode Island. From that time the industry rapidly progressed, and by 1830, factories employing 62,000 operatives and one and a quarter million spindles were producing goods to the value of more than £6,000,000, a result that was undoubtedly due to the strongly protectionist policy of the New England States.

The industry extended along the "fall line" of the Appalachians, and became strongly localised in New England, New York and Pennsylvania. Within a century of its establishment cotton goods to the value of nearly £100,000,000 a year were being produced. The momentum of an early start, the accumulated skill of the employees, and the presence of water-power, all combined to localise the manufacture in the north-east; but, after 1880, a definite change began, which has gathered pace in recent years. The southern states have many advantages for cotton manufacture, and that could not long be disregarded. Raw material is nearer to hand, cheap labour is plentiful and efficient, taxation—always such a grievous burden in New England—is much lower, and overhead costs for one reason and another are appreciably lower. And, in addition, the northern mill-owners were feeling the effects of labour legislation. As C. T. Revere has said, "Weekly working schedules have been determined by legislative enactment, while operatives with their strong

unions, have forced wage scales higher. This presentation has nothing to do with the morals of the process. It is concerned merely with the economics of the situation. Obviously, a manufacturer working on a forty-hour schedule weekly, and with a pay-roll for employees in excess of a competitor operating fifty-four hours weekly is placed at a striking disadvantage." At any rate, the weight of the industry began to swing to the South, and the process has been accelerated in recent years by the development of hydro-electric power in the southern Appalachians. One is drawn to speculate on a similar combination of factors which occurs in Central Africa, where the presence of the great potential water-power of the African lakes, an unlimited supply of negro labour, and access to the rapidly developing cotton fields of the Sudan and Kenya point to changes in the next hundred years of which the American movement may be only an indicator. The idea that the world's cotton industry may migrate to Central Africa is no more absurd than the movement from Massachusetts to Carolina would have appeared, in 1870, to American cotton-spinners.

One most interesting phase of our subject is the difference in the technical development of the British and American cotton industries. Whereas Lancashire has pinned its faith to the method of spinning which employs the "mule," the spinners of the United States since 1860 have developed the method known as "ring-spinning," and there are ten times as many ring spindles as there are mule spindles in that country at the present time. Since the ring spindle is comparatively new, the following

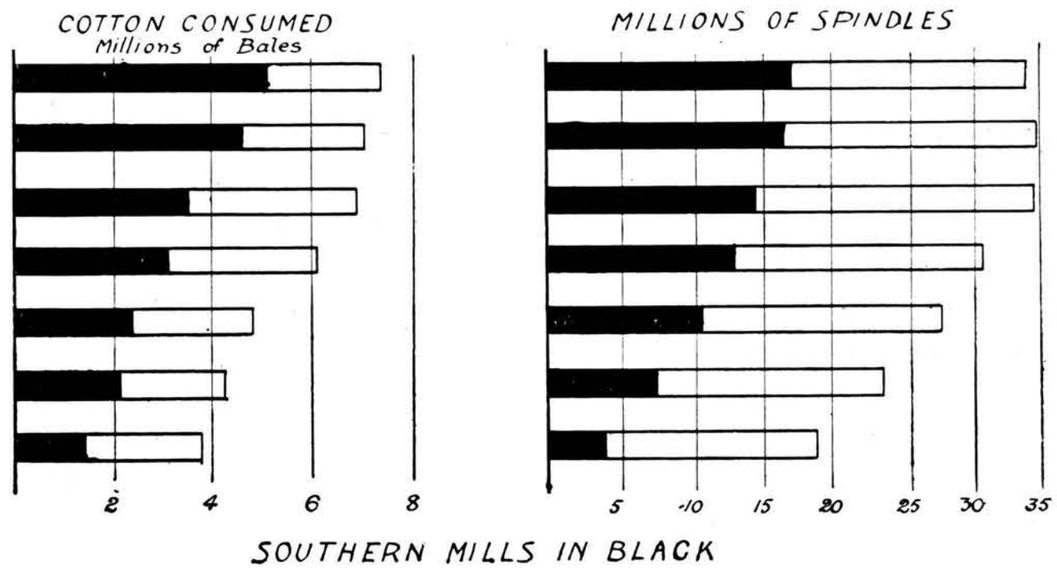


Fig. II.—The Growing Importance of the Southern States, as shown by amount of cotton consumed and number of spindles in U.S. mills.

description from a recent work on American industry may be of interest:—"The ring frame is not as impressive as the mule, but it is decidedly effective, and works with amazing speed. The bobbin holding the roving is placed directly over the spindle. Around each of the latter is a ring. There are about 112 spindles on each machine, and all the machine rings for the spindle are fixed in one frame. The upper edge of the ring is flanged, and over the flange is a small C-shaped ring called the "traveller." As the spindles and the rollers revolve the roving is fed out at a considerably slower rate than the spindle takes it up, so that there is always a tension on the thread. The spindle consequently pulls on the traveller, drawing

it around on its flanged track. It revolves a little more slowly than the spindle, and thus the yarn receives its twist. In ring spinning it is possible to operate the spindles at almost unbelievable speed. The average is 10,000 revolutions per minute, and on fine yarns it is several thousand more." The ring spindle is the American answer to the problem of lower costs; but the mule has a considerable advantage where the call is for quality rather than for quantity.

But all is not well with cotton manufacture in the United States, despite great efficiency of processes, plentiful raw material, abundant power supplies and a large home market, protected from foreign competition. Post-war prosperity has passed this industry by. As Howard Swiggett says in the American Cotton Supplement of the "Manchester Guardian," "It has suffered from over-production, a narrowing margin between cotton and goods, labour troubles, and fixed charges growing out of war expansion that are intolerable, however unwilling stockholders and creditors are to recognise them. The ailments apply generally to the cotton-goods business, whether in America, England or the Continent of Europe. They are one in their miseries." The reasons for this malaise were explained in a recent article in this journal on the British cotton industry, but the sickness in American cotton manufacture, while industry in general, and even special branches of the textile trade flourished, has puzzled the critics.

"A worn-out capital structure is, perhaps, the most serious drawback that individual mills face, and the reluctance to write fixed assets down to present-day values is shared not only by stockholders, to whom the loss is serious, but by financial interests of wider contact and experience. There is frequently a ready admission that the loss is there, but an utter refusal to reorganise." The effect on organisation and efficiency is heartbreaking. Over-capitalisation means an insuperable discouragement to managers of even the greatest energy and vision. "There is an intangible loss of moral in the management, which, in the long run, is more serious than the absence of dividnds. . . . The most faultless production, the most thorough and far-seeing sales policies are useless, and an atmosphere of pessimism is spread, further widening the vicious circle." In these words Swiggett has made a lucid and masterly summary of the present situation. It is the real reason, for example, for the differing situation in cotton and rayon production. Over-capitalisation, and neither loss of trade nor the competition of rayon, is the real difficulty. There is little doubt that the prosperity of the industry in the past has laid down a tradition of technique, and an independence of operation that prevents the trade from adopting the heroic but very necessary measures involved in reorganisation.

The great feature of modern manufacture is the demand for plasticity, for adaptability to changes in demand, changes in technique, changes in raw materials, changes

in markets. The readiness of the British woollen trade to concentrate on quality goods when faced by overseas competition in coarser goods is an indication of the policy to be followed. The barriers in the way of this plasticity in the cotton trade, whether in Britain or America, are the small size of the manufacturing units, the absence of vertical integration, and the "antiquated housing" which still obtains throughout the industry. The critics within and without the industry are pointing out another phase of modern method which the cotton manufacturer must be prepared to exploit. Great industrial concerns other than textiles have called in the aid of the scientist in order to discover new uses, and so far the cotton industry has been a laggard in this respect. Especially is this necessary for the heavy cotton products, which are meeting with such intense competition.

But the position is not to be allowed to rest there. From the production of cotton for the finer counts to the better organisation of the industry as a whole, reforms are brewing which may effect great changes in American textile conditions. The Bureau of Markets in connection with the Department of Agriculture is planning a very extensive survey of the whole situation as it affects the production of grade cotton. There is not the least doubt that the competition of artificial silk has had a marked effect on the production of fine cotton, but John A. Todd remarks on a curious instance of British adaptability:—"American manufacturers do not seem to have had the same experience as many English producers, who have found artificial silk a valuable ally, instead of a competitor." The problem for the cotton trade, as for many others, is to reorganise in such a manner that a premium shall be placed upon initiative and plasticity. The attempt to do this is shown by the newly-formed Cotton Textile Institute of the United States, "which has been organised to promote legitimate co-operation and to make available statistics and information that will give manufacturers a fairly correct picture of current conditions."

ENGLISH PRODUCTION AND CONSUMPTION OF ARTIFICIAL SILK.

According to the excise returns, English production of artificial silk in the second quarter of the year amounted to 12,643,283 lb., which just exceeds the record set up in the first quarter, when the figure was 12,550,391 lb. In the second quarter last year the corresponding figure was 8,742,583 lb., and in 1926 only 5,951,953 lb. These figures represent actual sales, so that a slight margin of error must be allowed for stocks of yarn unsold at the end of one quarter and carried forward into the next. Consumption (based on these figures) has also made rapid progress. In the first half of the year this totalled 22,448,043 lb. against 14,199,524 lb. in the corresponding period last year and 21,448,661 lb. in the whole of 1926.

Patents and the Employee

Specially written for this Journal by F. H. Campbell, D.Sc., F.A.C.I.

It is not the purpose of this article to consider the value of the patent system. The question may be held to have answered itself, in spite of the ever-recurring controversy as to the relative advantages of patenting an improved machine, or process, and of keeping the new knowledge secret. The problem to which attention is directed is a very real one in the textile industry, which involves mechanical, and, although to a less degree, chemical processes of a highly complex character. In every industry involving the employment of skilled labour there are to be found among the wage-earning grades men with ingenious and inventive brains. These men are often keenly interested in their work, and think about it in their own time. Under local conditions, where the executive officers so frequently are experts in finance and market problems, rather than technically-trained men, it is to these lower-paid men that the industry must look for improvements. It is self-evident that the condition of an industry is not sound unless it is being continually improved from within. If it is not, its continued existence is due solely to tariffs and other factitious advantages, and any technical advances it makes are those of the copyist, who in the end always pays top prices for what he gets.

The textile industry in Australia undoubtedly possesses men capable of contributing to its real well-being by virtue of their inventive capacity, but it may well be questioned that they are exercising their faculties to the full. The writer does not presume to prescribe methods of ameliorating this condition, but a statement of the position and of the means taken to better it in other cases and countries may be of assistance.

The point of view taken by the employer is that he buys a man's time, and anything produced in that time is his. This sounds reasonable, but it has the fatal defect of not being payable. If a manufacturer engages chemists it is entirely his own fault if misunderstandings arise as to the allocation of profits made from patented processes. It is not difficult to draw up an agreement to cover eventualities. If a person is engaged and paid for the specific purpose of carrying out research, it is somewhat unreasonable of him to expect any special reward if his work results in a payable improvement. He would feel deeply aggrieved if asked to share in the expense of work which had no monetary value. At the same time, the wise employer recognises that it pays him ultimately to forget his rights and to have an enthusiastic research staff. For this reason extra payments by way of bonuses or royalties are often granted. Such a system is, however, not without its dangers, for it may lead to friction. For example, the chemist may be inclined to devote attention to some problem, the solution of which he believes will result in his own monetary advantage, while his employer may consider that the technical man's estimate of the economic advantages of the contemplated improvement

is too optimistic, or that the greatest benefit to the concern would result from work in the research department, the success of which would not entail special payments to those performing it. For example, it would probably be laid down in the agreement that such payments would be made in those cases in which the original suggestion for the work came from the chemist, but not in those in which problems are handed out for solution.

While it deals with a patent for the production of petrol from heavy oils, the decision of the United States Circuit Court of Appeals for the Fifth Circuit is of great general interest. The judgment was delivered in May of this year, and closed fifteen years of litigation between the Gulf Refining Co. and the Texas Co. The bone of contention was a process for cracking heavy oils by heating them with aluminium chloride. A. M. McAfee carried out the laboratory work upon which the process was based and communicated the results to G. W. Gray, who occupied a superior position. Gray then applied for a patent in his own name, at the cost of the Texas Co. On hearing of this, McAfee protested and shortly afterwards resigned and joined the Gulf Refining Co., to whom he assigned his rights in the invention, and made application for a patent. Thereupon ensued a long contest as to which of the two patents should be granted. Ultimately the Court of Appeals of the district of Columbia decided in McAfee's favour. Throughout this contest it was urged, on behalf of the Texas Co., that Gray was the inventor, not McAfee. That part of the judgment dealing with this phase of the matter is as follows:—

"As to the kind of work in which McAfee was engaged at the time of his discovery of the patented process, the evidence was conflicting. One phase of the evidence was to the effect that the task assigned to McAfee after he came to Port Arthur was that of making investigations and experiments with the object of solving the problem of increasing the yield of gasoline from petroleum. Another phase of the evidence was to the effect that the task assigned by Gray to McAfee was that of conducting experiments in 'cracking and hydrogenating' —the cracking of hydrocarbons by means of heat and pressure, and hydrogenating of fatty oils by means of nickel or other catalyst.

The claim asserted by appellant (Texas Co.) was that in equity it was the owner of the invention or discovery in question because of the inventor's relation to it as employee at the time the patented process was discovered. If, in making that invention or discovery, McAfee did what he was employed and paid by appellant to do appellant was the beneficial owner of the invention or discovery. But the mere fact that McAfee was an employee at the time he discovered the patented process did not make his employer the owner of that process. An independent invention made by one acting as another's employee, not due to any suggestion made by the employer, belongs to the inventor, though the employer may be entitled to a shopright or licence to use the invention, because of the inventor making use of his employer's tools or facilities in perfecting the invention and putting it into practice. A phase of the evidence supported the conclusion that the circumstances attending the making by McAfee of the invention or discovery in question were such that appellant was not entitled to the beneficial ownership of that invention or discovery."

The final phase of the litigation centred around the claim of the Texas Co. to use the process without payment of royalties. This claim was rejected, because it was first raised at a late date in the procedings, so that the Gulf Refining Co. was successful on all points.

It appears that the whole of what must have been enormously expensive litigation could have been avoided had the Texas Co. engaged McAfee under a properly drafted agreement, that is to say, one which protected the interests of the employer and still was fair from that of the employee.

What is taken to be the more ordinary case under local conditions, namely, an improvement by an employee other than a member of the research staff, requires special consideration. In the first place, if a man is paid to operate a machine it cannot be urged, as in the case quoted, that if he invents an improvement he is doing what he is employed and paid to do. His claim to be the sole owner of the improvement is, therefore, strong, at any rate under American law. If he knows, or suspects, that his employer will claim an unreasonable share in any invention he may make he will either refrain from interesting himself in such matters, or try to keep what he has discovered to himself, until he can take steps to bring it to a better market. The only solution of the problem is for the employer to encourage the exceptional man and to get his confidence by showing by his acts that he is a believer in fair play.

Seasonal Unemployment in the Clothing Industries

Causes of Seasonal Fluctuations.

Primarily the seasonal characteristics of the clothing industries, as of all seasonal trades, originate from climatic changes. Man requires more or thicker garments to keep him warm in winter than in summer; consequently, with the change of seasons, he changes the nature of his clothing.

But this in itself is not sufficient to explain the alternate rushes and slack periods in these industries. A mere change from warm to cool garments does not necessitate a sudden rush of buying, and therefore of production, followed by a marked decline. Clothes do not automatically wear out in spring or autumn. It is true that owing to lack of foresight the consumer may suddenly discover, with the first arrival of winter cold or summer heat, that he is inadequately provided with suitable garments; but the onset of summer and winter is rarely so abrupt, and lack of foresight regarding clothes can hardly be so universal as by themselves to account for the sudden brief outburst of buying and manufacture at certain periods of the year. Moreover, were these the sole causes, it might fairly be assumed that manufacturers in their own interest would make anticipatory provision for such a regularly recurring pressure of demand, and spread production somewhat more evenly over the year.

The second cause of seasonal fluctuations, now even more powerful, if less fundamental than climatic changes, is fashion—that mysterious law or habit which decrees that its followers shall wear clothes of given materials, cut, colours and trimmings until such time as a new edict is issued. Its influence originates with deep-seated human instincts of display, imitation and the desire for novelty. There is, in fact, a curious combination of desires in the followers of fashion: to outstrip competitors in the search for novelty (and perhaps beauty), and to conform to the "laws" of fashion generally accepted at the moment. It has become a tradition (originally founded, no doubt, on climatic conditions) that the duration of a particular style shall coincide roughly with the climatic season, the new fashions being introduced at the change of season. With the advent of spring the new summer styles appear, while the fashions for the forthcoming winter are announced in the autumn.

Here lies the root cause of the seasonal fluctuations in the clothing industries. The new fashions are not known even to the trade until a comparatively short time before they are to be worn by the public. Consequently the manufacturer must delay production until he knows what the fashions are to be, and then rush through the manufacture of the new season's goods. He cannot anticipate demand by manufacturing for stock, since, if he fails to forecast the fashions correctly, he runs the risk of having his output left on his hands unsaleable. As a rule, the consumer will not buy unfashionable goods, and each season's production has therefore to be compressed into a few weeks. The rush at the beginning of the season soon dies away, since, except among the ultra-fashionable, a garment will ordinarily last the season, and the number of replacements during the season is very small compared with the number of purchases at its beginning.

The effect on employment is that a large working force is needed during the short period between the announcement of the new styles and their general appearance on the market. Subsequently the number of workers required diminishes steadily until the depth of the slack season is reached. Changes of fashion with the season thus produce unemployment by demanding at certain periods the services of a much larger number of workers than can be employed all the year round.

The degree to which changing fashions are responsible for fluctuations in employment is indicated to some extent by the comparative data for different trades given in the preceding section of this article. In the manufacture of underclothing, where the instinct for display has less scope and changes in fashion are less frequent and violent than in outer garments, employment fluctuates considerably less than in tailoring or dressmaking.

Women's dress is notoriously the most influenced by fashion, but it is interesting to note, in the United States and France, for example, that men's tailoring is just as liable to seasonal fluctuations, though these are less vio-

lent. Slight changes in the cut, material and trimming of men's garments have the same effect in causing seasonal rushes of production as the more revolutionary changes in women's dress. Even in such comparatively inconspicuous garments as shirts and pyjamas, the manufacturer awaits and adopts the new season's styles.

The effect of seasonal changes of fashion is seen in its more extreme form in the subsidiary trades supplying trimmings, such, for example, as artificial flowers. Here the very existence of a busy season depends on the fashion. If fashion rules that few or no flowers are to be worn on hats, the artificial florist's livelihood during what might have been the best season of the year is gone.

Although not strictly a question of seasonal unemployment, another feature of fashion changes must be mentioned, since it still further threatens the already precarious livelihood of the clothing worker. This is the entire disappearance of certain products or trades. The phenomenon of dying and nascent trades is a familiar feature of the economic system, but nowhere is it more accentuated than in the clothing industry, ruled by fashion and highly specialised. A given product may go out of fashion not merely for a season, but for years, if not permanently. Examples of this are the decreased demand in recent years for artificial flowers, ready-made cotton lingerie, and men's silk hats. In each case a whole trade has been greatly reduced in dimensions, and workers have lost their employment, not for a season, but permanently. Thus a clothing worker has to run the risk not only of seasonal unemployment, but of complete loss of his trade.

A further point to be considered in connection with the influence of fashion on employment is whether this influence is increasing or decreasing. On the whole, the answer appears to be that it is more widespread and therefore more powerful than it used to be.

In the first place, fashion now influences practically all grades of society. Whereas its sway used to be confined mainly to the wealthy and aristocratic, it now extends to the middle and working classes. It is a matter of common observation, confirmed by study of clothing shops in working-class districts, that the factory girl, clerk, or shop assistant now dresses "in the fashion" equally, if more cheaply, with her wealthier sister. This is no doubt partly due to the rise in the working-class standard of living with high money wages during the war. But to a large extent it is due to a more permanent and wider cause: the tremendous growth in the field and influence of advertising, a characteristic of modern sales organisation which ensures the universality and rapid adoption of new fashions. A further factor, on the side of production, which has made possible the wider penetration of new fashions, is the improved technique of the ready-made clothing industries. Formerly the ready-made garment was a low-grade, poorly cut article, turned out in a limited number of types. Now the wholesale manufacturer can produce as "smart" and fashionable garments as many a bespoke tailor or dressmaker. Competition, aided by the instinct of imitation, has brought the ready-made clothing trade under the sway of fashion to almost the same extent as the bespoke trade.

(Continued on page 517.)

Artificial Silk

The Different Processes

Specially written for this Journal by
D. G. Zwartz.

(Continued from page 348.)

In my former article I mentioned the development of artificial silk in the course of the years. I now come to a general description of the different processes of the yarns which are at present in the market. They are:—

(1) Nitro-silk or Chardonnet silk.
(2) Cuprammonium (copper) silk.
(3) Viscose silk.
(4) Acetate silk.

(1) Nitro Silk.—This is the oldest class of artificial silk, also called Chardonnet silk after its inventor, Count Hilaire de Chardonnet. The raw material here is cotton, for which cotton links (obtained during the ginning) are used. This cotton is scoured and bleached, and afterwards is treated with a mixture of sulphuric and nitric acids (the nitration process) until a certain degree of nitration is arrived at, after which it is freed from all traces of acid. The cotton (cellulose) now has been changed into nitro-cellulose, which is similar to that used for smokeless powders. This nitro-cellulose is now dissolved in a mixture of alcohol and ether, and becomes a viscous mass called the "collodion." The collodion is freed from impurities (by passing through filter presses) and forced through nozzles or spinnerets, where, owing to the evaporation of the ether and alcohol, a thread is formed immediately.

This thread is still nitro-cellulose (which is highly inflammable), and, therefore, has to be transformed to cellulose again, the denitration process, after which it is washed, bleached and dried. The silk is now ready for consumption.

As the original advantage of the nitro-silk (i.e., the possibility of spinning fine counts) has disappeared with the progress of the viscose process, the production of this nitro yarn is decreasing gradually. Moreover, its price is higher than viscose yarns, and it may be expected that it will disappear from the market entirely at any time.

The estimated production of nitro silk amounts to about 3 per cent. of the total production of artificial silk.

(2) Cuprammonium Silk (Copper Silk).—For this process also the raw material used is generally cotton, which, after scouring and bleaching, is treated with cupro-oxyde-ammoniac, in which the cellulose dissolves. The solution is filtered through filter presses and, after ripening, is ready for the spinning. The manipulation is so far different from the nitro process that whilst in the latter the coagulation takes place owing to the vaporisation of the solvents, here a special coagulating or spinning bath is required. After spinning the yarn is washed, soaped and dried.

It is estimated that the production of the copper silk during 1927 was about 6 per cent. of the total artificial silk production.

(3) Viscose Silk.—This is undoubtedly the most important class of silk at present, chiefly owing to the cheapness of manufacture in comparison with the other kinds of artificial silk, whereas the results obtained are very satisfactory.

Owing to its importance we will go a little more into detail than before.

First of all, the raw material for the viscose silk—the woodpulp. This is made chiefly in Canada, Sweden, Finland and Norway from a particular kind of pinetree. I

have seen in Norway one of the biggest works making this woodpulp. The procedure in this mill is as follows:—

The trees are cut into pieces and dirt and bark are removed. Then the pieces of wood pass chopping machines, which make them into fine chips. These are boiled in a Metternich boiler for about 20 hours with calcium bisulphide, which dissolves the resin of the wood and makes the actual cellulose free from other matters. This cellulose now is washed and bleached in large vats ("Hollanders") with sodium hypochloride, washed again, and then dried in such a way that the pulp comes out of the drying machine like sheets of paper, which are automatically cut to measure. They then are ready to be sent to the artificial silk mills. Here the sheets of woodpulp are first of all treated with a solution of caustic soda and undergo a certain mercerising process. This effects the change of the cellulose into alkali-cellulose. The excess of caustic soda is removed by heavy presses, and the remaining alkali-cellulose passes through huge grinding machines, which cut the original sheets into small pieces. We now get the process of ageing or ripening of the alkali-cellulose pieces, which consists of storing it up for a certain time in a room of a certain constant temperature. After this we have the treatment with carbon-bisulphide (CS_2), which changes the alkali cellulose (being unsoluble) into cellulose xanthate, which is dissolved in a weak solution of caustic soda, and after being dissolved has the name of "viscose."

The different chemical processes mentioned above are too complicated to go into further details, so that only a rough outline is given. We could really describe the above-mentioned processes as having only the purpose of making in the insoluble cellulose, in a soluble combination, out of which afterwards the cellulose can be precipitated again.

Also the viscose (a dark brown solution) undergoes a ripening process, as does the alkali cellulose. Here, however, the time of ripening is used for filtering the solution through batteries of filter presses, removing all impurities, etc., after which the viscose is ready for the spinning process.

The name of "spinning" is really badly chosen, as too often the idea is given that the spinning process is done on spinning machines similar to those used in the wool or cotton spinning. This is not correct. The spinning of artificial silk has to be considered more a coagulating or precipitating process than a spinning process. The viscose solution is pressed in the pipes leading to the spinning machines under a certain constant pressure. The solution passes then through plunger or gear spinning pumps and (after a final filtration) comes at the spinneret, where the actual thread is formed. This important part of the manufacture needs some further explanation.

The spinneret, generally made from a precious metal (being able to resist the influence of the strong acids of the coagulating bath), has the shape and size of a small thimble. In the top of this thimble small holes are bored, the number of which depends on the number of filaments required. Thus, e.g., an ordinary 150 denier is spun with, say, 22 filaments, then the number of holes in the top of the spinneret is also 22. In case a 300 denier is spun

with 42 filaments, the spinneret is changed for one with 42 holes, whereas at the same time the viscose supply is doubled. It is, therefore, clear that a thread of a certain count is spun in one manipulation, and that the different consisting filaments are not added together, as is often supposed to be the case.

The way the thread is actually made is the following:—

As mentioned before, the viscose solution is pressed through the holes of the spinneret, which latter is below the surface of the spinning or coagulating bath. This bath consists of an acid and a solution of different salts, and has the property to precipitate the cellulose of the viscose. Thus, as soon as the viscose comes out of the holes of the spinneret it comes into contact with the spinning bath, which precipitates the cellulose immediately, forming the artificial silk thread. As the process of spinning is, theoretically, unintermittent, a thread of indefinite length can be made. Here, then, we find the difference between artificial silk and cotton and wool, the latter two consisting of "staple" or short lengths, the former endless and without "staple."

The processes as described up to here are, more or less, adopted by all viscose-yarn manufacturers. From this stage on, however, we get a possibility to go in two directions, being—

1. The Bobbin System.—Here the thread, as it comes out of the spinning bath, is wound on horizontal bobbins. These bobbins are sufficiently washed to make them free of acid and salts, and are then dried. The thread at that stage still is without any twist; the separate filaments lie parallel. The bobbins are therefore put on a twist-frame, where the necessary twist is given to the thread, after which the skein is made. This is bleached and dried and ready for grading.

2. The Topham System.—The coagulated thread, instead of being wound on bobbins, passes over glass rolls, and is allowed to drop down vertically in a funnel, which moves up and down in the hole of the small centrifuge, which turns with a speed of about 500 revolutions per minutes. Owing to the centrifugal force the thread is laid against the side of the centrifuge, and builds up a kind of "cake," whereas, at the same time, the twist is given to the thread. After a certain time the centrifuge is stopped, the "cake" taken out and put on a special reeling frame, where the skeins are made. These, still containing salts and acid, are washed, bleached and dried, and then are ready for grading.

The Grading.—Several times I was asked the question: "Why don't you spin A quality only?" and, whilst in India, where generally the lower qualities are used, I often heard the reproach, "Why can't you supply more D, or inferior quality?"

To start with, the word "quality" is really misleading, and the expression, "first grade," would convey better than "A quality" the desired idea. The fact, indeed, is that we do not spin certain qualities. We all aim for the best possible yarn, the "A quality." As explained in the above description of the manufacturing process we have only **one** solution of viscose; only **one** way of spinning. Where, then, do the different qualities come from? It will be understood that, during the spinning process, owing to a small impurity in the viscose holes of the spinneret get closed; that during the long process a thread is mechanically damaged in some way or other; that some hanks get stained; that the reeling is not absolutely perfect, etc. All the hanks with those faults are no longer "A" hanks, but are placed, according to the nature of the damage, in a lower grade.

This grading is effected by trained girls, who inspect and examine each hank individually, classifying them in the different grades according to the standard of qualities adopted by the maker.

Contrary to practice in several other lines of manufacture, where different qualities are internationally fixed, in the artificial silk industry every manufacturer has his own standard of quality. Therefore, it may happen that a "B" quality of one make is worse than "C" quality of another.

The secret of the manufacture of artificial silk is to get a high percentage of qualities of very high standards, which can only be obtained after several years of experience. This is the reason of the success of the long-established firms, like Courtaulds and Enka, which both started making artificial silk before the war.

It is obvious that the physical conditions of the different qualities of a certain make are all the same, as all the yarns come from **one** "spinning."

After the grading, the skeins are formed to hanks, and after bundling are ready to be sent to the consumer.

(To be continued.)

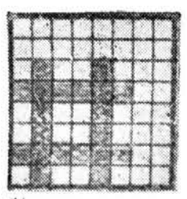
Textile Design and Colour

Specially written for this Journal by "Designer"

(Continued from page 412.)

DOUBLE CLOTHS.—(Continued.)

Continuing with double cloths constructed on the warp stitch principle, we come to those made on the two and one principle. As stated previously, these are used in the worsted trade chiefly to produce cheaper cloths, by having a woollen back, or by using a thicker worsted for the back. For example, if we made an ordinary double cloth on the one and one principle, using the two and two twill for both face and back, we should require the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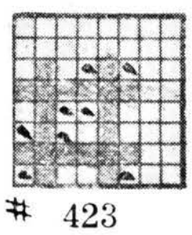
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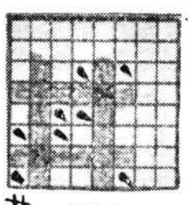
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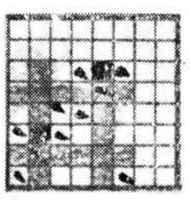
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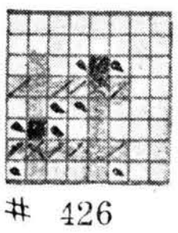
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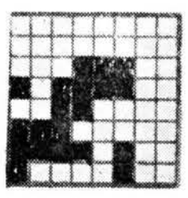
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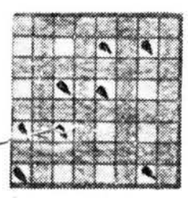
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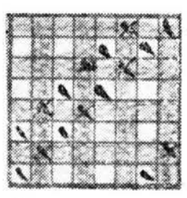
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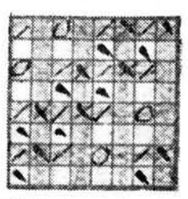
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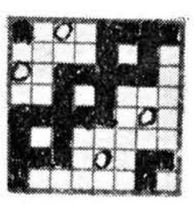
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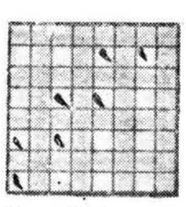
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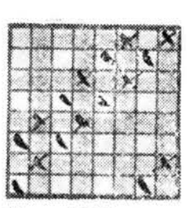
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some count of yarn and setting for both face and back. The cost of making this cloth would be very high, and for all practical purposes a cloth made on the two and one principle, with a woollen back, or a thicker worsted yarn would have the same appearance on the face.

The weaves used are as a rule two and two twill for face and plain weave for back, with proportionate settings.

The method of construction is the same as before, except that we now take two ends and picks for the face weave, against one each for the backing weave, the usual method being to commence one face, one back, one face.

The two and two twill being complete on four ends and picks, and the plain on two ends and picks, the design will be complete on six ends and picks.

The method of stitching is exactly as before, namely, if possible, stitch between two raised face warp threads, though on examination it will be found that there are actually only two places in this design where it is possible to make perfect stitches. Therefore, these should be used.

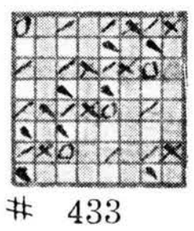
Plan 422 shows the paper shaded ready for inserting the marks.

Plan 423 Face Weave.

Plan 424 Face and Backing Weave.

Plan 425 Face and Backing Weave, with stitches added.

Plan 426, as 425, but with face warp raised on backing picks, or, in other words, the complete design.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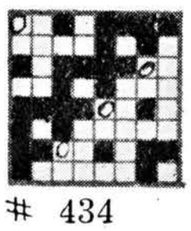
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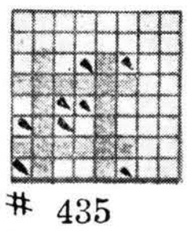
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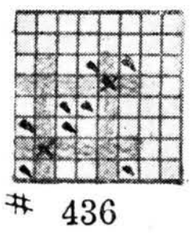
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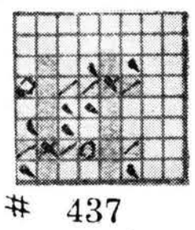
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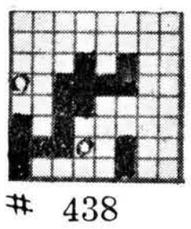
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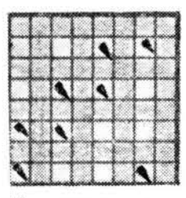
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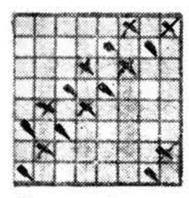
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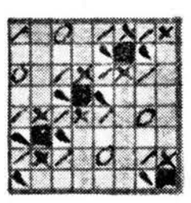
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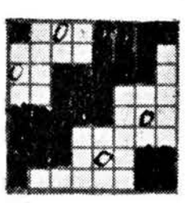
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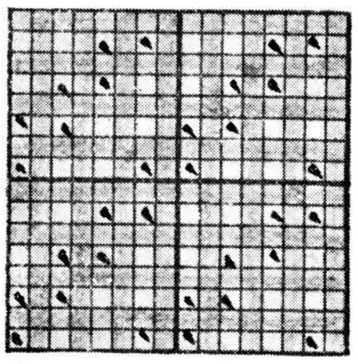
Plan 426 A, complete design in block squares.

Double Cloths Stitched with Weft.—The only difference between these and those stitched with warp is that we stitch by bringing a backing pick over a face end, if possible between two face picks, in place of having a

backing end if possible between two face ends. To do this we proceed as before until we come to raising the face threads on the backing picks (leaving out the warp stitch, of course) when, before putting in these marks, we find a suitable place for the stitch. It will be remembered that a weft stitch is shown by a mark ⌀, though this is taken as a blank in the plan. Therefore, what we require this time is a blank to come between two blanks, as these represent weft. In order to make this more



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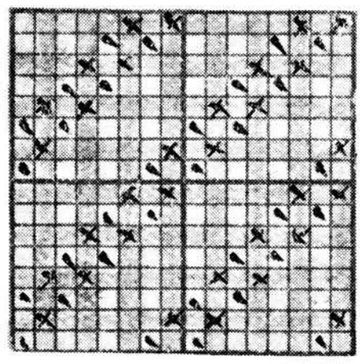

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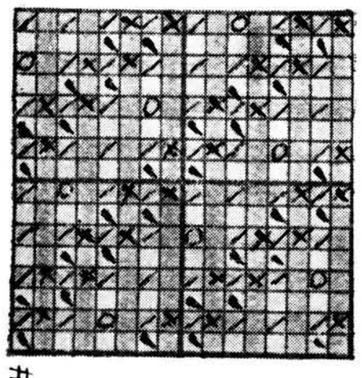

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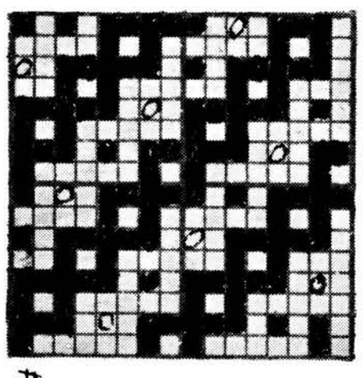


446

clear we will show a two and two twill, face and back, stitched in twill order, with perfect stitches. This will be complete on eight ends and picks.

Plan 427 shows face weave.

Plan 428 face and backing weaves.

Plan 429 shows face and backing weaves, also face warp raised on backing picks, except where stitch is made. This is also the complete design.

Plan 430 shows the complete design in block squares.

Plans 431 to 434 show the same face and backing weave stitched in twill order, but with an imperfect stitch. It will be noticed in this case that the stitch is only covered by the weft on one side, with the result, particularly if the face and backing yarns were of different colours, the stitch would most probably show.

We proceed in the same manner for any other design.

The two and two twill face and back, stitched by weft in sateen order, is arranged as follows:—

Plan 443 Face Weave.

Plan 444 Face and Backing Weave.

Plan 445 Complete Design.

Plan 446 Complete Design in block squares.

Plans 435 to 438 show the two and two twill face and plain back, made on the two and one principle stitched with weft.

Plan 435 Face Weave.

Plan 436 Face and Backing Weaves.

Plan 437 Complete Design.

Plan 438 Complete Design in block squares.

Double Cloths Stitched With Both Warp and Weft.—These are known as double-stitched cloths, and are simply the two former methods combined. Naturally these give a firmer cloth than those obtained by using either of the other two methods, and it is a matter of choice as to which is used.

The two and two twill face and back, stitched in warp and weft in twill order, is obtained as follows:—

Plan 439 Face Weave.

Plan 440 Face and Backing Weave.

Plan 441 Complete Design.

Plan 442 Complete Design in block.

(To be continued.)

British Investigation of the Production and Utilisation of Wool.

A survey of the production and utilisation of wool, which is at present being undertaken by the Research Association for the Woollen and Worsted Industries, whose headquarters are at Leeds, England, is of great interest, not only to sheepbreeders all over the world, but also to the manufacturers of wool cloths. Three factors are to be considered in this survey: Production, conditions affecting marketing of raw material, and utilisation. Members of the association are now touring the Continent and later intend to visit the colonies. Coincident with these investigations is the visit to England of a group of farmers from Australia, New Zealand and South Africa.

Increased Orders for Chinese Hair Nets.

Orders for hair nets in the Chefoo, China, market appeared to be a little larger during the early part of the current year than in 1927. The demand was for the usual kind of nets and for a good-quality merchandise. Stocks have been exhausted and supplies are rather difficult to obtain, owing to existing chaotic conditions in the section in which hair nets are made. Exports from this district during the first quarter of 1928 totalled 155,623 gross, as compared with 119,198 gross during the corresponding period of 1927.

British Trade and Industry

Specially written for this Journal by
Gilbert C. Layton, Assistant Editor of "Economist."

The Textile Merger.

In previous notes we have referred to amalgamation as one of the chief hopes of the Lancashire textile industry. It cannot be doubted that the industry is less efficient than it might be. In the main, it consists of small units, each controlled by sturdy individuals who have not, in many cases, kept entirely abreast of the times. The economics of large-scale operation, which experience has proved to be essential under modern conditions, have, therefore, not been realised. In these circumstances we welcome the announcement that the Lancashire Textile Corporation Ltd. is to be formed shortly. It will be the largest amalgamation which has taken place in the industry for many years. It is reported that at least 50 mills, controlling 5,000,000 spindles, will join the company, and there are confident expectations that in the long run a larger number of companies will join the combine. The registered capital of the company will be nominal, and will be increased as the companies are merged. When the full 50 are amalgamated the total capital will be around £5,000,000. Steps are being taken to ensure efficient control of the corporation. The functions of the combine will include the buying of cotton, the purchasing of consumable stores, spinning, a sales department, both for the home and overseas trade; the corporation will also deal with the financial side of its constituent companies. It is believed that great financial economies will result from the combine. The scheme has aroused the greatest interest in Lancashire, which is of good augury in view of the hopes that other companies will joint.

The Worsted and Wool Industry.

The position in the wool and worsted industry is far from satisfactory. Production is limited, short time is increasing, and though the outlook has slightly improved it still leaves much to be desired. Nor is any substantial improvement expected at an early date. The number of insured workers who are unemployed is greater than at any time during the last, say, six years. Neither spinners nor manufacturers can make anything like the prices they consider to be necessary in fixing up new contracts, and in order to obtain any business at all there is a tendency to pay less and less regard to quality. This is a very regrettable feature, and is chiefly due to the advance in wool values. The best policy in the present circumstances is, in the view of the majority, to continue making standard yarns and cloths, and to take the risk of finding future outlets for them.

The future of the industry is bound up with the question of prices. Wholesale price goods merchants are still keen in their demands for reasonably priced fabrics, and if they cannot satisfy these demands in the home market they are by no means unwilling to go to foreign firms. It is quite clear that so long as cloths are reasonable in price they will sell fairly rapidly. The present tendency, it is considered, is certain to have the effect of bringing about a reduction on the prices for merino combing wool. A substantial contributory factory, however, is the extent of Continental demand. If this is maintained at the level of the past year the prospect of an appreciable reduction in quotations is not very promising. In any case, there will have to be a considerable revival in home trade to justify present prices.

Jute.

The Dundee jute mills continue to be well employed. Indeed, the order books are so full that the normal holidays are being curtailed. The looms are working at full capacity, there being a good deal of leeway to be made up, particularly by spinners, who, in many cases, are in arrears with their deliveries. In these circumstances yarn prices and the prices of manufactured goods are likely to remain firm, at least where quotations are, for the present year. The tendency of the raw material, however, is somewhat undecided. Buyers are pursuing a hand-to-mouth policy, purchases being in small lots for immediate requirements. Doubtless this attitude is based upon crop reports, which, in the main, are quite satisfactory. In view of the good crops, it seems to be argued, there is a probability of a fall in prices.

The old crop is now rarely mentioned for shipment, and the supply of material on the spot has shrunk to a very small volume. The general outlook remains fairly satisfactory. A very good inquiry prevails for hessian cloth, and the difficulty is to secure delivery.

The Production and Manufacture of Woollen Yarns

Specially written for this Journal by "Lana"

There are three divisions into which the woollen system of yarn manufacturing can be allotted. These divisions are wool cleansing, wool carding, including scribbling and condensing, and woollen mule spinning. The wool from the sheep's back contains several extraneous substances, which must be removed before the carding operation can take place.

The natural impurities in raw wool are yolk or wool fat and suint. Suint is a residue deposited on the wool fibre by the perspiration of the animal. The yolk is a very useful oil which is emitted by the glands of the sheep's skin to protect the wool fibres in their growth.

Other matters of external origin found in wool are burrs, twigs, sand and dirt. These are gathered by the sheep in its wool and secured to the wool fibres by the wool fat. In wool scouring it is necessary to remove the wool fat in order to liberate the foreign matters and effect their removal. Another type of impurity found on many fleeces are tar and paint marks. These marks are applied by farmers to distinguish their distinctive flocks of sheep Serious defects in both yarns and fabrics are ultimately met with from this maleficent practice.

After scouring the wool is dried and then taken to the blending room, where it is prepared for carding either as virgin wool or blended material. The term virgin wool covers all the new wool used in woollen yarn manufacture and distinguishes new wool from manufactured or partly manufactured materials.

Raw Materials.

The raw materials of the woollen trade are new wool, partly manufactured materials and remanufactured materials. The virgin wools used are fine wools, such as merinos and Southdowns, and longer wools, such as Cheviots, Wiltshire Downs, Hampshire and Dorset Downs The two divisions of virgin wool employed on this system are given the names of "Saxony" and "Cheviot," any merino wools processed into woollen yarns are known as "Saxonys," while Downs, demi-lustres and fine crossbreds are denominated "Cheviots."

Noils and Wastes.

The worsted system of yarn construction can only deal with long fibres as a rule; all fibres which are not an inch long are removed from the worsted slivers at the combing operations. These short fibres are known as noils. The characteristics of the noils are identical with the characteristics of the wool from which they are removed.

Noils are pure wool, but have not the required length for the worsted trade, yet in quality and fineness of diameter, felting properties and brightness, they are precisely the same as the top made from the longer fibres. In many cases the shortness of staple gives a finer diameter to the noils, so that they may be classed as a trifle finer than the top. The noils cannot be classed as a waste, like laps and thread waste, as they have not received any detrimental treatment in their production. The processes prior to their separation from the longer fibres helped to produce the noils in a satisfactory condition suitable for their absorption into the woollen industry. They were cleansed in the scouring, opened out and given softness in the worsted carding, and their colour was improved by backwashing.

The noil removal by the worsted comber is very expeditiously done, with a view to obtaining a worsted top free from all short fibres and foreign matters. These are removed together, so that the noil contains burrs, neps and other matters rejected by the comb. Where the amount of burrs and vegetable matters is excessive they are removed from the noils by either a chemical process known as carbonising or by the mechanical operation of burr-beating.

Laps and Hard Wastes.

These are by-products of the worsted industry. Laps are soft waste which has accumulated on rollers, carriers and bobbins in the open and cone drawing, also in the spinning. Roller laps are the source of a large proportion of the soft waste used in the woollen industry. Hard waste is waste made in both woollen and worsted spinning after the spinning operation is completed and twist has been inserted into the yarn.

In the case of soft waste the only conversion process needed before blending into woollen goods is a breaking up process where the laps are rendered into a loose and open state; usually this opening out is done by a fearnaught. The hard waste needs special treatment in order to disintegrate the fibres from the twisted strand of yarn. A garnet waste machine is used, but in all cases serious fibre breakage takes place. The laps have retained all the characteristics of the original wool, but may have suffered somewhat in strength and elasticity, while the thread waste is almost a new material possessing new qualities, and is considerably inferior to the wool noils or laps.

Remanufactured Materials.

These materials are recovered fibres from various cloths which have once been constructed in a fabric form. The various types of remanufactured fibres vary according to the nature and structure of the previous fabric of which they were a component part. The chief divisions of fabrics from which recovered fibres are obtained are wool-knitted goods, cotton and wool fabrics and heavily woven woollen and worsted goods. The material obtained from knitted goods is known as "shoddy," the material from mixture goods "extract," and from woven goods "mungo."

Shoddy.

Shoddy is obtained by the opening up of knitted goods, such as wool hosiery and underwear. In the manufacture of these goods a soft twist was used in spinning, and in the interlooping of a knitted fabric there is not the tenacious interlocking of the fibres, as they are found in the woven cloth. Knitted goods are, therefore, much more easily dissected into fibres than woven goods, giving more strength and length of fibre to the shoddy goods. The fibres are gradually opened out from the yarn and drawn out individually without any very serious damage being done thereby. For some fabrics a remanufactured material will produce a yarn which is superior to a virgin wool yarn in the production of a full, heavy, solid yarn.

Extract.

Fabrics which have wool and cotton in combination need special treatment when one of the constituent materials is to be recovered. In all cases one material is obtained by the dissolution of the other; the cheaper of the two materials is dissolved by a chemical action. The process of wool recovery is known as carbonisation. A cotton or wool mixture is submitted to a treatment by an acid, and seeing that cotton absorbs acids more readily than wool, the cotton is carbonised on being subject to a great heat. The residue after drying is wool and carbon; the carbon is crushed and shaken out, leaving the wool unhurt. The wool fibres which have been recovered from mixture cloths in this way are known as extract. There are two methods of carbonisation in common use, the wet method and the dry. In the former case the material to be carbonised is treated with sulphuric acid, while in the latter case hydrochloric acid fumes are employed as the carbonising agent.

Mungo.

This is the lowest and shortest of the recovered fibres; the cloths used in producing mungo are closely woven and heavily milled fabrics. In order to reduce such fabrics to fibre much force is needed, which damages the fibres by breaking them into short pieces, and does considerable injury to the serrations of the individual fibres, thereby impairing the felting and spinning properties. The machines used in the reduction of these cloths to fibres diminish the utility of the fibres. Yet mungo is an all-wool product, and can fulfil spheres of usefulness in the woollen industry; it is a useful addition in many of the woollen mixture yarns. In classification mungo is regarded as the shortest fibre used in yarn structure. As a general rule the fibres rarely exceed half-an-inch in length.

The Woollen Blend.

An important feature of woollen yarns is that of blended materials. These yarns are farraginous in their employment of several types of materials. Some blends are made up of fine wool, crossbred noils, shoddy and cotton; a greater coalescence of substances can hardly be thought of, yet the yarn produced from these materials will compare favourably with fine merinos and pure vicunas. It is essential that the blending should be both carefully thought out and carefully processed. The materials are laid out in the mixing room in layers; the number of the thickness of the layers varies according to the proportions of the materials included in the blend. In many instances a preparatory process is advisable in cases where dissimilar materials are to be intermixed. Laps and noils are greatly improved by being processed in a fearnought machine before being held out in the blend. Cotton needs an extra carding process before it is blended in order to render it light and fluffy and give fulness to the somewhat dead fibres.

Application of Oil.

The removal of all the oil from virgin wool in scouring was necessary in order that the dirt which was intermixed with the grease could be removed. It is essential to restore a lubricant to the wool before processing in the woollen card, in order to protect the fibres during the carding, which involves a considerable fibre movement. The method of applying oil to a woollen blend is to pour oil over each layer of material in the mixing room while the wool is being laid out. An oilcan with a T-shaped spout is used, and the oil is assisted in its distribution over the material by being whipped with a long cane. The oil is often applied to the blend in emulsion form. An emulsion is an admixture of oil and water, where an agent has been used as an emulsifier. Olive oil emulsions are often used with ammonia as the emulsifying agent. When vegetable fibres are to be included in the blend the oil must only be applied to the animal fibres; this involves a separate layout of the woollen materials, which are oiled and mixed, and then laid out a second time, so that the cotton, which has been previously carded, may be added. The object of lubricating the wool prior to the addition of the cotton is that the cotton has a great avidity for oil, and would absorb the lubricant intended for the wool.

The Woollen Blend.

Woollen yarns may be made up from virgin wool, noils and shoddy blended together. The construction of suitable yarns for the weaving and knitting trades is assisted by the adaptability of woollen blends, which enable suitable yarns to be made at reasonable prices. A vital point in the production of a good woollen yarn is the fibre distribution. It is vital that the fibres comprising the yarn should be thoroughly distributed. A complete distribution of the fibres is indispensable when mixed materials are being used, as the evenness of the yarn is seriously impaired by undistributed fibres. A woollen blend characteristic of the various mixtures made in this trade could be made from—

(1) Southdown wool.
(2) Botany noils.
(3) Shoddy.

The proportions of wool, noils and shoddy are varied accoring to the value of the yarn to be produced. The cost of the subsequent yarn is the basis from which the required proportions are determined. The raw materials would cost, say, Southdown at 22½d. per lb. (unscoured), the noils at 20d., and the shoddy at 10d.

(To be continued.)

Our Bradford Letter

Specially written for this Journal by
S. B. Hollings, F.T.I.

BRITISH TEXTILE TRADE.

Prices of Standard Cloths Made in Yorkshire.

Manufacturing Costs.

In describing manufacturing conditions in the West Riding of Yorkshire, emphasis is frequently laid upon the question of price. The slackness seen among spinners and manufacturers since last March may be attributed almost entirely to wool values going beyond what wholesale piece goods merchants have been prepared to follow. The opinion was generally and emphatically expressed that the price of the raw material would have to come down to enable it to be used profitably. Even now in endeavouring to make preparations for the next spring season manufacturers find that wholesalers will only go on at the same prices as were paid for the spring of 1928. No doubt the fine summer has enabled retailers to clear off considerable quantities of stock. Already retailers and tailors are showing for the autumn, and some delightful fabrics are to be seen. It would appear, however, that export, rather than home trade, is at the present time the better outlet for manufactured goods. Judging from the Board of Trade returns for July, export houses are still doing a fair amount of business, the shipments of fully manufactured goods having been larger during the first seven months of this year than in the corresponding period of 1927. Even after recognising this, it is quite easy to see that the increasing use of artificial silk yarns has inflicted a serious blow to certain spinners in the West Riding, big weights of single botany yarns having been displaced by artificial silk for women's hose. This is no doubt a permanent development, and users of wool cannot expect to do any more than hold their own in the general competitive scheme of things.

Notwithstanding the present quietness, there is reason for saying that before long there will be more doing in Bradford, due to manufacturers covering their requirements for spring goods. The following is a list of men's and women's fabrics, manufacturers' current prices being given in comparison with previous dates. As it includes cloths of plain styles, such as Australian manufacturers have hitherto been most successful in producing, it should be of interest to readers of this journal. No attempt is made to compare the prices given with the cost of production in Australia. Manufacturers will be able to do that for themselves as far as it is possible. The first two cloths and the last one are priced for the usual coating measure (one yard and one thirty-seventh allowed). All the others are net measure (36 inches to the yard). The prices are arrived at by allowing 5 per cent. profit on cost:—

	Aug. 20.	June 30.	Jan. 31.
	s. d.	s. d.	s. d.
17-18 oz. 64's Botany serge, indigo and London shrunk	9 1	9 2	9 2
17-18 oz. 56's crossbred serge, indigo and London shrunk	7 6	7 7	7 7
9-10 oz. 46's Botany serge, ordinary navy	5 3	5 3	5 3½
9-10 oz. 46's crossbred serge, ordinary navy	3 2	3 2	3 1
10-11 oz. 60 in. wide, union gaberdine, dyed and Cravenette proofed	5 4	5 4½	5 5
11 oz. Botany wool gaberdine, 64's, black and navy	6 6	6 7	6 7
13 oz. 64's Botany wool whipcord, black and navy	7 3	7 4	7 4½
11-12 oz. Botany wool repp colours	6 4	6 4	6 4½
14-15 oz. 70's Botany dress suiting, Diamond Black and London shrunk	7 11	7 11	7 11

It will be noticed from the above prices that the only cloths which have become dearer this year are 17-18 ounces crossbred serge of 58's quality and 9-10 ounces serge of 46's quality. All the Botany cloths are cheaper except one, and this reflects fairly accurately what is going on in manufacturing circles in the West Riding. The dearness of merinos has enforced substitution for something of lower quality, and even then it has been well nigh impossible to make anything like profitable prices. The present cost of clothing compels many people to curtail their purchases, or at any rate to buy what can be had at less money, even if something is sacrificed in quality. Take, for example, the 17-18 ounces Botany indigo serge mentioned above. A manufacturer states that the actual cost of making this cloth is 8/10½, and, calculating 5 per cent. on this, the cloth should be sold at 9/3, whereas the price given above is 9/1. Any manufacturer who is able to offer cloth at the price quoted in the list must, therefore, be cutting things very fine—so fine, indeed, as to make it practically certain that no profit remains. This can only be overcome by the substitution of lower quality.

The Textile Trade in Japan

Woollen Yarn.

Credit difficulties and weather affairs rather emphasised the between-periods condition still affecting operations. Forward quotations maintained their previous strength owing to little inclination shown by producers to grant price concessions in order to make progress. Spot quotations ruled 7 or 8 sen less than forward delivery. Imported stocks were neglected, though cablegrams reported a fall of 1d. to 2d., and required 10 per cent. more than the home stocks, which were preferred. There was no change in the market situation in Nagoya, where moderate business was done on the spot.

Mousseline.

After the continued easiness on account of rain, and in sympathy with cotton yarn, mousseline again fell back on a further reaction in cotton yarn. Business on the spot and forward was held over. Holders are watching the market with anxiety, with business to be resumed for the autumn shortly. The present condition is taken as giving a discouraging indication for business in sight.

Hosiery.

The monthly report published by the Union of Hosiery Exporters calls attention to the active business done with British India. Orders placed in the spring are being executed, shipments in July showing a large increase over the quantities sent in the previous month. The parcels for August delivery are about 300,000 dozen. Orders on African, Egyptian and New Zealand account have fallen off. Business with London continued of small dimensions, but the margin with buyers' limits tends to shrink. After the large quantities shipped in June supply to the Manila market was reduced, but an active business is expected after the rainy season. Business with the South Seas and Singapore is at a standstill since the latter part of May, when the boycott was organised there, where there is every indication of a large stock being left on hand. Chinese firms in Kobe appear to carry a considerable stock. It is likely, however, that dealings will revive after the settlement of accounts in October. A fairly good shipment is being made to North China and Manchuria to anticipate the trade revival for the winter. Business is in abeyance with Shanghai, where the boycott is in full swing.

Hemp Yarn.

Business is slow in hemp yarn, with the announcement of prices for the season close ahead on the part of manufacturers. It is expected that tariff prices will be higher than last year, when there were considerable floating stocks on offer since the consolidation of the Teikoku and Nippon companies. Holdings are much smaller now, while the prices for raw materials rule higher owing to a poor crop in Hokkaido and the gain of silver on the yen. On the price announcement there will be buying to cover future needs, which will impart much briskness to the market.

Banshu Cotton Goods.

The cotton textile mills at Taka-gun, Banshu, specialising in pieces for home consumption, will be closed from August 20 to September 10 in order to reduce the stock that has accumulated. The mills where export goods are turned out may be able to go on, some of them having sold up to October. The prices paid, however, hardly cover the cost, it is complained.

Gunnies.

A further advance in India and active business done in Dairen at 43½ sen per piece for blue for August, with the depreciation of the yen, has favourably influenced Kobe, where ready buyers can be found at 43 sen for the same date.

Cotton Yarn for China.

After the recent heavy slump, business with China in cotton yarn is expanding at improving prices. The question developed expectations of anti-Japanese movements in many places in China, sending down the market 10 taels below the best level. Of late, however, there is quiet buying in progress of large quantities evading the vigilance of men who have organised the movement. The operation is made in view of the large margin Japanese goods have with Chinese, which is not enough to meet requirements. Export during the last 10 days of July is reported as 417 bales, which compares favourably with the figure for the preceding 10 days.

Korean Cotton.

The cultivation of cotton is growing popular in Korea, thanks to the encouragement given by the Government in order to reduce the importation of raw cotton. In Southern Zenra there is an area of 615,404 tan under cultivation, showing an increase of 60,606 tan over the previous year. The growth of the plant is satisfactory. The quality obtained in Korea is relatively fine, selling about 2 yen per bale below American middling. The cultivation, however, brings in a return smaller than the growing of rice, and may be affected unless some inducement is given.

Mousseline.

The first business for the autumn with Hokkaido and neighbourhood, started a few days ago, has proved unsatisfactory owing to the weather. Prices are easy at 65.5 sen per yard for red 100, 55¼ sen for new special, 56½ sen for D. Forward quotations rule lower, buyers watching the market, which indicates that it will continue as it is for some time to come.

THE SILK MARKET IN JAPAN.

Habutae.

In sympathy with raw silk futures, Fukui habutae slumped 10 to 50 sen afer maintaining the previous day's strength. Buyers' limits, however, still showed margins of 10 sen or so. Dealings in Fukui are to be closed till 17th. Moderate business developed in Kaga habutae, with gaps of 10 sen or so being bridged over by mutual concessions.

Pongee.

Pongee was easy, the Pine Brand, red stamp, August and September, being quoted at the common price of 4.10 yen, against which 4.05 yen was buyers' limits. The Fukui market had advanced rapidly on the previous day, because, it is stated, holders, in order to force up prices, bought actively. Others refused to be led, and the operation was dropped. It is likely that the market will go down further.

Raw Silk.

After a disappointing business on Monday, raw silk was depressed owing to a further fall in price in New York. Only immediate requirements were covered, not exceeding 8000 lb. Prices were steady, however, supported by comparatively short supply, Atama (X Best), 14-denier, taking 1290 yen, less 45 yen yellow.

Fukui Crepe.

Organised curtailment of output in crepe-de-chine for export is in force in the Fukui district. The reduction in output was decided upon in order to deal with the depression. In many mills piece goods for home consumption, or Fuji silk in broad widths, are produced instead, and others are run on hours shortened 1½ or 2 a day. The market is improving, but not to such an extent that the production is profitable, as raw silk is advancing. The curtailment is well organised, and it is expected that before long the market will recover to make the business reasonably profitable.

Yokohama Silk.

The Yokohama Customs report that during the first ten days of the current month 16,344 bales of raw silk were exported from Yokohama, showing an increase of 1041 bales over the previous ten days. These bales were destined as follows:—United States, 15,326; Canada, 40; South America, 5; Europe, 966; Australia, 7. The firms participating in the business are Gosho, 925; Nippon Menkwa, 1093; Hara, 1039; Nippon Kiito, 1929; Mitsui, 5266; Nichibei, 492; Katakura, 749; Asahi Silk, 1617; other Japanese firms, 1144; foreign firms, 2090.

Spun Silk.

Active business has developed in spun silk both in the export and home sections of the market. Profits are increasing for manufacturers, estimated at 100 yen per 10 kwan in 135 and 70 yen on average. Export is on the increase, favoured by the low exchange, and the production schedule to be adjusted in Fukui and district has brought an active demand for the raw material. Australia shows interest in the cloth, as well as the South Seas, after a long period of no buying. Weaving centres for home goods require an increasing quantity. Manufacturers have sold up to November, and merchants are endeavouring to secure stocks held at second hand. The output restriction, however, will be maintained, as the night work will have to be abolished shortly.

Silk Advances.

The outflow of money from Tokyo to finance local filatures is not so brisk as it used to be. It was anticipated that there would be a considerable increase this season over last year, but as a matter of fact the amount that has been advanced up to date does not exceed 170 millions, as against over 200 millions a year ago. The explanation lies in the fact that the funds distributed in local banking by the Government to help deal with the condition springing from last year's financial crisis have reached where they should go, and resources have risen in local banks to meet the demand from filatures. Moreover, producers, who have learned a lesson, were careful to adjust production with the market condition. Financing for summer-autumn cocoons is just beginning, and the requirements will probably be moderate, as compared with last year. Advances to be made will be paid back promptly, as cocoons will advance owing to the shortage that is expected.

Silk Statistics.

During the month of July receipts of raw silk at Kobe were 25,928½ bales, as compared with 79,602 for Yokohama. Export in the month amounted to 10,956 bales, the largest figure in the past seven months, and comparing with 33,498 for Yokohama. The Kobe firms which participated in the business in July are Mitsui Bussan, 3727; Asahi Silk, 3990; Nippon Kiito, 1249; Nippon Menkwa, 855; Gosho, 700; General Silk, 425; Kawanoishi, 10.

Silk Conditioning House.

As already reported in these columns the National Silk Conditioning House for Kobe, it has been decided, will be located at Yobancho, a little west of the Minatogawa tramway tunnel, instead of being placed in the neighbourhood of the settlement. The decision is believed to be due mainly to a proposal of the Governor of Hyogo-ken against objections raised by numerous local silk export agencies, including some foreign firms. The local agencies are going to protest, it is stated, against the decision made by the Governor. It is even reported that some of the foreign silk export agencies find it advisable to remove to Yokohama owing to the better facilities there than in Kobe, the location now decided upon in Kobe being regarded as very inconvenient. It will be remembered that the decision was made directly between the Kencho and the Tokyo authorities without the municipal consent, and accordingly the municipality now intends to protest against the decision for the benefit of the local interests. In this connection an extraordinary municipal assembly may be held before long.—"Japan Weekly Chronicle."

Japanese Considering Development of Sericulture in Sumatra.

A number of Japanese sericultural experts have been sent to Sumatra for the purpose of making investigations concerning the possibilities of producing silk, especially in the northern half of the island.

Increase in Henequen Acreage in Mexico.

Henequen production in Mexico totalled 133,000 metric tons (metric ton = 2204.6 lb.) in 1927, as compared with 117,000 in 1926 and 137,000 in 1925, according to figures recently published by the Mexican Department of National Statistics. In 1927 an area of 190,000 hectares (hectare = 2.47 acres) was planted to henequen, as against 182,000 in 1926, and 187,000 in 1925.

The Turkish Carpet Industry

Through the ages the making of rugs has served as an outlet for the artistic tendencies of the Turkish people. Beautifully designed rugs and carpets have comprised one of the principal contributions of the Orient to the world's art. The methods of manufacture have changed very little since the days of the Seljuk sultans (1001 to 1299 A.D.). Rugmaking has remained a cottage industry and the art of weaving has been handed down from mother to daughter through generations. The products are now marketed by large organisations, which supervise the manufacture and collect the rugs from the weavers, and coal-tar dyes have replaced the vegetable dyes formerly used. Otherwise the industrial revolution has not affected carpet making in Turkey.

Industry Disrupted by World War and Subsequent Hostilities.

Before the war the Turkish carpet industry was very prosperous. Exports from Smyrna alone were valued at 600,000 gold Turkish pounds (2,640,000 dollars) in 1913. This figure does not include exports from the Ceaserea district, where weavers were turning out thousands of silk and woollen rugs. At that time carpets and rugs were woven in large quantities in many districts of southern Anatolia and thousands of people were employed in their production.

From the time of the declaration of war by Turkey in 1914 until the cessation of hostilities between Turkey and Greece in October, 1922, carpet and rug manufacture in Turkey was practically at a standstill. Operations were resumed on the looms in the Sparta, Ouchak, Koola, and Ghiordes districts in 1919, but just when the situation was beginning to assume a more favourable aspect the Greek occupation divided Anatolia into two warring zones. Many of the weaving centres changed hands several times and some were destroyed. Carpet production practically ceased in the districts where fighting was going on. After the capture and burning of Smyrna this region experienced economic chaos and carpet weaving was abandoned. It was only at great expense and with infinite patience that producers were able to revive the industry, which was severely handicapped by the loss of Greek and Armenian workmen. These two classes supplied some of the cleverest weavers in the country and were generally entrusted with the designing of the rugs and carpets and overseeing of production.

Industry Regaining Its Pre-War Importance.

At present carpet weaving is once more being conducted on a large scale in the districts of Sparta, Ghiodes, Koola, Oushak, and Demirdji. Production at Simav, Guerai, and Kutshia is not as large as it was prior to 1914, while in Sivas, Marash, and Sille carpet weaving has almost disappeared. Because of higher prices, present production almost equals in value the pre-war output, although it is considerably smaller in quantity. Producers are confident that they will be able to overcome the difficulties occasioned by the war and the exodus of Greek and Armenian workmen and to meet successfully the competition of the newly established rug industry in Greece. They do admit, however, that the finer grades of carpets, which were formerly made in Turkey, are now being manufactured almost exclusively in Greece.

Sparta the Principal Centre for Rug and Carpet Weaving.

Although Smyrna is the centre of the Turkish carpet industry, very few rugs are made in the city. The weaving is done in the home of the weavers scattered over various districts of southern Anatolia. Certain types of carpets and rugs have been named for the principal town in the district where they are made. An average of the estimates of the Smyrna Chamber of Commerce and of four large producers indicates that more than 40 per cent. of the looms and weavers are located in Sparta. When reference is made to any place, Sparta for example, the town alone is not meant, but quite a large area surrounding it.

Smyrna the Distributing Centre for Turkish Carpets and Rugs.

Inasmuch as rug weaving has remained a cottage industry, the large producers have built up a special type of organisation, with head offices in Smyrna, from which the business is managed and the carpets are assembled and prepared for export. At present there are seven large concerns (four Turkish, two British, and one American) engaged in the production and distribution of Turkish carpets and rugs. Practically all manufacturers follow the same methods:—

The producer obtains orders for a certain quantity of a given quality of carpet to be made according to an approved design, which may have been prepared by the pur-

chaser or which may have been submitted by the manufacturer. All producers maintain agents in the various weaving centres to supervise the weaving. When an order has been received at the Smyrna office the necessary designs, weaving specifications, properly dyed wool yarn, and cotton or wool warp or weft are sent to the agent in the interior. All of the materials are delivered to the weaver's home, where the loom (sometimes owned by the weaver and in other cases by the producer) is set up and the warp of the carpet placed by a skilled workman called a "mounter." The weaver then begins work, following the designs and specifications supplied by the producer, whose representative calls from time to time to inspect the work and often to make advances of money to the weaver for her work. When the carpet is finished it is carried to the depot of the agent, who counts the number of stitches and places the weaver's earnings to her credit. The carpet is then sent to the main assembly plant, which, in every instance but one, is located in Smyrna, where the pile is clipped and the rugs are washed by a special process. At the assembly depot the carpets again are measured, clipped once more, cleaned, and packed into bales for export.

Materials Used in Carpet and Rug Manufacture.

Anatolian wool is used exclusively for spinning yarn which forms the pile of Turkish carpets and rugs. Approximately 9,000,000 lb. of grease wool are consumed annually by the carpet industry. The very best wool, known as high plateau, comes from the vicinity of Konia, Angora, Afion Karahissar, and Eskichehir. This high-grade wool is mixed with lowland products, in order to obtain a blend which will give strength, body, and lustre to the yarn. All wool yarn employed in carpet making is spun locally. Three of the largest rug producers maintain modern spinning mills, where they turn out vast quantities of yarn for their own use and for sale to other carpet manufacturers. Carpet and rug yarns vary considerably as to quality and certain characteristics are desired for different types of carpets. The pile of all Turkish carpets and rugs, however, is invariably pure wool.

Wool is also frequently used for the weft of medium-grade carpets, but it is not as strong nor as satisfactory as cotton weft. In rare cases wool weft is used in inferior grades of carpets and rugs.

About 400,000 kilos (880,000 lb.) of cotton are imported annually to be spun into yarn for the warp and weft of Turkish carpets. Of this amount approximately 70 per cent. is Indian cotton, from which is manufactured the warp and weft of the best-grade carpets, such as Sparta and Oushak. The aforementioned three large carpet manufacturers also spin cotton warp and weft for their own requirements and for sale to other producers.

Vegetable dyes, formerly used to colour oriental carpets, have been replaced by chemical dyes, made from coal tar. About 30,000 kilos (66,000 pounds) of dyes are imported each year by the carpet industry, of which approximately 99 per cent. is supplied by the German dye combination, the I. G. Farbenindustrie, which maintains a representative in Smyrna.

Amount of Dye Required an Important Consideration.

The cost of dye is a most important factor in determining production costs of carpets and rugs, on account of the variation in the quantity and price of dyes required for different types of rugs. For example, a dark Sparta rug takes from 250 to 350 grams (gram equals 0.035 avoirdupois ounce) of high-priced dye per square pic (0.5039 square yard), while one Oushak rug needs only 100 to 150 grams of dye, costing about one-fifth that of the dye used for Sparta rugs. Alizarine dyes are employed for Sparta, Pergam, Serapi, and Irani carpets, while aniline dyes are used for the Ghiordes, Teziah, and Karadji products. The yarn is dyed in the Smyrna plants, wound into hanks, and shipped to the agents in the interior in required quantities.

Designs Identified with Certain Types of Rugs.

The names designating types of carpets and rugs, such as Sparta, Oushak, and Pergam, are indicative of the construction of the carpet rather than of a particular design. Certain patterns, however, have become identified with special kinds of carpets and are seldom used for other varieties. Copies of designs in antique Turkish rugs or of Persian and Chinese carpets are frequently made, but every rug producer of any consequence maintains a staff to create original designs and to modify older patterns. Dealers in foreign markets sometimes employ artists to furnish designs which will show the Turkish manufacturer the prevailing tastes of the dealer's custo-

mers. Original patterns are often submitted to foreign purchasers for criticism and later modified to suit the buyer. Miniature designs to show the figures and colour combinations are made in water colour and from these patterns weaving guides or "millimetriques" are fashioned, which show on a scale the number of knots of each colour required to the square millimetre of carpet. The weaver places the millimetrique on the loom and follows it in weaving the carpet.

The process of weaving is further described in the following paragraph:—

As previously stated, the time-honoured and traditional art of carpet weaving is passed from mother to daughter in Turkey. At a very early age girls begin to help the older women and by the time they are 12 to 15 years old have acquired extraordinary skill in weaving. Usually from two to four weavers are employed on one carpet loom, and one or two on a small rug loom. The loom is set up in the home of the weaver by the mounter, who sees that the warp of the carpet is properly strung. The weavers sit on a low bench in front of the loom and are equipped with a millimetrique, yarn dyed in various colours, a short sharp knife, clipping shears, and a heavy-toothed instrument resembling a currycomb. The weft is placed in the carpet by the weaver, each bit of yarn being passed twice around the strand of warp and then cut with the knife. The colour of the knots of yarn follows the design. Another person, usually an apprentice, beats the knotted yarn and weft together with the toothed instrument, and a third clips the pile to an even length.

Weavers work from sunrise to sunset, or from five to six hours in winter, and from nine to 10 hours per day in summer. Expert weavers have turned out 10,000 stitches a day, but the average is from 6000 to 8000. The amount of carpet that can be produced in a day by a weaver depends to a great extent on the number of knots per square inch, which vary in the different types of carpets. Four average weavers working on one loom will produce a high-grade Sparta carpet, 22 pics square (pic equals 25.6 inches or 0.71 yard), in six or eight weeks. A medium-grade carpet will be woven by the same person in four weeks and a low-grade carpet in 15 days.

Labour Cost Varies.

The wages of weavers have declined somewhat during the past year. The average weaver earns about 2.50 Turkish pounds (1.25 dollars) per day. (The paper Turkish pound is worth about 0.51 dollars, and is equivalent to 4000 paras.) The labour cost per square pic for the various types of carpets is approximately £T1.60 for Sparta and Pergam carpets, £T1.40 for Oushak, and £T1 for Ghiordes and Zaif Ali.

Production and Exports of Carpets and Rugs.

The total production of carpets and rugs during 1927 amounted to 974,000 square pics, or approximately 490,800 square yards. The output in square yards by districts, according to figures supplied by the Smyrna Chamber of Commerce, was as follows:—Oushak, 181,400; Ghiordes, 116,000; Sparta, 74,200; Demirdji, 37,600; Koula, 33,200; Simav, 24,000; Bordour, 12,800; Bouladan, 5500; Sersikouy, 2300; and Oulou Bourlou, 3600.

Exports of carpets and rugs, according to the same source, aggregated 5,344,328 kilos (kilo equals 2.2046 lb.) in 1927, compared with 4,709,311 in 1926 and 3,995,994 in 1925. Of the 1927 exports, the United Kingdom took 2,276,481 kilos and the United States 2,253,666 kilos. The balance went to Continental countries and Egypt.

Demand for Rugs for Various Markets.

The bulk of the production is exported to the United States, Great Britain, and the Continent, as there is very little local demand. Each foreign market has its peculiarities, and carpets and rugs are produced in combinations of designs and colours to satisfy the taste of each country.

The American rug buyer demands carpets of dark shades, usually rose, dark blue, or golden brown, with over-all patterns without a medallion or centre design. American consumers also prefer carpets with a thick, luxurious pile and a glossy surface. Carpets with a sheen, produced by washing them in a chemical solution, are shipped in large quantities to the United States. The most popular type is the Sparta, the most expensive carpet now being manufactured in this region, followed by the Pergam, Teziah, Oushak, and Ghiordes.

The English market is conservative and continues to purchase large quantities of Oushaks with medallions in the centre and designs that were favoured during Queen Victoria's reign. The plain and fancy Oushaks shipped to the British Isles are light in colour and have a short pile. The carpet is not washed.

The French and German markets also demand carpets in light colours with fancy designs and thin short-pile goods, because the duty in both countries is computed on the basis of weight.

Economic Importance of Industry.

The carpet industry furnishes a home market for Turkish wool, employs thousands of people, and brings large amounts of money into the country every year. The industry passed through a most disastrous period from 1914 to 1922 inclusive, but it has again become stabilised and prosperous and should continue to expand.

(U.S.A. Commerce Report.)

Egypt Offers Good Market for Handkerchiefs.

The Egyptian market for cotton, silk, rayon, and linen handkerchiefs is large. The native demand is for highly-coloured plaid patterns, most of which are imported. The local handloom weavers are supplying a portion of the rayon handkerchiefs for the domestic market. Fine linen and silk handkerchiefs with a woven pattern border, either two-tone or plain colour, are sold to the better-class of the population. The cheap quality coloured patterns find a market among the native trade. Fringe handkerchiefs are used by men for wrapping around the head. The prospects seem very good for American participation in this trade, in both made-up goods and handkerchiefs in the piece.

Wetting-out Agents and Other Auxiliary Products Used in Dyeing

By E. J. Rath, Ph.D.

(Continued from page 433.)

In the state in which it leaves the scouring bath wool is normally harsh, and would spin badly if a certain quantity of grease or oil was not applied to it. Carded yarn is generally softened with olive oil or oleic acid emulsified by soap or ammonia. By the aid of the leonil LE, fats and oils, whether saponifiable or not, can be converted into extremely stable and fine emulsions without any soap, and such soap-free emulsions have great advantages in the spinning process, particularly in the case of carbonised material or material containing residual acid from the dyeing process, as there is no danger of the wool becoming sticky. Leonil LE emulsion wets the wool very rapidly and uniformly and covers each single wool fibre with a fine film, with the result 15 to 30 per cent. oleic acid can be saved, and the same softening effect obtained. Wool so treated gives an even, round sliver, and uniform yarn, which is readily scoured and milled.

When using the ordinary process of emulsifying with soap an addition of 2 to 3 g. per I leonil S to the softeners can be recommended. This also holds good for the breaking (devilling) of shoddy, if a pure oil is not used.

When dyeing wool with acid and chrome developing dyestuffs an addition of 1 to 2 per cent. leonil S on the weight of the goods increases the dispersion of the dyestuffs, and thus their levelling and penetrating properties, even if the goods are not quite clean or completely neutralised.

In carbonising the addition of 0.5 to 0.75 g. leonil SB per I liquor enables the concentration of the acid to be reduced from 6 deg. tw. to 4 deg. tw., and at the same time an entirely uniform wetting-out, including the soiled patches, is obtained; the acid solution, which has only a very slight surface tension, is also more easily removed from the goods in the subsequent hydroextraction. The vegetable impurities are thoroughly wetted-out by the acid, and consequently are completely destroyed during the drying process. Such goods are, of course, easier to neutralise and to dye. The quality of the wool is preserved, and carbonising stains are avoided. The action of these bodies is so intense that it is even possible to carbonise in the grease without difficulty.

When washing piece goods, the residue of leonil originating from the spinning oil is very advantageous. Milling proceeds more quickly in consequence of the fine distribution of the grease, and the washing out of all impurities is facilitated.

An entirely novel point which may lead to the development of new processes is that a mixture of leonil SB and soap may be acidulated with sulphuric acid without separation of fatty acid, the latter remaining in solution and retaining its washing and cleansing property, notwithstanding the acid reaction. It is an absolutely new experience that soaps may be used in acid baths and still have a considerable cleansing effect. Possibilities are thus opening to the wool industry the significance of which cannot yet be estimated; e.g., in milling there is no need for carefully removing the acid, and dyestuffs which may not ordinarily meet the requirements of milling will stand the acid milling process without detriment.

A product of great importance for milling and washing woollen piece goods is water-soluble laventine BL, which in combination with soap removes the most obstinate impurities without difficulty. Generally one part laventine BL per 5 to 10 parts soap is sufficient.

In special cases wetting-out agents containing fats are needed in the cotton industry. The prestabit oils are an improvement on Turkey red and monopol brilliant oils. They possess excellent fastness to acid, lime and Epsom salt. It is singular that in alkaline baths they lose their wetting-out property (the KN and BM brands excepted), and are surpassed therein by monopol brilliant oils. Their principal sphere of application consequently is not so much in the general bleaching, dyeing and finishing processes for cotton, but rather in special methods of working. Prestabit oil KN is an exception, as it wets out well, even in alkaline cold solution, and is a good auxiliary in kier boiling, bleaching and dyeing, and should be used in all cases where the presence of oil is desirable.

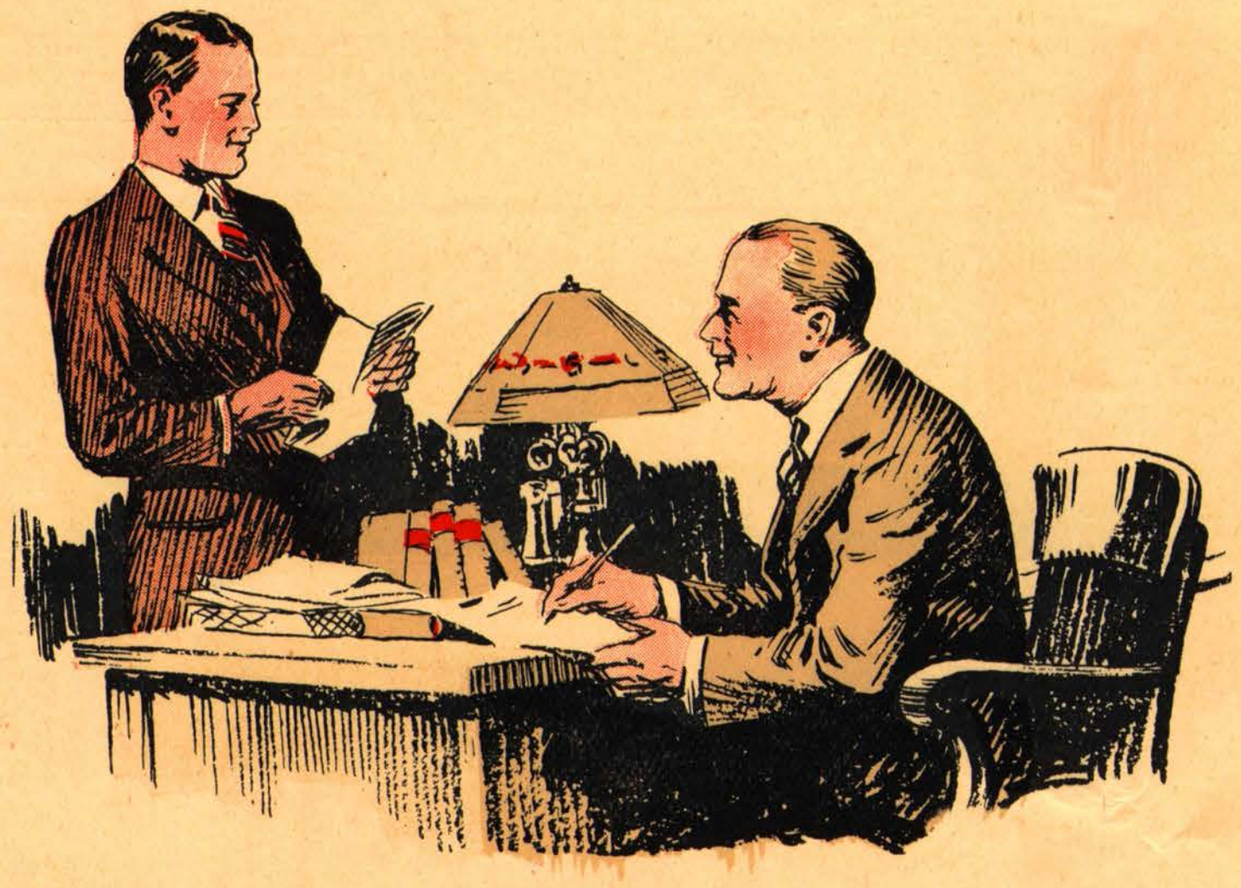
Prestabit oil BM is of particular advantage for mercerising in the grey. It imparts to the caustic lye (52 deg. to 57 deg. tw.) excellent wetting-out properties, and the goods may be subjected to a higher tension and a higher lustre obtained. The old liquors may be made use of, as is customary, in kier boiling, and possess a higher wetting-out power and a stronger effect. Prestabit oil is not required for previously wetted or bleached goods, which absorp the caustic readily. The GA and VA brands are specially valuable, as they are adapted to very heavy Epsom salt finishes.

Continued Increase in World Production of Raw Silk.

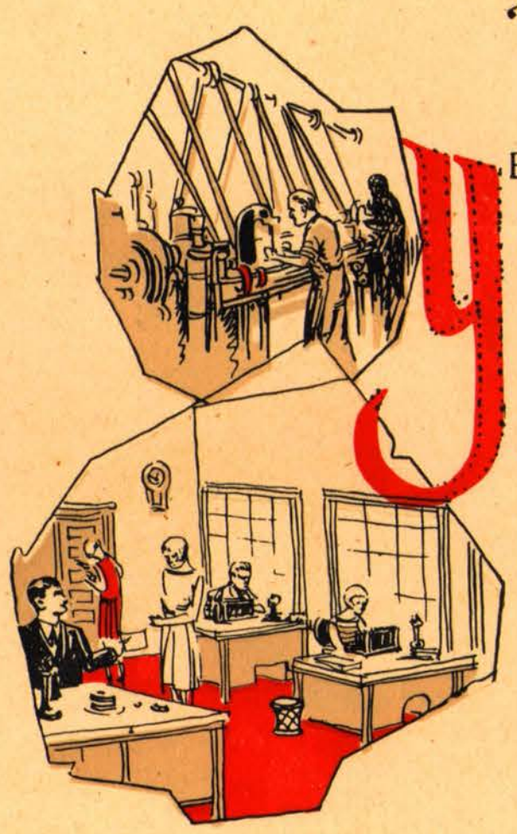
World silk production statistics for 1927 have been issued by the Union de Soie de Lyon. The figures for the Far East are provisional, and those for the Near East and Italy approximate. The 1927 crop of raw silk is placed at 46,350,000 kilos (kilo equals 2.2046 lb.), an increase of 2,210,000 kilos over the 1926 yield, and is credited to the various countries as follows:—France, 295,000 kilos; Italy, 4,450,000; Spain, 80,000; Eastern Europe, Levant, and Central Asia, 1,100,000; China, 8,190,000; Japan, 32,100,000; India, 75,000; Indo-China, 60,000. Totals for the Far East are for exports only.

European Corsets Sold in Syria.

Corsets, brassieres and girdles are imported into Syria, chiefly from the Continent. Corsets and girdles sell for approximately 2.35 dollars to 6.50 dollars. Brassieres of net retail at 0.40 dollars to 0.80 dollars. A similar garment in silk is priced at 0.80 dollars to 1.20 dollars. An attempt to import garments combining corset and brassiere failed, because the size relations were not according to local demand. American exporters are advised to enter the market through commission merchants.



"Jones, I've decided to overhaul and improve the hygienic and general working conditions of the factory!"



YES, sir, and if I may make a suggestion, I think one of the best things we could do would be to seek the aid of the 'Textile Journal's' Subscribers' Service Bureau."

"Exactly what is that Service Bureau, Jones?"

"It is a department inaugurated by the 'Textile Journal of Australia' to thoroughly analyse economical and technical questions of textile manufacturers like ourselves. They have a complete organisation, which has full access to reference libraries, laboratories, etc. These facilities are again enhanced by the supplementary advice of the most skilled and experienced specialty experts in Australia."

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SERVICE BUREAU

Financial Review

Specially written for this Journal by "A. Stockbroker"

Business on the Stock Exchange has become definitely quieter than it was a month ago, and while the outlook is by no means dull no early resumption of activity can be looked for. The decline in turnover commenced with a slackening off in demand for any stocks with a speculative savour, followed by an increasing demand for Commonwealth Bonds and other gilt-edgeds. Prices generally remain steady throughout the market.

As matters still are rather at sixes and sevens on the waterfront, and for a long while the normal spring rains delayed their visit to the wheatfields and sheep paddocks, although recent copious falls have since brought about flooded conditions in some districts, it is no wonder that would-be investors in Stock Exchange securities have of late been adopting a cautious attitude. Rather than buy at recent prices, they have been content to wait and see how the season develops, and what is the outcome of the industrial struggle on the wharves.

There is a characteristic, moreover, in other than Stock Exchange circles, and, as a consequence, business in most sections of trade, commerce and manufacturing is stated to be dull. No extensive purchasing is going on, and, in fact, is not likely to be made until industrial conditions improve, although the outlook is better than it was even a week ago.

The strike of the members of the Waterside Workers' Federation against the award of the Arbitration Court is rapidly collapsing as a result of the successful employment by the shipowners in several ports of hundreds of volunteer workers under the protection of the new Commonwealth Industrial Acts and the batons of scores of police.

The prospect at present is that many of the strikers will permanently lose their former employment and will be replaced by volunteer labourers registered under the emergency measure recently rushed through the Federal Parliament. The shipowners appear to be masters of the situation, and this trouble should be followed by a period of peace on the waterfront, such as the public has not enjoyed for many years.

The idleness and muddle in the ports resulting from the strike is only a passing phase, and the cost of the strike will count as money well invested if the outcome should be a few years' peace and satisfaction on the wharves.

The wool sales everywhere were completely held up, but Melbourne brokers resumed sales on Tuesday, 2nd inst., and, although prices have suffered as a result of the delay, the market is rapidly settling down to normal.

While the strike position consequently is clearing up, the seasonal outlook has been completely changed by the recent rains, and the harvest in the four principal wheat-producing States of the Commonwealth is now assured. The pastoral position also is much more satisfactory.

So far as the lambing and the wool clip are concerned, pastoralists generally are thoroughly satisfied, and in most cases the clip will be an excellent one, quite up to the high expectations.

Considerable confidence has been inspired by the published estimate of the United States Agricultural Department that the world's wheat harvest is only 4 per cent. above last year's, and that shortages in Russia and India will correct the influence on the market of that small surplus. Prices for wheat, consequently, although not up to last season's, are expected to be reasonably profitable.

The money market, for the time being, is in an exceptionally easy position, due, partly, to the lessened demands of the business world owing to dulness of trade, and largely to the repayment by the Commonwealth on the 15th ult. of the balance of the unconverted portion of the 5 per cent. loan maturing on that date and amounting to around £8,500,000. The temporary cessation in the financing of wool bills due to the hold-up of shipping through the wharf labourers' strike also has released a large amount of money seeking short-dated investment.

The market for Commonwealth Bonds is responding to the plenitude of cash, and most of the issues are firm. The 6 per cents. due December, 1930, as being the most popular short-dated issue, have been in demand, and large parcels have been placed at advancing rates, and prices have been pushed up to a 5⅜ per cent. basis, and at one time gave the lowest return of all the issues, with the exception of the fives due 1948. The 5 per cent. 1948's are generally maintained at a price above their return value by reason of the buying by executors and trustee companies for the purpose of effecting payments of Commonwealth estate duty, for which the bonds, now available at £98/13/9 net, are accepted at par (£100), plus interest.

There also have been further sales near par of State Savings Bank 5½ per cent. 1939, and Melbourne and Metropolitan Board of Works 5¾ per cent. 1944 loans.

So far as Melbourne Stock Exchange markets are concerned, there has been little outstanding activity, and price fluctuations have been restricted to rather narrow limits. Several important balance-sheets and company statements have been made, but these have hardly affected the price of shares. Perhaps one stock which has been the exception is Myer Emporium ordinaries. These at one stage firmed to 41/ (cum dividend, 1/4½), closing around 37/ (ex dividend). The company's profit for the past year is reduced, and 14 per cent. is paid, compared with 17½ per cent. paid last year. It also has been announced that the company has acquired a controlling interest in James Marshall and Co., Adelaide.

Bank shares have been very firm, and both E.S. and A.'s and National of Australasias have advanced further. There

is a market rumour that a new E.S. and A. Bank issue is contemplated. The balance-sheet and dividend are due in November. For a long time National Banks have been cheap in comparison with many other bank shares.

Speculative and mining stocks were rather on the neglected side, and prices showed little variation until the last week or so. Prices of base metals were steady, and as a result shares of metal-producing companies quiet. Metal prices now are showing some reaction. Tongkah Compound and Bundi, both of which are now regarded as definitely settled on a dividend-paying basis, showed strength earlier, but Compounds close weak, as also do Tongkah Harbours.

Even the small interest aroused in a few Victorian gold-mining stocks during August has departed, although New Red, White and Blue Consolidated has paid another shilling dividend. Roma Oil shares have been firm, and sales have taken place up to £6/15/, closing lower, following fresh showings of gas from boring on the field.

One of the most disappointing stocks of recent years has been Dunlop Rubber, and the latest announcement is that, operating during a year when the Perdriau Company made a record profit and the Barnet Glass Company's profit was large and satisfactory, this concern has incurred a loss, and reserves will have to be drawn upon to pay the preference dividend. The directors report that the loss has been incurred in rubber purchases. In contradistinction the Perdriau Company has been enabled to write up the book values of its assets by £166,168 in order to increase the book values to true levels, presumably as a result of investigations arising out of negotiations for a merger of interests between the two companies.

The Sydney Stock Exchange has also shown signs of quietening down, although the volume of sales put through continues of fair dimensions. Prices, however, are still holding well, after allowing for some reactionary movements following good rises of recent occurrence. British Tobacco are firmer, as are Colonial Sugar and Kandos Cement.

David Jones has declared a final ordinary dividend at the usual 10 per cent. rate, and shares are available to return 7½ per cent.

On 8th inst. the Australian Gaslight Company auctioned 35,000 £6 shares, and the public apparently regarded it as a favourable opportunity of obtaining on favourable terms shares which constitute a sound investment. The dividend is fixed at 8 per cent., and shares should be purchasable to return about 7⅛ per cent. The whole of the shares realised an average price of a little short of £70.

Were's Investment Trust reports that a steady stream of applications for shares is still coming in, and to date about 720 shareholders have taken up 400,000 shares. Shares are 5/ each, fully paid, and the lists of the first issue are still open. A feature of the company's flotation is the smallness of the expenses which the company will have to meet, and in this respect a notable contrast is provided with the recently launched Australian Investment Trust. As for the first period of a trust company's existence the question of expenses is a very serious one,

(Continued on page 498.)

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NOTICES.

CONTRIBUTIONS.—We solicit contributions upon all matters relating to the textile industry, and especially do we welcome the views of practical men upon practical subjects. We accept no responsibility in connection with submitted MSS., but will endeavour to return unsuitable articles when stamps are sent for the purpose. We pay for original and suitable matter.

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MELBOURNE, OCTOBER 15, 1928.

MEET "LANA."

This issue contains our first article from "Lana." This nom-de-plume hides a contributor well versed in the subjects with which his contributions deal. He is fully qualified to write authoritatively about them. It is his desire that he shall supply us with matter under a pen-name. It is not ours. We honour his wish and do not question it.

Occasionally we have been asked whether those of our contributors who so desire to remain unidentified are men of knowledge sufficient to warrant reliance on their statements. The answer is obvious. We print their manuscripts. Therefore, to our minds, they are worthy of respect and credence. The position is two-sided. The excellence of our writers' matter gives standing to our journal. The standing of our journal stamps with reliability its contributors who prefer anonymity to the divulgence of their names.

Many inexperienced and insufficiently informed people look upon noms-de-plume as evidences of weakness, unreliability or ignorance. They argue that only uncertainty of the truth of what they write or the fear of being proven wrong cause writers to shun self-advertisement. If the authors of published matter were sure of their statements they would be only too glad to put their names to it.

It is not so. There are numerous excellent reasons why men, sometimes, should demand and be allowed to remain incog. It is so with those of our friends whose contributions are printed under assumed names. Naturally, for the benefits which accrue to us from such a course, we prefer to publish their full names and qualifications. But if we cannot do so we cannot. We are satisfied to be disappointed in such circumstances.

IRISH LINEN.

We commend to our readers Mr. A. S. Moore's article in this issue entitled "Big Move to Revive Irish Linen." It is pregnant with meaning to us. The details of unemployment in the Irish linen trade are attention-arresting and sufficiently startling to call for serious thought. It is gratifying to read that steps for the amelioration of the conditions under which the trade and its workers are suffering have been taken by a powerful committee. We in Australia cannot afford to view with indifference any misfortune that attaches to or attacks any of the activities of Great Britain.

It is not with the object of elaborating Mr. Moore's remarks or dwelling upon the difficulties with which the Irish linen industry is faced that we refer to our contributor's article. Our purpose, rather, is to draw some comparison between the outlook of Irish linen manufactures and that of some of our textile millers. The former—experienced in the building up of a great industry—have come to the conclusion that some of their misfortunes result from the facts that purchasers of their manufactures have no assurance that linen which they buy is what it is represented to be by the middlemen from whom it is bought. As a consequence, for the sake of obtaining increased profits, other linens of inferior qualities are sold as Irish. Thus sales are lost. Customers ordering "Irish" are supplied with some other which, by reason of its inferiority, depreciates the reputation of the high-class line which it is falsely represented as being. In every way this practice—which is not peculiar to Irish linen—has a very detrimental effect upon the true and better-class product.

Irish linen manufacturers have decided to take steps to ensure that their goods will stand or fall by their own merits or demerits. They propose to arrange that buyers of Irish linen can be certain that the line they receive is the one for which they seek, and for which they have paid. This—so far as we can see—necessitates that "stabilisation and uniformity of products and quotations" shall be adopted by all makers who desire these ends, and that the product itself bear visible statement that it is "Irish linen," and is of a certain grade or quality. Evidently these are the intentions of the Irish Linen Guild, and are the outcome of a bitter experience which, probably, has shattered the age-old beliefs of some members of the Guild that such actions were fundamentally unsound, or at least quite unnecessary.

We have advocated somewhat similar action being taken by our Australian textile millers. Our views have not met with the whole-hearted or general support that we think they are worth. And probably, in spite of the facts that every line that is particularly well established on the markets of the world is so because of the fact that its existence, its virtues and its identity have been impressed upon those who bought and used it, and have not been separable from it; they will continue to be without it. Even the change of front by Irish linen manufacturers will have no weight with some.

Notwithstanding this, we state again our belief that the separation of Australian-made textiles from imported goods by the incorporation of a system of brands worked into the material, and so ineradicable, is highly desirable. The plan which is good enough for the recovery of trade lost should be better than good enough for the establishment and development of a trade that is comparatively new. The probability is that any advice proffered by Irish linen manufacturers to Australian textile millers would be somewhat of this nature: "Lose no time in identifying your goods with yourself. Be sure of retaining for them all the excellence of reputation they may make. So treat them that no one will be able to present inferiorities in their stead, without the duplicity being evident. Ensure a continuance of the result of your work by making your product easily identifiable."

We ask—How can this be done other than by brands?

COTTON THREADS.

As we have done before, we draw the attention of our readers to Mr. G. L. Wood's article herein on "The Cotton Industry in the U.S.A." The pregnancy which has marked Mr. Wood's previous contributions is equally noticeable in this. All those connected intimately with the cotton industry, either directly or indirectly, can read it with advantage. Its contents will repay careful thought.

It may be considered to be a supererogation for us to comment on this informative and interest-creating article. We do not presume to add to its matter or elaborate its many important features. Our object is rather that of an index. We wish to make plain and easily discoverable, by readers to whom the service may be welcome, several of the many important references with which Mr. Wood's contribution is replete. Nevertheless, we advise those classified above to read it for themselvs. It is quite possible that they will discover in it more than we have.

AFRICAN LABOUR.

The fact that Mr. Wood sees in the cheap labour to be obtained and utilised in Africa a factor which threatens the transference of the dominating influences in the cotton industry is worthy of our thought. Mr. Wood has shown plainly and conclusively, in the scholarly articles on the world's textiles, which he has prepared at our request, that he is not only well qualified to write on this great subject, but that he spares no pains to acquire reliable

information, and is careful and painstaking in his presentation of it. His deductions are logical and are made from data which he has obtained with discrimination. Therefore, his statements deserve appreciative attention.

In respect of his speculation—which is all that he claims it to be—regarding the menace of Africa's coloured cheap labour, we must remember that his inquiries into the history of the American cotton industry's growth and movements, and his examinations into the effects which the Chinese and Japanese activities in textiles have had, and are having, have equipped him with bases for his arguments which few of us possess.

Mr. Wood has given us—by his "speculation"—a lead to the contemplation of some possibilities and their effects. The rest is left to us.

American Collars Well Liked in Venezuela.

There is a favourable demand in Venezuela for American collars, even though they are higher priced than those of domestic manufacture. More than 20,000 dollars' worth were imported from the United States in 1926. Semi-soft styles are now more popular than the starched variety. American collars must be sold in Venezuela on a strictly quality basis, and considerable advertising is essential in order to hold the market from European competitors.

Quality of American Work Clothing Appeals to South African Market.

A large part of the work clothing sold in South Africa is reported to be of American manufacture, although shipped through European branch houses. The local industry heretofore has manufactured only the cheapest articles, thus leaving an excellent opportunity for the sale of good-quality American overalls, work coats and shirts. Local manufacturers are importing their supplies, and keener competition can be expected.

Activity of German Flax-spinning Mills Curtailed.

The exceptionally high prices for raw materials have forced a number of German flax-spinning mills to reduce their output still further than the 30 per cent. curtailment already effected or to shut down their plants entirely. In Silesia, the centre of the German linen industry, various prominent firms have ceased activities, some for an indefinite period and some for four weeks. Inasmuch as the shortage of raw material is expected to become still more acute toward the end of this year's flax season, the closing of further plants will be almost unavoidable. The situation is not expected to improve until the first supplies from the new harvest are received, probably in the early part of September. Prospects for the new crop are reported favourable.

FINANCIAL REVIEW.

(Continued from page 494.)

it will be particularly interesting to compare results of these two trusts. The directors of Were's Trust have stated that dividend income already received bears out the prospectus estimate that dividend of 7 per cent. will be paid for the first year.

Interest has been aroused by the listing of Cresco Fertiliser shares, and the ordinaries have been available at 23/, at which price the return is £8/13/11 per cent. The company is a large and progressive one, and has been paying 10 per cent. to ordinary shareholders for some years now, after meeting the 7 per cent. preference dividend charge.

Textile Company Financial Results.—Lustre Hosiery (Sydney) sales for the 1927-28 financial year jumped to £340,625, compared with £172,481 for last year and £150,888 the year before. Five years ago the twelve months' sales totalled on £36,347. Gross profits for the year just closed were £112,892, compared with £74,114 for 1926-27, and net profit was £28,073. Dividend is maintained at 10 per cent. on both ordinary and preference shares, and takes £20,000. Shares stand around par (20/).

G. A. Bond and Co. business is still being carried on in liquidation with a view to a possible reconstruction or the sale of the business as a going concern. The most encouraging announcement in this regard is the issue of a balance-sheet by the liquidators covering the period from December 7 last to June 30. This shows trading profit of £24,412, and, after making provision for depreciation, a net profit of £5411 remains.

The spinning plant of the cotton mills has been leased, and the liquidators are engaged upon manufacturing cotton yarn for consumption in the hosiery and underwear mills, while a small surplus stock is being disposed of.

G. A. Bond Cotton Mills has been in the hands of the receivers for some while, and it has now been placed into liquidation, as stocks were insufficient to meet the claims of the bank and other creditors, and it will be necessary to meet further claims by the realisation of fixed assets.

Soft and Semi-soft Collars Used for Street Wear in Ecuador.

Ecuador took 1319 dozen collars and cuffs from the United States during 1926. American-made soft white collars retail for 30 to 35 cents. English stiff doubled collars retail at 35 cents and English starched white cuffs at 50 cents per pair. Domestic soft collars sell for 12 cents to 20 cents each. Local dealers will make collars to order for approximately 30 cents apiece. Soft and semi-soft collars are the styles generally seen on the streets.

POSITION WANTED.

Foreman.—Tuner in the Weaving Department. Highest credentials. Available for immediate employment. Apply "Foreman," c/o "Textile Journal of Australia."

Cotton Yarn Testing

A recent trip through quite a number of cotton mills, both large and small, disclosed the surprising fact that just one mill out of the entire number visited was carrying on a regular system of test for the cotton yarn being used in the make-up of their products. And most surprising was the fact that the majority of these concerns were doing complete testing on many other fibres, and in some cases maintained large and well-equipped laboratories, where the cotton yarn might be tested very easily. The reasons given for not making tests was this: no trouble was being experienced with the cotton, so no tests were taken.

A large laboratory, testing several thousand cases of cotton yarns of various qualities, received from different spinning mills, found that the moisture content of the yarns tested covered a range from 6.7 per cent. to as high as 15 per cent., when the standard moisture content should have been 8.5 per cent. Claims, which were made, based on the aforementioned results, netted enough to pay the total expenses of the laboratory for a period of six months, even though the laboratory was a large one, employing eleven people. Only two of these were working on cotton tests. The saving in itself, while a fair sum, is not to be compared with the saving which resulted, for ever since these claims were made a constant supply of yarn is being received, with very little deviation from the standard moisture content. This has led to very gratifying results in the reduction of bad work caused by uneven running of cotton yarns.

In addition to the conditioning tests it is very important to make sizing, twist and tensile strength tests. Also tests to determine the average staple lengths used. The standards for all of these tests can easily be obtained from various sources; even the spinners in many cases will gladly supply manufacturers with data that has been accepted by the cotton trade as standard requirements for the various counts and types of yarn. The tests are simple and are easy to make, although care must be taken to see that they are accurately and regularly made, to obtain worth-while results. Tests made this way will in many cases show surprising results, and in a majority of instances lead to an improved product of uniform quality. —"Black and White."

Decrease in Italian Incubation of Silkworm Eggs.

The "Ente Nazionale Serico" reports that, contrary to preliminary estimates, it has now been ascertained that the amount of silkworm eggs incubated in Italy this spring was 5 to 10 per cent. below the 1927 figure. A cocoon yield slightly less than that last year, therefore, is anticipated. It is believed, however, by the local trade that owing to the abundance of mulberry leaves and the favourable seasonal conditions during the past month, the decrease in cocoon production will not be as great as that in the volume of eggs incubated.

World's Textile News in Brief

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Italian Rayon Production Increased in 1926.

In 1926 Italy took second place among the rayon producers of the world, being outstripped only by the United States. The industry has made tremendous strides within the past few years. As late as 1922 Italian rayon production totalled only a little more than 6,000,000 pounds. By 1924 the output had almost tripled, and in 1925 amounted to about 30,000,000 pounds. Unofficial estimates place the 1926 output at 35,000,000 pounds, while production in the United States is variously estimated at 62,000,000 to 66,000,000 pounds. A further expansion of the Italian rayon industry is expected in 1927.

Over Half of Rayon Output Exported.

The domestic market is entirely inadequate to absorb this huge output. Italian consumption of rayon during 1926 has been estimated at approximately 13,500,000 pounds. Italian rayon producers export from 50 to 60 per cent. of their output, and the growth of the national industry is based on the expansion of the export trade. Despite unfavourable conditions on the world market during the early part of 1926, the volume of exports kept pace with production.

Italian Exports of Rayon Doubled Since 1924.

Italian exports of rayon increased from approximately 10,000,000 pounds in 1924 to 16,000,000 in 1925, and to 21,600,000 in 1926. Interesting and far-reaching changes took place in the country's export outlets for rayon during the past year. Whereas in 1925 Great Britain and the United States were Italy's best markets, accounting for almost half of the total exports, sales to these countries declined sharply in 1926, when combined exports to Great Britain and the United States represented about 14 per cent. of the total shipments. The loss in sales to the United States was less marked than in shipments to Great Britain. The United States took 2,139,000 pounds of rayon from Italy in 1926 against 3,271,000 in 1925, while British purchases dropped from 4,452,000 pounds in 1925 to 853,000 in 1926 largely as a result of the imposition of a duty of 33 1/3 per cent. on rayon, effective July 1, 1925.

Germany and Far Eastern countries, particularly India and China, have become Italy's best customers for rayon at present. German purchases accounted for 25 per cent. of Italian exports, and the combined takings of China, Japan and British India for 32.5 per cent. Converted to pounds, exports to the foregoing countries were as follows:—Germany, 5,456,000 pounds; China, 2,603,000; Japan, 1,551,000; and British India and Ceylon, 2,865,000. Italy at present supplies about 60 per cent. of India's rayon imports. Among Continental countries, Spain, Belgium, Austria and Switzerland are the largest export outlets for Italian rayon.

Principal Italian Rayon Concerns Have International Affiliations.

At present 16 Italian concerns, operating 24 plants, are engaged in the production of rayon. The Snia Viscosa group, comprising three companies, with five plants (one still under construction), accounts for over 50 per cent. of the Italian production. Next in order of importance come the Soie de Chatillon and the Societa Generale della Viscosa, with its two subsidiaries, the Seta Artificiale Varedo and the Italo-Olandesa Enka. The Italian Enka group was formed in 1926 by the amalgamation of the Viscosa Vercellese and the Societa Seta Artificiale di Cremona. The Snia Viscosa and the Varedo recently have come to an understanding with the British Courtaulds and the German Glanzstoff groups for commercial and technical collaboration. The Soie de Chatillon is reported to have made a similar agreement with the Glanzstoff interests, but at the date of writing the rumour had not been confirmed. The Societa Generale della Viscosa is said to be affiliated with the German I.G. Farben-Rotweil group.

All but two of the sixteen Italian rayon producers use the viscose process. The Societa Italiana Seta Bemberg utilises the cuprammonium process and the Setyl Italiana (a recent combine) has completed a plant for the production of rayon by the cellulose-acetate process. The Snia Viscosa reached an average daily output of 110,000 pounds in 1926. Its plants are equipped to produce 220,000 pounds on a twenty-four-hour schedule, and the concern hopes to operate at capacity during 1927. The Soie de Chatillon estimated its 1926 output at 9,500,000 pounds, and, by the close of 1927, hopes to turn out 44,000 to 48,000 pounds daily. The 1926 production of the Societa Generale della Viscosa is said to have reached 7,500,000 to 8,000,000 pounds, and further expansion is reported in sight.

Italian Producers Specialise on Cheaper Grades of Rayon.

Italian viscose rayon is produced in all counts from 80 to 900 deniers, but the manufacturers have speecialised largely in the production of the cheaper-grade, coarser counts. Italian producers of rayon have made every effort to improve the quality of their yarns, for which they claim certain absorptive properties, which make them especially suitable for the manufacture of underwear. Through their affiliations with other European rayon concerns, Italian producers will have access to new technical processes which should enable them to improve further the quality of the Italian product.

A realisation of the disadvantage arising from concentration on the production of the cheaper grades of rayon caused Italian rayon concerns to turn to the production of special fibres. In October, 1925, Snia Viscosa put on the market an artificial wool, "Sniafil," which is manufactured in two grades—Sniafil F.C., a short-staple fibre having certain affinities with cotton, and Sniafil F.L., a long-staple fibre closely resembling natural wool. Sniafil is especially adapted for mixing with real wool, and can be spun and woven without necessitating any changes in the machinery. The Soie de Chatillon a few months later put out a similar fibre, "Chatilaine," for mixing with wool, and an artificial schappe, "Seris," for mixing with silk, wool or cotton. Seris is a soft, pliable, strong, almost lustreless yarn, which can hardly be distinguished from real silk. Piece goods woven of a mixture of Seris and silk do not have the stiffness common to ordinary rayon fabrics, but retain the draping qualities of silk. The Societa Generale della Viscosa has also developed an artificial wool.

The Societa Generale della Viscosa recently put on the market a new fibre called "Celta," with a tubular hollow filament and the dull lustre of silk. It is said to be particularly adapted for use as a substitute for and in combination with real silk in the manufacture of underwear, hosiery and velvet. At present the concern is turning out about 6000 pounds daily at its plant in Naples.

Production of Rayon Other Than Viscose Limited.

The Societa Italian Bemberg started the production of cuprammonium rayon in February, but so far develop-

ments have not been on a large scale. The Setyl Italiana, using the cellulose-acetate process, has just begun producing, and its output has not yet reached any considerable volume. The Setyl Italiana is said to be affiliated with the group of synthetic-dye manufacturers controlled by the Societa Italiana del Gas of Turin, and its cellulose acetate is to be secured from one of the members of the aforementioned group.

An electrochemical concern in Naples recently has been experimenting with esparto grass, which is grown extensively in Italian colonies, as a substitute for cotton linters in the production of cuprammonium rayon, and Italian rayon producers have evinced great interest in the possibilities of esparto cellulose. In the opinion of many well-informed producers the position of the Italian rayon industry would be consideably stengthened if, in addition to viscose, the higher grades of rayon were also manufactured.

America Supplies Nicaragua With Textile Imports.

Textile goods form one of the most important items of importation into Nicaragua. In 1925 cotton cloth to the value of more than 2,000,000 dollars was imported, together with other cotton goods and clothing worth more than 600,000 dollars. Silk goods imported were valued at 350,000 dollars, and wool goods at 150,000 dollars. About 70 per cent. of this total textile import is of American manufacture.

Decease in Exports of American Cotton Cloth to Guatemala.

Cotton goods is the largest single classification in the Guatemalan import statistics, and in 1926 amounted to 3,912,977 kilos, valued at 4,143,628 dollars. Of this total the United States furnished cotton fabrics worth 1,888,953 dollars, as compared with 3,043,121 dollars in 1925, a decrease of about 38 per cent. Imports from England, however, increased about 48 per cent. Merchants state that the American prices did not drop as rapidly as did the British, and were not low enough to compete during the middle and latter part of the year.

Opportunity for Marketing Ready-made Clothing in Norway.

It is believed that an opportunity exists for the introduction of American ready-made clothing in the Stavanger district of Norway. Most of the clothing now on that market is of domestic manufacture, but it is admitted that American makes are superior in style and appearance. The prices of the locally produced clothing, moreover, are rather high. Men's suits are made from heavier material than is usually used in the United States, and are always lined. Only dark colours are in demand. A line of cheap, strong work clothing of good appearance should find a ready sale. That now in use is manufactured locally from dungaree, which is imported from the United States. A relatively good potential market exists for women's ready-made suits and coats, especially the latter in waterproof types.

Australian Textile Imports Increase in Value.

Australian imports of all classes of textile products during the fiscal year ended June 30, 1927, were valued at £42,416,966, as compared with £39,055,395 in the previous 12 months—a gain of 8.6 per cent. All three categories of textiles—"apparel and attire," "textiles" (which include piece goods and similar products) and "yarns and manufactured fibres"—shared in the increase. The value of receipts of articles of apparel and attire rose from £6,507,090 in 1925-26 to £7,101,652 in 1926-27; textiles, from £26,748,030 to £28,813,587; and yarns and manufactured fibres from £5,800,275 to £6,501,727. (The foregoing figures are preliminary, as official published returns have not as yet been received.)

Principal Sources of Australian Textile Imports.

The United Kingdom is the leading source of Australia's imports of all classes of textile products, but its share in the total declined from 60 per cent. in 1925-26 to 55 per cent. in 1926-27, while the proportions imported from Japan, the United States, Germany and Canada all registered small gains.

Piece Goods Imports Decline Slightly in Value.

Cotton piece goods accounted for 22 per cent. of the total value of the 1926-27 imports of textiles into Australia. The total value of imports of cotton piece goods declined from £9,644,657 in 1925-26 to £9,476,920 in 1926-27. About 85 per cent. of the piece goods import comes from the United Kingdom, whose share in the trade declined from £8,234,041 in 1925-26 to £8,011,904 in 1926-27. Receipts from Japan dropped in value from £654,231 in 1925-26 to £595,725 in 1926-27. Losses were registered in imports of unbleached and bleached cloth and in cotton tweeds, while gains were recorded in dyed or printed piece goods and in knitted cottons in tubular form. Imports from the United States rose in value from £543,572 in 1925-26 to £649,827, or from 5.6 per cent. to 6.9 per cent. of the total. Receipts of grey or unbleached goods from the United States increased from £42,348 in 1925-26 to £104,912 in 1926-27, of dyed or printed goods from £115,469 to £152,400, and of leather cloth from £308,781 to £326,718. Total imports of cotton piece goods from Continental countries likewise registered a gain—to £211,974 from £197,790 in the previous year.

American Silks Popular in Australia.

Australian imports of silk piece goods rose in value from £5,251,723 in 1925-26 to £6,854,616 in 1926-27. Japan supplied almost half of the total imports in both years. France ranked second in importance, and receipts from that country rose from £905,075 in 1925-26 to £1,169,616 in 1926-27. Switzerland, the United Kingdom, Italy, Germany and the United States followed in the order mentioned.

American silk goods, particularly prints, have been increasing in popularity in Australia, even though they are somewhat higher in price than French and Japanese printed fabrics. Australian importers are said to be disinclined to purchase French silks at the present time, because the fabrics are so heavily weighted as to impair their wearing qualities. The trade is more favourably disposed toward Japanese silks, which are well established in this market. Japanese manufacturers, however, seldom use more than two colours in their prints, and their designs are not altogether adapted to Australian requirements. Many large houses in Australia which formerly specialised in French silks are displaying increased activity in the purchase of American silks, although they may have to pay 7/ or 8/ (1.75 or 1.95 dollars) per yard for United States products, against only 5/ or 6/ (1.22 or 1.46 dollars) for the French. The success of American prints is attributed to their advanced designs and comparatively small weighting. Recently, however, the local trade reported that some American manufacturers of silks have commenced using too much weighting in fabrics exported to Australia, and intimated that if this practice should become general it would seriously retard the demand for American silks in Australia and hinder the future expansion of existing sales. American manufacturers, accordingly, are advised to give careful consideration to this sentiment of local silk dealers.

United States Exports of Cotton Cloth to Australia Increase in 1928.

United States exports of cotton cloth to Australia during the first five months of 1928 totalled 3,091,709 square yards, valued at 850,061 dollars, as compared with 2,996,519 square yards, with a value of 626,274 dollars, in the corresponding period of 1927—a gain of 3 per cent. in quantity and of almost 36 per cent. in value. The statistical classification of United States exports of cotton cloth was considerably revised, beginning January 1, 1928, and for that reason no accurate comparisons can be made of the various classes of goods shipped in 1928 with exports during 1927.

The greatest increase was registered in exports of tyre fabrics, shipments of which rose from 284,571 square yards in 1927 to 766,421 in 1928, and in value from 115,229 dollars to 329,440 dollars—a gain of 169 per cent. in quantity and of 186 per cent. in value. Australia has a considerable domestic industry engaged in the production of automobile and other tyres, and an American concern manufacturing tyres also has a subsidiary in the Commonwealth. Practically all of Australia's requirement of tyre casings is manufactured in that country.

Exports of all classes of cotton duck, other than tyre fabrics, declined from 142,916 square yards in 1927 to 101,464 in 1928. Shipments of other cotton cloth showed the following decreases in quantity:—Unbleached, from 392,349 square yards in 1927 to 273,597 in 1928; bleached, from 287,795 square yards to 225,094; and printed, coloured and dyed goods, from 1,888,888 square yards to 1,725,133.

New Jute Mill for Calcutta.

A company has been formed with a view to erecting and working a new jute mill in the neighbourhood of Calcutta, India. It is proposed to equip the mill with 500 looms, and most of the machinery may be manufactured and purchased in Calcutta. The announcement is of considerable interest, because member companies of the Calcutta Jute Mills' Association have voluntarily refrained from erecting additional mills or enlarging existing plans during recent years. The establishment of new factories by concerns outside the association may force the companies in it to break their agreement.

Bolivia Offers Limited Market for High-grade Hats.

The value of men's hats imported into Bolivia during the first nine months of 1927 reached about 500,000 dollars. Italy, Germany and Great Britain were the chief suppliers. Price is an important factor, and a cheap Italian felt hat is worn largely by the natives. There are approximately 10,000 men in Bolivia who can afford high-grade imported clothing, and to these the quality appeal of American goods should be made.

Sisal Plantation Established in Belgian Congo.

The first sisal plantation in the Congo has been started at Kinanga. It is reported that 88 acres have been planted, and that a plant for the treatment of sisal will be installed in about three years. It is also reported that on January 18, 1928, the Compagnie Agricole et Industrielle du Congo, with a capital of 4,500,000 francs, was formed at Antwerp, for the purpose of raising sisal and other fibrous plants in the Congo.

America Supplies New Zealand Upholstering Industry With Artificial Leather.

The upholstering industry is of considerable importance in New Zealand. Pile fabrics, cretonnes and tapestries are popular for coverings. Stripes, checks and small-pattern effects are favoured in the pile fabrics, with ground colours of fawn, grey, brown, blue or black. Cretonnes must not be gaudy, but gay designs are usually chosen for bungalow-type homes, and the more staid dark body-colour prints for apartment use. Tapestries of all types are in demand. Plain silks and haircloth have no sale. The hotel and chair trade demands leather or leather cloth. The leather cloth used has fancy markings on lighter ground. The sources of supply for these materials are varied, and are governed largely by fashion. In artificial leather, however, America absolutely controls the market.

New Australian Tariff Affects American Exports of Hosiery.

In the calendar year 1927 Australia was the second largest export outlet for American hosiery, having taken 1,927,000 dollars' worth, or 9.5 per cent. of the total exports to all countries. Australia was the leading export market for silk hosiery, its purchases totalling 117,893 dozen pairs, with a value of 1,573,238 dollars. The revision of the Australian tariff in the latter part of 1927 changed the rates on hosiery. Under the old schedule silk and rayon hosiery was subject to an ad valorem rate of 50 per cent., and cotton hosiery to an ad valorem rate of 45 per cent. These ad valorem duties are retained in the new tariff, which also provides an alternate specific rate of 11/ (2.68 dollars) on silk and rayon hosiery, and of 10/ (2.43 dollars) on cotton hosiery per dozen pairs, the higher rate to be applied. These duties became effective November 25, 1927, and following their application there has been a sharp reduction in United States exports of cotton and rayon hosiery to Australia, with a corresponding increase in shipments of silk hosiery. Apparently the price of the cotton hosiery exported was low enough to warrant the imposition of the specific duties, as the United States had been able to compete in the cotton-hosiery trade when the ad valorem duties only were in force.

Situation in Italian Silk Industry Remains Unchanged.

The Italian silk industry reports no improvement. Difficulties have become more or less chronic, and reflect the disparity between the prices of cocoons and the selling price of silk. Stocks, however, of both raw and worked silk have been further reduced, despite increased inactivity of the spinners. Demand from German factories has been less satisfactory, but Lyons has been taking a normal volume of Italian silk. A Government commission has been formed to make a serious study of the situation. The measures proposed centre on an increase in the production of raw material through the efforts of the Ente Nazionale Serico, a reduction in production costs through lower wages, and facilitations in the matter of taxes, tariff protection and a prohibition against the increase in reeling basins for a certain period of years.

Price Governs Sale of Artificial Flowers in Australia.

There is a good market in Australia for artificial flowers, but it is governed largely by considerations of price. Although not used on millinery, flowers are becoming increasingly popular as sprays and for wear on afternoon or evening frocks. Small sprays of artificial flowers retail as low as 0.25 dollars, and the average price for those of better quality for evening wear ranges from 1.66 dollars to 3.25 dollars.

Industrial Lancashire Prior and Subsequent to the Invention of the Mule

By G. W. Daniels, M.A., M.Com., Professor of Commerce and Administration in the University of Manchester

(Continued from page 408.)

In concluding this brief survey of industrial Lancashire prior to the introduction of the new machinery, a word must be said of the organisation of the textile industry during the period. Evidence of the character of this organisation for the sixteenth and the seventeenth centuries is scanty, the first being the record of the "clothier" in the Manchester district at the beginning of the sixteenth century, who found employment for a number of workpeople, and maybe the clothier did not occupy the solitary position the record suggests. At any rate, could he have lived on to the latter part of the century and to the beginning of the next, he would certainly have found himself in company with many others who had large capitals invested in the cloth trade. In 1619, for example, the capital of Humphrey Chetham and his brother amounted to about £10,000, their concern consisting of a branch in Manchester and one in London, as was the case with others of which we have information. An appropriate description of these men is that they were large-scale trading capitalists, and it is probable that at this time a large part of the trade of the Manchester area was in their hands. A popular view, for which there is no substantial body of evidence, is that the workpeople of Lancashire in these days, and until the last part of the eighteenth century, were independent producers engaged partly in industry and partly in agriculture. That small agriculturists also engaged in textile work is undoubtedly true, but it is extremely improbable that all the textile workers were also engaged in agriculture. Certainly they did not work in factories, nor were they congregated in populous centres; generally they were scattered about the country districts, and carried on their work in their cottages or in "shops" which formed part of them. Places like Manchester and Bolton were trading rather than industrial centres, and it was at these centres that the textile workers came into contact with the trading capitalists or their representatives, and through them obtained the raw materials they required and disposed of their products. No doubt some of the workers were in a position to buy their materials, carry them through the process of manufacture, and wait for their returns until they sold the product. On the other hand, there is evidence that some were dependent upon the traders for credit; the position in Manchester in the middle of the sixteenth century has been mentioned before. Again, it is likely that there were other workers who had their materials "put out" to them, and received a wage remuneration for their labour when they returned the product.

As we have seen, in the seventeenth century it is probable that fustians were manufactured mainly in Bolton and its vicinity. At Bolton, we are told, they were "bought in the grey by Manchester chapmen, who finished them and sold them in the country." If this statement is interpreted strictly it would appear that at this time the "putting-out" system had not become general in the Bolton district. However this may have been in the seventeenth century, in the first part of the next century it is clear that a large number of fustian "manufacturers" had emerged in both Bolton and Manchester, and that one effect of their emergence was to establish the system as the general rule. Between these manufacturers and the older trading capitalists there was an important distinction, which in some cases, however, should not be too rigidly drawn. With this reservation, the distinction was that the latter were primarily traders interested in the manufacture of goods because they required supplies for their markets, while the former undertook the responsi-

bility of seeing that supplies were forthcoming, and to this end invariably "put-out" materials to workpeople and paid them a wage remuneration for their labour. Thus some of these manufacturers came to have a large number of workpeople who looked to them for regular employment, in much the same way as their successors looked to the factory employers. In the proceedings that led to the "Manchester Act," one witness asserted that he and his brother employed upwards of 600 looms in the weaving of fustians, and as one weaver required four spinners to supply him with yarn, he computed that upwards of 3000 workpeople were dependent upon them for employment. Maybe this case was an exceptional one, though there is other evidence which shows that the number of workpeople employed was not an important difference between the manufacturer of the eighteenth century and the later factory employer. The more important differences were that the manufacturer did not bring his workpeople together under one roof, and that, consequently, neither he nor his representatives could exercise continuous supervision over their operations, nor did he usually provide them with their instruments of production. His capital was embodied in materials while they passed through the various processes and until they were sold. Of the factory employer's capital, only a part was used in this way; another part was embodied in more fixed forms, in buildings and in machinery. Moreover, under the earlier system the family rather than the individual was the unit of employment, though in some cases the one who came directly into contact with the manufacturer also employed one or two journeymen or apprentices. In the smallware trade of Manchester in the eighteenth century, a person in this position was known as an "undertaker," but he himself stood to the manufacturer essentially in the relation of an employee to an employer. If proof of this relationship is required it can be found in the labour combinations which existed, and in the strikes that took place in the Manchester district in the middle of the century. The fact has been already mentioned that the Manchester Directory of 1772 gives the names of 132 fustian manufacturers who were situated in Manchester and within a radius of about 15 miles. There were, however, two other branches of the textile trade in the district, the check and the smallware branches. In connection with the former the names of 106, and with the latter of 49, manufacturers are given, and in addition the names of 78 whitsters (bleachers).

With this view of the conditions in industrial Lancashire, prior to the invention of the mule, before us, we may now proceed to consider the subsequent conditions. The mule was introduced to the public in 1780, but, as Crompton tells us, his efforts to invent it began in 1772. By that time Arkwright had established himself at Cromford, and had taken the first steps towards organising the cotton industry on the lines of the factory system. It was not for some years, however, that the industry greatly expanded. The new machinery was protected by Arkwright's patents, and could be openly used only by Arkwright and his partners, and by those to whom licences were issued. In fact, it is probable that neither the jenny nor the mule could be fully utilised until Arkwright finally lost his patents in 1785. Further, it was not until this year that Watt's steam engine was applied to the driving of cotton machinery. Previously the machinery had, at best, to be driven by water power, and factories had to be erected where this power was available, mainly in country districts, which involved difficulties of labour supply and resort to the apprenticeship system. When steam power became available, factories could be erected in the towns, and many other advantages secured which were lacking in the country districts. Thus the years immediately following 1785 may be taken to mark the beginning of a new stage in the development of the cotton industry organised as a factory system. If the information contained in a pamphlet published in 1787 may be relied upon, there were at that time 143 cotton factories in England, Scotland and Wales, of which 113 were in England, 41 being situated in Lancashire. Apparently Lancashire had not shared inordinately in the development up to 1787, though it should be borne in mind that in all probability the majority of these factories were small in size, and in this and other respects not to be compared with the town factories which were soon to make their appearance. Town factories were those that were erected in populous centres, as contrasted with those erected in country districts, and their rise may be dated from about 1790.

Though the earlier type persisted and increased in number after this time, it is in the town factories that the main line of development in the cotton industry can be traced, and thus the development which transformed industrial Lancashire. At the same time, it must be borne in mind that other changes were proceeding in the industry or in close association with it, all of which played their part in the transformation. Apart from Kay's "fly-shuttle," the earlier inventions had not directly affected the weaving process, and consequently weaving remained mainly a domestic occupation. In 1784, however, Dr. Edmund Cartwright received the necessary impulse towards the invention of a power-loom from a conversation in which the opinion was expressed "that as soon as Arkwright's patent expired so many mills would be erected, and so much cotton spun, that hands could never be found to weave it."

In less than twelve months Cartwright had taken out his first patent for a power-loom, which he followed by three others during the next four years. Although his looms were not largely successful, from the date of his invention efforts to perfect the power-loom were continuous. Among other things, improvements were required in the methods of dressing the warp and in taking up the cloth as it was woven, and in these directions considerable advance was made by William Radcliffe and Thomas Johnson in 1803 and 1804. Soon afterwards the methods they devised were improved, and other patents for power-looms taken out, of which the most notable were those by Horrocks, of Stockport, between 1803 and 1813. It was not until the latter date that a really efficient power-loom was produced, and even then there was much scope for it to be improved by Richard Roberts, of Manchester (also famous in connection with the self-actor mule) and others. As late as 1819, to a man of John Kennedy's experience in the cotton industry it was still questionable whether the saving of labour with the power-loom counterbalanced "the expense of power and machinery and the disadvantage of being obliged to keep an establishment of power-looms constantly at work." Evidently when Mr. Kennedy made this statement the factory system had not become prominent in the weaving branch of the cotton industry, but in the finishing branches of the industry, large-scale production, based on new methods, had become established. Probably the great majority of the "whitsters" whose names are given in the Manchester Directory of 1772 were in a small way of business, using the tedious methods which made bleaching a matter of weeks, or even of months. Improvement had begun, however, in the middle of the eighteenth century, with the introduction of the use of sulphuric acid, which shortened the period required, and this was supplemented by a method of preparing the acid which greatly reduced its cost. In the 'eighties came the application of chlorine to bleaching, and this marked the beginning of a new era in the industry. It was as these new methods were introduced, and as the cotton industry expanded, that bleaching in Lancashire became an industry for large-scale concerns, and judging from the number of failures that are recorded it was an extremely risky industry.

(To be continued.)

WOOL

The National Bank of Australasia Ltd. reports that "the 1928-29 selling season was opened on August 20 in Sydney with an allotment of 120,000 bales for the series, which ended on August 30. Largely owing to the excellent rainfalls of the previous two months, wool has been delayed in its movement from the back country stations, and the quantity received in Sydney up to the middle of August totalled 105,000 bales, which compares with 132,000 bales at the parallel date of the previous year. The market showed a weakening in demand and a lower price level, but as the sales progressed competition became more general, and withdrawals were less numerous than on the opening days. Japan and Germany provided the chief support for the market, with France and Yorkshire both very quiet.

"We are informed that the wools offering are better grown and carry more grease than those submitted at the opening sales last year, and that, making allowance for this, it is possible that the actual decrease in price on clean scoured basis would probably be about 5 per cent. As no higher-class wools have yet made an appearance among the offerings, the sales cannot be accepted as an indication of the coming season's values. The market is said to be overweighted to some extent by heavy stocks of tops held in England and France, and the difficulty experienced by top makers in effecting sales of tops at rates which show a margin above cost. In this connection we have advices from our London office to the effect that Continental stocks of tops are unusually heavy, but that a feeling of confidence in the market seems general among European manufacturers. Stocks of raw wool are stated to be comparatively light, thus offsetting to some extent the excess quantity of tops held.

"The weak tone of the August sales in Sydney has raised the question whether it is advisable to hold sales during that month. August has long been regarded as a vacation month among woolbuyers, many of whom hold that the period between the closing sales of last season and the opening this season has been too short for them to make a satisfactory canvass of manufacturing houses and complete arrangements for the new season's buying. The August bank holiday in Europe comes at the height of the summer holiday season, and buying orders are difficult to obtain during that month. Another factor favouring the later opening of the Australian selling season is that the northern hemisphere clips, including that of the United States of America, are still being marketed up to middle-August, and orderly marketing of the world's wool makes it desirable for our sales not to interfere unduly with the disposal of the Northern countries' production.

"A number of senior buyers is now returning here from Europe, and it is hoped, and in well-informed circles believed, that the buying in September will be more widely spread than during August, with a possibility of the weakness then shown being overcome.

"Another factor which may have had an easing effect on the August market is a widely-held assumption that the current season's clip is likely to exceed that of the season now past. There is, however, nothing to indicate any marked increase. The estimate of the National Council of Woolselling Brokers for the current season is practically equal to the quantity actually received last season, indicating no increase on last year's final figures.

"Although stocks of tops in Europe may be heavier than at this period of last year, it is reasonable to assume that the total quantity of wool in sight in Europe and the United States of America is no more than equal to the total of the preceding August. The quantity in Europe may be greater, but it is less in the United States, and though trade in the latter country is disturbed at present with the prospect of the Presidential election, this important matter will be settled on November 4, with a prospect of a revival in trade generally and an increased demand for wool thereafter."

British Trade Review

H.M. Trade Commissioner has received catalogues and leaflets regarding the Exhibition of British Artificial Silk Goods which will be held in London from January 21 to 26, 1929, inclusive. Goods made wholly or in part of artificial silk will be shown in greater quantity than at previous exhibitions, and manufacturers will release and give first showing of their latest materials and designs.

A feature of the exhibition will be a new mannequin pavilion and a platform running across the hall, on which living models will display the last word in fabrics, made up and fashioned by London's leading coutouriers. Every garment shown will be specially designed for the exhibition, and those attending will thus be afforded the opportunity of seeing not only the latest in fabrics, but the dernier cri in the made-up materials.

Britain is making every effort to attract to the exhibition buyers from the Empire and from foreign countries. The British Trade Commissioner has been supplied with a number of admission cards for those wishing to attend the exhibition, and will also furnish details as to the exhibition upon application to him at Henty House, 499 Little Collins street, Melbourne.

The exhibition will be open to the trade only from January 21 to 25. On January 26 both public and trade will be admitted.

TEXTILE TRADES.

Linen.—Flax.—This year's Irish flax crop is expected to exceed that of last year, but warmer weather is required to ensure a satisfactory yield. Reports regarding Continental crops are satisfactory in most cases, but in several countries warmer weather is desired. From Russia reports are not good. Increased acreage is general.

Yarns.—Inquiries are not very numerous, and any business placed is for small lots. The raw material situation remains difficult.

Weaving.—Most of the spinning and weaving establishments have been closed down for a prolonged holiday, and conditions at the moment are quiet.

Merchanting.—In the merchanting end some manufacturers are busy fulfilling contracts for the Christmas trade. Some repeat orders are being received, but they are small in volume. Buyers desire to keep small stocks. Demand for cambric and shear linen is also quiet, and the difficulty of obtaining remunerative prices continues.

Exports.—The July exports of linen goods from the United Kingdom amounted to £694,223, as compared with £787,305 in June and £729,776 in May. The total values of linen manufactures exported from the United Kingdom during the seven months ended July, 1928, 1927 and 1926, were £5,597,415, £5,459,616 and £5,926,047 respectively. The total quantities of piece-goods exported from the United Kingdom during the seven months ended July, 1928, 1927 and 1926, were 42,356,000 square yards, 44,280,200 square yards and 46,759,900 square yards respectively.

Textile Machinery.—The Russian orders for Lancashire textile machinery, representing £1,000,000, reported some weeks ago, are being confirmed by a Soviet trade delegation now visiting Lancashire to inspect cotton mills and decide the specifications of the plant they require.

After a careful inspection of the Lancashire methods, the Russians, it is stated, will be able to put the work in hand at once. The firms principally concerned are Tweedale and Smalley, of Castleton, near Rochdale, and Platt Bros., of Oldham, with each of whom the Russians have placed orders to the extent of £500,000.

John Hetherington and Sons, textile machinists, have secured an order for a complete cotton mill in Egypt.

£1,000,000 Textile Merger.—It is announced that four firms engaged in the silk industry are to combine with a capital of £1,000,000. They are: J. and T. Brocklehurst and Sons, spinners, throsters, manufacturers and dyers, of Macclesfield; William Whiston and Son, printers, of Langley; Messrs. A. Hind and Son, of Wyke, Bradford; and Davis and Andrews, wholesale distributors, of London. The amalgamation is to be made for the purpose of securing increased efficiency and to reduce costs. The four firms will be able to deal with the raw materials right through to the finished goods, which they export largely to the colonies and the Continent. It is understood that they will act as wholesale distributors only, and not sell direct to retailers. An official statement will be issued shortly.

Alliance Artificial Silk Ltd. was registered as a public company on July 18, with a nominal capital of £1,550,000 in 5/ shares. The objects are to adopt an agreement with the International Artificial Silk Co. Ltd., and to carry on the business of manufacturers and dealers in artificial silk. The first directors (to number not less than three nor more than twelve) are to be appointed. While Syntheta, A. G. of Basle, and/or the directors thereof, hold at least 200,000 shares, that company or its directors may appoint one director of this company.

Big Move to Revive Irish Linen

Extensive Campaign to be Enterprised

Specially written for this Journal by Alfred S. Moore

Nature knows no standstill. There must be either progress or decline, and the latter inevitably leads to extinction. Whether the Irish linen industry, or its sister English textile, cotton, is the more moribund at present is epen to doubt. However, with some intention to retrieve their position, those connected with the Irish linen trade have come together in the establishment of a body to be known as the Irish Linen Guild, representing a programme whose fulfilment must tend to check the present downward progress and probably lead to some revival. Frankly, with 27,000 Irish linen workers idle and 73 per cent. or the looms static, no one can urge that this step has been precipitate.

Its Basic Principles.

Happily, however, the reform movement, as we may well term it, has been undertaken not by mere theorists. but by a highly representative and practical executive, so that even if it merely awakens the trade itself to its peril some good will have been achieved. Albeit, something more important than this is even hoped for by those connected with the organisation of the Irish Linen Guild. Thus, adopting the plans of the Irish and Scottish Damask Guild in U.S.A. and Canada, a similar campaign will be launched not only throughout Australia and the great home British centres, but in all overseas countries, for the display of linens generally.

Still another aspect of the work outlined will be to afford the Irish manufacturers as much information as possible relative to tendencies in designs, styles, textures and colours, for it is understood that if the public favour silk, because of one or other of these factors, they are as likely to transfer their patronage to goods of flax which contain them. In fact, the Linen Guild will provide both market research and manufacturing research.

Where Linen Now Suffers.

It cannot be denied that there is vast scope for the campaign to be undertaken, and a few of these problems may be mentioned. The need of stabilisation and uniformity of products and quotations is more than a long-felt desideratum, for unless importers, makers-up and buyers generally can be assured of these in future it is inevitable that they must transfer their favour to other textiles where such is possible.

Again, it is hoped that some way may be found whereby the public will be safeguarded, not merely in the knowledge that when they ask for Irish linens, they are obtaining such, but in the additional facts that they are obtaining Irish linens of the best qualities, and not "seconds," and that there is no "profiteering" on the part of the retailer.

Housewives to be Protected.

One prominent Irish linen manufacturing firm which brands its linens with its own trade mark and advertises them largely has already taken steps in this needful direction by advertising their lines at such prices as will secure a good profit to the seller and yet not prove a handicap to the purchaser. Celandese, Courtaulds and other noted firms also adopt a like procedure, and there should be no reason why the pockets of retail buyers of linens should not be similarly protected. Surely there must be something wrong in regard to the retail selling of linens when it is possible for Americans to purchase Irish flaxen goods in New York at the same price as, and often even less than, in Belfast or any of the English cities, although linens entering U.S.A. are burdened with a tariff of, perhaps, 65 per cent. ad valorem average.

All of these problems, and many others, must be faced by the Irish Linen Guild. Their reform will be for the stability and progress of the industry and every constituent firm comprising it, whether they be flaxgrowers, spinners, weavers, finishers, merchants, agents, importers or retailers. But no good will be possible if even half-a-dozen firms hold back from giving the Guild their genuine and loyal support. If the linen industry is to recover, it is vital that every firm will co-operate with enthusiasm. It is not a time for individualism, however. That suave qui peut may do in the case of a shipwreck. No one can say that the Irish linen industry is yet a shipwreck, but drifting as it has been during recent years was tempting Providence in that direction, so, if the lee shore is to be left, then it must be by teamwork and the cordial co-operation of every member in the Irish Linen Guild, so that it will be a 100 per cent. representative body.

Strongly Practical Executive.

It is the time for Irish Unionism in a famed industry, and only unionism can bring recovery. Certainly the personnel of the committee of the Irish Linen Guild should inspire every confidence, consisting, as it does, of the following:—Mr. James McCartney (Messrs. Falls Flax Spinning Co. Ltd.), Mr. Sidney Frazer (Messrs. Frazer and Haughton Ltd.), Mr. H. R. Hadden (Messrs. Irish Flax Spinning Co. Ltd.), Mr. J. S. Lamont (Messrs. S. Lamont and Sons Ltd.), and Mr. J. K. Laughlin (Messrs. McCrum, Watson and Mercer Ltd.). In addition, Mr. John Gilliland (Messrs. John Gilliland and Co. Ltd.) will act as director of sale promotion and publicity. Moreover, the new body has the united support of the following:—(1) The Irish Flax Spinners' Association; (2) the Irish Power Loom Manufacturers' Association; (3) the Linen Bleachers' and Finishers' Association; (4) the Irish Linen Merchants' Association and allied interests.

In regard to the world's support of Irish linen, while the United States formerly were the best customers, Australia now occupies that premiership, the Australians taking probably ten times per head more linen than America. In fact, the exports of linen in piece to Australia during the first seven months of the present year (1928) totalled 4,654,100 sq. yds., compared with 18,087,400 sq. yds. to United States, though the latter country has an incomparably vaster population.

GRADING RAW SILK.

Those connected with the inspection of raw silk and the manufacture of the fibre, often remark on the wide range of quality covered by various producers.

The American Silk Association has made tests and adopted standards which amply care for the proper grading, in general cases. But local conditions always enter to vary conditions to a certain degree, and the manufacturer must make a careful study of these conditions, along with his study of the Association's standards, if he is to be benefited by these tests.

It is not necessary to adopt all of the tests submitted. Most consumers will readily agree that boil off, size and conditioning are of vital importance, although these tests alone throw little light on the actual quality of the silk. Such tests as the seriplane, gage, cohesion, serimeter and serigraph should be studied so that the manufacturer can determine the quality of the silk, and apply this knowledge to the selection of the fibre for the particular type of fabric he is making. He will know whether a Grand Double Extra, Best Extra, or any other grade is best suited. A certain manufacturer has been able to make a high quality product out of a Best Extra silk, while other manufacturers making a like product are using a Grand Double Extra, because he has paid particular attention to the selection of tests and the results of the same, constantly keeping in mind the finished product.

Inspectors of raw silk should have a well-versed acquaintance with all of the manufacturing conditions and requirements of the plant they are in. This type of man pictures the various conditions the silk must meet after it receives his approval, and is better able to judge whether the fibre should be approved or not. In addition to his familiarity with grading, according to the standards of the Silk Association; with local conditions, with the various steps in manufacturing and with the finished product, he must also be able to convey the results of his tests and grading to the source of supply. By doing this, rejections of raw silk will be cut to a minimum.—"Black and White."

Favourable Conditions Reported in Italian Wool-Spinning Industry.

The Italian Wool Association reports that combing mills are working at capacity. The activity of worsted spinning mills is almost normal, owing to a revival in the demand for worsted yarns by knit-goods manufacturers, to seasonal orders from domestic weavers, and to considerable orders for yarns for export. The sale of wool piece-goods for the 1928-29 season has now closed, with the results, on the whole, somewhat better than last year, but still below normal in the volume of orders. The domestic market is weak, and weavers are still feeling the effects of disturbances in the credit system. Prices are too low to allow Italian weavers an adequate margin of profit.

Modern Industrial Steam Generation Plant for Textile Mills

Water Tube Boilers, Travelling Grate Stokers and Pass-out Turbines Save About 70 per cent. of Coal Bill.

A significant sign of the times is that the industrial steam boiler and power plant in the textile world, as elsewhere, is now more and more taking the shape of water tube boilers, the latest type of mechanical stoker or pulverised fuel equipment, and steam turbines, in the latter case of either the back-pressure or the pass-out type for low-pressure process and "boiling" steam. With a steam plant of fairly large size the total saving to be made in this connection is undoubtedly enormous, as compared with the usual practice of, say, "Lancashire" or other boilers with a high-pressure set for condensing steam engines and separate low-pressure for boiling steam. A striking example in this connection of which we have just received information is a large and well-known jute mill in Calcutta, having, under the old conditions, a total consumption of 70 tons of coal per day, costing 700 rupees delivered. Then a complete reorganisation of the steam and power plant was carried out, three "Thompson" water tube boilers being installed, operating at 215 lb. per square inch gauge and 200 deg. F. superheat, with a rated evaporation of 15,000 lb. of water per hour each, along with a 2000 h.p. pass-out geared turbine, which gives a drive equal in smoothness to electric motors.

The mechanical stokers are of the "underfeed, class A, self-contained" type, supplied by the Underfeed Stoker Co. Ltd., of London, along with the "Detrick-Usco" flat suspended arches. The net results are that cheaper and lower-grade coal, costing 2/3 to 3/ at the pit head, is being burnt without difficulty, supplying the full requirements of steam and power, while the total coal consumption is now only 30 tons per day, costing 180 rupees, instead of 70 tons previously—that is, 700 rupees. In other words, the saving is actually about £40 per working day, probably, on the average, £12,000 per annum.

In normal operation two boilers are being used, with one as a stand-by, corresponding to about 27,000 or 28,000 lb. of steam per hour, and not only do the stokers burn this low-grade coal without difficulty, but they are able to take very heavy overloads. For example, on a number of occasions the whole demand of the mill has been supplied from one boiler only, the steam output being nearly double that of the designed rating. The "underfeed self-contained type A" travelling grate forced-draught stoker is, of course, well known to steam and power users, having the electrically-driven forced draught fans as an integral part of the stoker itself, on the entirely self-contained principle, two fans and a motor being fixed to the front of the coal hopper.

Finally, it may be stated, rapid progress is now being made with the "Detrick-Usco" flat suspended furnace arch, of which over 14,000 installations are now at work, while an important new development in this connection is the construction of the combustion chamber walls on this unit principle, as well as the arches, also allowing of very efficient air-cooling of the setting, with the heated air passed to the combustion chamber.

Man's Early Coverings

The Empire of the Incas—Part 5

Pizarro at the Court of Spain

Specially written for this Journal by
Victor Nightingall, A.M.I.E. (Aust.)

The palace of Charles I., King of Spain, was one of the finest in Europe in this year of grace 1528. Famous for its beauty, its Moorish architecture was set off by the magnificent aspect of the surrounding country, while near at hand the wonderful garden, with its artificial lake gleaming through the trees, was surrounded on all sides by wonderful new plants gathered from the Indies. Here and there peacocks strutted on the lawns and fountains played their music to the air. Amidst wondrous nooks strange birds of bright plumage looked out through netted cages, no doubt comparing this European paradise unfavourably with their native wilds of the New World so lately discovered and brought under the sway of the Master of Spain.

In keeping with the beautiful surroundings of the palace, the interior lacked nothing of the luxury of the 15th century. Within, the walls were hung with costly Arras tapestry, much of it trophies of war brought back from many a hard-won campaign, while pictures adorned the walls—pictures that even in their day were priceless works of art by the great masters of the age.

But our interest on the October afternoon in 1528 is not of the palace generally, but more in the great room near, where the people are already gathering in an anteroom preparatory to His Majesty of Spain holding court. Amongst the assembled crowd can be seen many notables, mostly soldiers of rank, for His Majesty's military star was in the ascendant at the time. Ambassadors of foreign States, ladies of fashion and general members of the court lend colour to a scene set midst brilliant surroundings.

As the doors swung open the hum of conversation died out and an officer of the household announced His Majesty the King. Everybody paid homage to Charles I. of Spain, for, if kings of the period are to be judged by their people, he was a great king. Of religious mind, his daily life largely governed by religious duties, he found time to conquer France and many other countries. Of the Catholic faith, Charles had to govern a Catholic country like Spain and a country—namely, Germany—that was being stirred by a great preacher, Martin Luther. Charles granted Luther a safe conduct and called him to a Diet at Worms. Luther defended his cause with energy and boldness, but Charles kept to his word and let him go, but issued a severe edict against him after his departure.

Charles had a noble air and refined manner. He spoke little and smiled seldom; a man of cool judgment, who knew how to use men. The great painter, Titian, once dropped a brush while the king was watching him paint. Instantly the king picked up the brush, saying, "Titian is worthy of being served by an Emperor."

Such was the man who advanced down the room with his queen beside him. Slowly he seated himself in a chair of State, when the business of the day began, for back of the court life of the day was all the intrigue of European stormy politics.

But of all the men who gathered at this function, history has marked none more than two men who had come from the New World, each unknown to the other, and, by a trick of fate, both on a similar errand.

The great Cardinal Ximenes, now growing old, was about to present an elderly man who looked sadly unhappy in a courtier's uniform, but whilst he was the jest of the people who did not know him, all stood to attention when the Cardinal craved leave to present Hernando Cortes, the Conqueror of Mexico. He had come home to Spain to lay an empire at his Sovereign's feet, and to demand in return redress of his wrongs and recompense for his great labour. He was at the end of his career, while, standing by, witnessing this scene, was another man, no longer young, but just mounting the ladder of fame—Pizarro, the man who was to conquer Peru.

Cortes' hearing over, and the matter put by for consideration, all held their breaths, for a new star had arrived from the New World, a man who had a story to tell of a new prospective empire, and, after all, Spain had conquered Mexico, and its riches were flowing into Spanish coffers. So they dismissed Cortes and gathered round

to hear a man well in his fifties, but withal hale and hearty, who felt the Castilian blood in his veins and was in no way put out at the strange company he now found himself in. He had dreamed of this day, man and boy, for years. In his direst extremity he buoyed himself up with the thought, and now his dream had come to pass.

He saw Cortes' somewhat meagre reception. He had never met the man, but knew him by reputation, and realised that Spain had affronted one of her greatest sons. Pizarro was by no means embarrassed. He was too used to adversity to worry over another who had just been refused what he had come from Panama to try to achieve, namely, assistance of the Crown to complete his conquest of Peru.

With his usual self-possession, and great decorum and dignity, Pizarro delivered his address to their Majesties and the Court. He spoke in simple language, as an actor in the drama he described. He told of the wonders of the great Southern Continent, where gold and silver existed in quantity. He produced trinkets of gold and silver from the Inca city of Timbrez. He showed wonderful clothes of a new material made from the wool of the llama. This animal Pizarro had brought home, and the king showed great interest in the creature. The royal cupidity was aroused by the graphic description of the golden utensils used by the Inca.

Pizarro was quick to judge his advantage, and waxed more than eloquent when he saw the impression he made on the king. He told of the wonderful empire to be added to the Spanish Crown. He impressed with religious fervour on the king his duty to Christianise the Inca people. In short, his oratory was of such an order that when he described his suffering and that of his men when starving in the swamps of Peru, the proud King of Spain was affected to tears. So says Prescott, the historian of Peru.

Some days later Charles commended his vassal Pizarro in favourable manner to the Council of the Indies, with the result that Pizarro was granted a form of charter to legalise his expedition to Peru. He was appointed Governor and Captain-General of New Castile, as Peru was named, and many other titles, such as Adelantado and Alguacil, Mayor for life.

Canada's Textile Imports Decline Slightly in Value.

Textile fibres and manufactures thereof to the value of 183,584,000 dollars were imported into Canada during the fiscal year ended March 31, 1927, compared with 184,762,000 dollars' worth in the previous 12 months. The United Kingdom ranked first as a source of imported textile products into Canada during 1926-27, and supplied 72,713,000 dollars' worth, or 39.6 per cent. of the total, while U.S.A. took second place with 66,964,000 dollars, or 36.5 per cent. to its credit. In the previous year their positions were reversed, the United States having furnished 79,105,000 dollars' worth of textile products to Canada, or 42.8 per cent. of the imports of these commodities, and the United Kingdom 70,164,000 dollars, or 38 per cent.

SEASONAL UNEMPLOYMENT.

(Continued from page 471.)

Seasonal changes of fashion have also acquired a greater hold on the industries through the fact that on the whole clothes are, and are intended to be, less durable than they were half-a-century ago. Where a garment used to last for years, perhaps with some alteration as a concession to changing fashions, it is now frequently made to last only for a season or so. Even the less fashionably-minded members of the community, therefore, have to replenish their wardrobe more frequently than was once the case, and this tends to accentuate the seasonal pressure of demand.

The net effect of the increased influence of fashion must therefore be, unless measures are taken to counteract it, to increase the liability of the clothing industries to seasonal pressure and, consequently, the risk to the worker of seasonal unemployment.

While it is comparatively easy to see the effect of fashion on employment, it is more difficult to find the origin of the disturbing cause. The average manufacturer of clothing feels himself at the mercy of the consumer, who insists on having fashionable goods. Thus the habits of the consumer in following more or less slavishly the dictates of fashion would appear to be the cause of seasonal unemployment.

True though this doubtless is, it is not a complete explanation, since the bulk of consumers merely **follow** the fashion; they feel, indeed, constrained by the force of social convention to do so. Who, then, is responsible for the changes in fashion?

The actual creators of new fashions are presumably to be found in a comparatively small number of firms, notably, for women's dress, the world-famous designers of Paris. Thence the fashions filter down with startling rapidity to the retail and wholesale manufacturers of all countries. Some share in the creation of new styles is doubtless also taken by the designers and manufacturers of textiles. New fabrics and patterns afford yet greater scope for ingenuity and novelty in dress fashions, and may be evolved independently or in co-operation with dress designers. Thus the industry itself appears to be responsible for the changes in fashions and the fluctuations in employment consequent thereon. The fact that changes of fashion involving periodically renewed consumer demand are a recurring source of profit to designers and manufacturers lends further colour to this view.

Clearly, however, the explanation is by no means complete. There is, in fact, little to be gained by a search for the villain of the piece. Neither the individual consumer nor the manufacturer can fairly be blamed for the variability of fashion, and it would be idle to condemn the fundamental and by no means reprehensible instinct which lies at the root of the matter—the deep-seated human desire for change and variety in life. The fact of changing fashions must be accepted, and the elimination of seasonal variations in employment must be achieved rather by so organising the clothing industries that production may be carried on continuously in spite of the discontinuity of demand. To this point we shall return in the final portion of this article.

(To be continued.)

Companies' Financial Statements

Yarra Falls Limited

Registered Office: 452-484 Johnston street, Abbotsford, N.9, Victoria.

Directors: William L. Baillieu, chairman; Frederick F. Robinson, Arthur Hordern, Ernest M. Pearce, Fred Hill, Norman De W. Robinson.
London Directors: William S. Robinson, Clive L. Baillieu.
Auditors: Cook, Tomlins and Mirams.
Secretary: Arthur W. Briggs.

Report of Directors.

To be submitted to the ordinary general meeting of shareholders to be held on Thursday, the 18th day of October, 1928.

Your directors have pleasure in submitting herewith balance-sheet and profit and loss account to the 30th June, 1928.

After providing for depreciation and taxation the net profit for the year is ...		£88,018	17 1
To which must be added the amount brought forward from last year	£43,821 9 5		
Less a dividend of 6 per cent. paid out of this amount on 11th October, 1927	41,400 0 0		
		2,421	9 5
Making available a total of		90,440	6 6
A dividend of 5 per cent. was paid on 26th April last, amounting to	34,500 0 0		
Your directors have decided to pay a further dividend at the rate of 5 per cent. on the paid-up capital of the company, amounting to .	34,500 0 0		
Also to transfer to reserve ..	18,000 0 0		
And to staff superannuation reserve	1,000 0 0		
		88,000	0 0
Leaving a balance to carry forward of ...		£2,440	6 6

The above dividend will be payable on Thursday, the eighteenth day of October, 1928, and, together with that paid on the twenty-sixth day of April, 1928, shall be deemed to have been paid out of the profits of the year derived from trading operations.

Although during the past six months of the financial year business has been restricted in volume, mainly owing to the financial stringency and general trade depression existing throughout Australia, your company has succeeded in maintaining a satisfactory position, and your directors are of the opinion that trade is now likely to improve.

Further extensive additions are being prepared for the ensuing year, and these, when completed, should tend materially to assist production.

Your company has sustained a severe loss by the death of Sir Henry Whitehead, of Bradford, who was a member of the London board and technical adviser to the company.

He was closely associated with the company from its inception, and his advice and assistance were always of inestimable value. He at all times took a very keen and active interest in the affairs of the company, and the whole world's textile industry is poorer owing to his death.

In accordance with the provisions of the articles of association, Messrs. William Lawrence Baillieu and Ernest Marsh Pearce retire from your board of directors, and, being eligible, now offer themselves for re-election.

Your auditors, Messrs. Cook, Tomlins and Mirams, retire, but, being eligible, seek reappointment.

By order of the board,

W. L. BAILLIEU, Chairman of Directors.

Abbotsford, 28th September, 1928.

Balance-sheet at 30th June, 1928.

LIABILITIES.

Authorised Capital—			
1,000,000 shares of £1 each		£1,000,000	0 0
Less unissued capital		250,000	0 0
Subscribed capital		750,000	0 0
Less uncalled capital		60,000	0 0
Paid-up capital		690,000	0 0
Paid in money, 525,000 shares fully paid	£525,000 0 0		
Paid in money 120,000 shares paid to 10/	60,000 0 0		

Paid otherwise than in money shares fully paid	105,000			
	750,000	690,000	0	0
Reserve account			143,000	0	0
Suspense account			16,368	10	10
Reserve for depreciation			314,666	11	8
Staff superannuation reserve			4,000	0	0
Sundry creditors, including provision for taxation			181,433	14	0
Deposit accounts and interest			41,155	3	10
Employees' savings account			2,020	7	1
Appropriation Account—Balance			36,940	6	6
			£1,429,584	13	11

ASSETS.

Freehold land and buildings at cost	£198,239	4	11	
Less mortgage	1,500	0	0	
			£196,739	4	11
Fixtures, fittings and mill furniture, etc., at cost			11,005	13	7
Machinery and plant, etc., at cost			535,940	19	8
Shares in other companies, at cost			10,500	0	0
Stocks on hand and in transit, at cost or valuation			344,528	0	2
Payments in advance			1,063	19	11
Sundry debtors and bills receivable (after making provision for bad and doubtful debts)			126,385	14	6
Deposit accounts and interest			163,155	11	6
Commonwealth Loan, at cost			1,483	13	9
Cash on hand and at bankers			38,781	15	11
			£1,429,584	13	11

Profit and Loss Account for the Year ended 30th June, 1928.

To Directors' fees, audit fees and salaries	£13,415	12	4
„ Administration expenses (including London office) and provision for taxation	32,246	5	4
„ Property expenses and depreciation	1,684	11	0
„ Net profit for year, transferred to appropriation account	88,018	17	1
	£135,365	5	9
By gross profit from manufacturing and trading account	£126,606	4	5
„ Rents from properties, etc.	1,807	17	6
„ Interest	6,951	3	10
	£135,365	5	9

Appropriation Account.

To Dividend paid 26th April, 1928	£34,500	0	0
„ Transfer to reserve account	18,000	0	0
„ Staff superannuation reserve	1,000	0	0
„ Balance	36,940	6	6
	£90,440	6	6

By Balance at 30th June, 1927	£43,821	9	5
Less Dividend paid 11th October, 1927	41,400	0	0
	2,421	9	5
„ Net profit for year ended 30th June, 1928	88,018	17	1
	£90,440	6	6
By balance	£36,940	6	6

LUSTRE HOSIERY LIMITED.

Registered Office: 379 Kent Street, Sydney.

Directors: Mr. Henry H. York, chairman; Mr. W. G. Forsyth, Mr. J. M. Forsyth, Mr. Martin McIlrath.

Directors' Report.

Sydney, September 13, 1928.

Your directors take pleasure in submitting herewith their seventh annual report for the year ended June 30, 1928, together with audited balance-sheet and subsidiary accounts.

The transactions of the company resulted in a net profit of £28,073/14/3 for the year, as compared with £17,650/1/6 for the previous year.

Income taxes amounting to £3979 have been paid and ample depreciation allowed on plant and all wasting assets before arriving at the net profit detailed.

During the year an interim dividend of 10 per cent. on both preference and ordinary shares, absorbing £10,000, has been paid.

Your directors recommend that the balance of £21,068/3/ standing at the credit of profit and loss appropriation account should be appropriated as follows:—

Final dividend on both preference and ordinary shares for the second six months at the rate of 10 per cent. per annum, absorbing	£10,000	0	0
To reserve for taxation on the year's trading result	6,000	0	0
To general reserve	2,000	0	0
To write off balance of preliminary expenses	811	13	4
	£18,811	13	4
The balance, subject to directors' fees and factory manager's bonus to be carried forward	2,256	9	8
	£21,068	3	0

The sales for the twelve months under review were practically double the figures for the previous year, and the period from July 1 to date again shows a large increase on the figures for the corresponding period in 1927.

The directors have found it necessary to build up a large stock of manufactured goods each winter in order to provide for early spring and summer deliveries, and the sales resulting from this policy have proved it to be justified, and have the effect of relieving the liquid position progressively from June 30 to December 31.

The demand for the company's products has increased so largely in the last year that the company is faced with the necessity for further early expansion.

The company's mill manager, Mr. J. C. Bachelder, has spent the last five months in America, England and the Continent, investigating the latest types of textile mill machinery and equipment, and when your directors feel justified in further capital issues the company will have at its disposal the most up-to-date information regarding costs and capabilities of new equipment.

Signed on behalf of the board.
HENRY H. YORK, Chairman.

Sales figures for the various years since the inception of the company are:—

Period ended 30/6/22 (10 months).	£15,180
Year ended 30/6/23	36,347
Year ended 30/6/24	64,889
Year ended 30/6/25	118,923
Year ended 30/6/26	150,888
Year ended 30/6/27	172,481
Year ended 30/6/28	340,625

The sales for the period from 1/7/28 to 15/9/28 show a very satisfactory increase on the similar period in 1927.

Balance-sheet as at June 30, 1928.

LIABILITIES.					
Nominal Capital	£250,000	0	0		
Less: Unissued	50,000	0	0		
	200,000	0	0		
Issued—Fully Paid Ordinary Shares	133,334	0	0		
10 per cent. Preference Shares	66,666	0	0		
				£200,000	0 0
Reserves—Sundry	2,625	0	0		
Life Insurance	997	9	7		
				3,622	9 7
Sundry Creditors	47,505	13	11		
Bank, E.S. and A. Ltd. ..	49,168	18	8		
				96,674	12 7
Profit and Loss Appropriation Account ..				21,068	3 0
				£321,365	5 2
ASSETS.					
Freehold Land and Buildings, less Mortgage				£26,404	4 10
Plant and Machinery, less Depreciation ..				73,855	12 1
Motor Cars, Lorries, Office Fixtures and Fittings, less Depreciation				2,080	18 4
Stocks on Hand—All Materials				157,688	11 1
Sundry Debtors				49,262	1 11
Life Insurance—J. C. Bachelder				997	9 7
Goodwill				10,000	0 0
Preliminary Expenses				811	13 4

Cash on Hand and Deposits	110	0	0
Trade Marks and Patents	154	14	0
	£321,365	5	2

Profit and Loss Account for Year Ended June 30, 1928.

To Salaries, Wages, Depreciation and Sundry Charges	£84,818	6	2
To Net Profit Carried to Appropriation Account	28,073	14	3
	£112,892	0	5
By Gross Profit	£112,892	0	5
	£112,892	0	5

Profit and Loss Appropriation Account as at June 30, 1928.

1927.—Oct. 15—						
To Directors' Fees	£1,000	0	0			
To Final Dividend	8,179	19	1			
To Bonus Mill Manager ..	417	5	0			
				£9,597	4	1
1928.—March 30—						
To Interim Dividend . .	10,000	0	0			
To Bonus Mill Manager ..	748	15	0			
				10,748	15	0
To Balance Carried Down				21,068	3	0
				£41,414	2	1
1927—July 1—By Balance				£13,340	7	10
June 30—By Net Profit for Year ...				28,073	14	3
				£41,414	2	1
1928—June 30, By Balance Brought Down				£21,068	3	0

Auditor's Report.

We have audited the books and accounts of Lustre Hosiery Limited for the twelve months ended June 30, 1928, and certify that in our opinion the foregoing balance-sheet is properly drawn up so as to exhibit a true and correct state of the company's affairs as shown by the books at that date. Stocks on hand are certified to as to quantities and value by Mr. Henry H. York.

CULLAM & CULLAM, Public Accountants, 77 Elizabeth street, Sydney, September 11, 1928.

HENRY H. YORK, Chairman. BASIL R. ORR, Secretary.

Sisal Decorticating Plant Erected in Haiti.

One of the most important developments in connection with the sisal industry in Haiti during 1927 was the construction of a modern decorticating plant at Hatte Lathan, about nine miles from Port au Prince.

Import Duties Favour American Silks.

Import duties in Cuba favour the importation of American goods, which receive a 40 per cent. reduction in the ad valorem rates. The new customs schedule, which became effective October 26, 1927, reduced the duty on silk piece goods (including broad silks) imported from countries other than the United States from 51.75 per cent. ad valorem to 50 per cent., and the preferential rate to the United States from 31.05 per cent. ad valorem to 30 per cent.

The same duties apply to rayon fabrics, which are offering heavy competition to silk fabrics in Cuba. The improvement in the quality of rayon fabrics in recent years, together with their lower price, has favoured the sale of rayon piece goods at the expense of board silks, and demand for rayon fabrics is showing a tendency to increase.

Rumania to Have First Rayon Plant.

The first rayon factory has been established in Rumania. German capital is interested. Construction has been begun at Comarnic, and a technical staff engaged. It is reported that the import duty on rayon is to be raised, in line with the Government policy of protecting infant industries.

Italian Hemp Market Firm, Although Somewhat Inactive.

There was limited activity in the hemp markets of Northern Italy during the month of June. The market, however, maintained a consistently firm tone, which has been attributed to the small available quantity of fibre from the old crop, and to the still unsettled reports regarding the character of the new crop. The weather during the month was favourable, and local feeling regarding the crop is now more optimistic than earlier in the season.

Census of Wool Manufacturing in Irish Free State.

Woollen and worsted goods were manufactured in the Irish Free State to the value of £737,336 during 1926, according to preliminary figures just released by the Department of Industry. These figures include the operations of 41 factories, and account for practically the whole production of wool goods, exclusive of hosiery and carpets. The principal items covered are:—Woollen cloth, £303,549; worsted cloth, £174,855; yarn sold or added to stock, £137,122.

Greek Demand Principally Low-Priced Raincoats.

The imports of all types of raincoats into Greece during 1926 were valued at about 18,880 dollars. A little less than half were made of rubberised fabric, about half of gabardine, and a few of silk. The sizes most in demand are 44 to 52, and the styles most called for in men's lines are raglans, without belts or caps, of cheaper quality. The c.i.f. prices paid by importers range from 3 dollars to 6 dollars. Comparatively few raincoats for women or children are imported.

Ready-Made Clothing Increasing in Popularity in Colombia.

Ready-made clothing is not used as extensively in Colombia as in the United States. An increasing quantity, however, is imported annually. Such clothes must compete with locally tailored suits, ranging in price from 35 dollars to 60 dollars. Dress suits are made of the best English material and sell for 90 dollars to 110 dollars. Some overcoats are imported, but the demand is limited. Others are tailored locally. Imported overcoats retail in the city of Bogota for 60 dollars to 90 dollars, while those tailored locally sell for 40 dollars to 65 dollars.

Opportunity for Developing Chilean Market for American Hats.

Chile imports annually about 300,000 dollars worth of cloth and felt hats, according to statistics compiled by the Chilean Government. Of this amount the United States contributes only about 5 per cent. Although local industries steadily have increased their activities and encroached upon the foreigner's market in all the lower grades of cloth and felt hats, there is still opportunity for American firms to secure a somewhat larger percentage of the gross imports. Types of hats currently popular in the United States are in demand.

Statistics

IMPORTS.

Article.	Period. July. 1927.	1928.
CLASS VIII.—(a) Apparel and attire; (b) textiles; (c) manufactured fibres.		
(a) Apparel and attire.		
Blouses, skirts, costumes, etc. (other than knitted) ..	52,028	55,471
Boots and shoes	35,102	36,111
Furs and other skins wholly or partly made up and dressed or prepared	67,252	36,112
Gloves	45,954	48,258
Hats and caps	77,191	71,272
Knitted articles of apparel—		
Blouses, skirts, jumpers, underwear, etc.	10,047	9,257
Socks and stockings	186,766	133,967
Men's and boys' outer garments	4,769	8,225
Shirts, collars, ties, etc.	4,946	3,229
Trimmings and ornaments	110,696	77,268
Other apparel and attire	63,374	64,479
(b) Textiles.		
Carpets, linoleums and other floor coverings	236,751	219,693
Handkerchiefs and serviettes of cotton or linen ..	48,560	57,372
Piece goods—		
Canvas and duck	64,994	52,921
Cotton and linen	959,725	659,994
Hessians and other jute piece goods	41,601	37,143
Lace for attire, etc.	57,282	57,933
Silk or containing silk	673,868	669,403
Velvets, velveteens, plushes, etc.	22,649	18,539
Woollens	205,692	123,393
Other	70,090	76,778
Quilts, tablecovers, sheets, etc.	28,949	24,724
Sewing and other cottons, threads, etc.	74,675	64,599
Towels and towellings	42,488	32,285
Other textiles	52,516	64,276
(c) Yarns and manufactured fibres.		
Bags and sacks—		
Bran, chaff and compressed fodder	9,643	16,083
Corn and flour	9,654	49,718
Woolpacks	38,139	156,189
Other	806	496
Cordage and twines, ex metal cordage	18,666	16,046
Yarns—		
Artificial silk	35,391	59,852
Cotton	51,832	60,334
Wool	31,340	15,186
Other	8,381	17,065
Total, Class VIII.	3,441,817	3,093,671

EXPORTS.

CLASS VI.—Animal substances (mainly unmanufactured).		
Wool—		
Greasy	1,537,788	1,526,173
Secured	682,545	597,256
Tops	64,101	23,239
CLASS VIII.—(a) Apparel and attire; (b) textiles; (c) manufactured fibres.		
Other apparel and attire	11,770	14,750
Piece goods	15,698	16,239
Other textile	2,788	5,018
Manufactured fibres, inc. bags, cordage and yarns	10,495	15,542

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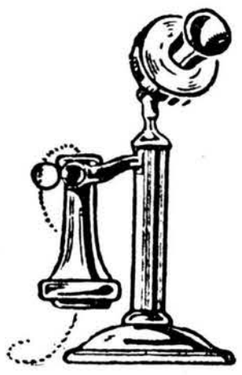

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Societe Alsacienne de Constructions Mecaniques.
Stamp, John W.
Wood, J., A.M.I.Mech.E.
York, Henry H., and Co. Pty. Ltd.

EXHIBITION.
Nottingham, October 5.

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Valley Worsted Mills Pty. Ltd.

OILS (LUBRICATING).
Vacuum Oil Co. Pty. Ltd.

OILS (Silk).
Lee, Frank, and Co. Pty. Ltd.
York, Henry H., and Co. Pty. Ltd.

OILS (Wool Batching).
York, Henry H , and Co. Ltd.

OILS (Olive).
York, Henry H., and Co. Ltd.

OVERCOATINGS.
R.S. and S. Woollen and Worsted Co-op. Mfg. Co.
Valley Worsted Mills Pty. Ltd.

PATTERN MAKERS.
Brown, J. C., and Co. Pty. Ltd.
Dyson, J., and Sons Pty. Ltd.
Stamp, John W.

PICKING BANDS.
Brooksbanks, Son & Co., J.
Handley Bros. Edgar.

PULLEYS.
Dyson, J., and Sons Pty. Ltd.

PULLOVERS.
Australian Knitting Mills Ltd.
Thyne Bros Pty. Ltd.

RUGS.
Amalgamated Textiles (Aust.) Ltd.
Albion Woollen Mills (The).
Hirst, Godfrey, and Co. Pty. Ltd.
Lincoln Spinning Mills Pty. Ltd.
R.S. and S. Woollen and Worsted Co-op. Mfg. Co.
Vicars. John. and Co. Ltd.

SAVINGS BANK.
State Savings Bank of Victoria.

SCOURERS.
Textile Dyers and Bleachers Ltd.

SCOURING BOWLS.
Brown, J. C., and Co. Pty. Ltd.

SCOURING MACHINES.
Davies, Simpson Pty. Ltd.
Dyson, J., and Sons Pty. Ltd.
Hall Bros. and Co.
Lee, Frank, and Co. Pty. Ltd.
Societe Alsacienne de Constructions Mecaniques.
Stamp, John W.

SCOURING AND MILLING MACHINES (Combined).
Davies, Simpson Pty. Ltd.
Dyson, J., and Sons Pty. Ltd.
Stamp, John W.

SERGES.
Amalgamated Textiles (Aust.) Ltd.
Collins Bros. Pty. Ltd
The Australian Woollen Mills Ltd.
Yarra Falls Ltd.

SERVICE BUREAU.
"Textile Journal of Australia."

SHAWLS (Infant).
Auswool Shawls Pty. Ltd.

SHODDIES.
Amalgamated Textiles (Aust.) Ltd.

SILK AND ARTIFICIAL SILK LUBRICATION.
Neutrasol Products Corporation.

SOAPS (Textile).
York, Henry H., and Co. Ltd.

SPARES (Machinery).
Brown, J. C., and Co Pty. Ltd.
Dyer and Phillips Pty. Ltd.
Lee, Frank, and Co. Pty. Ltd.
Wood, J., A.M.I.Mech.E.
York. Henry H., and Co. Ltd.

STOCKBROKERS.
Were, J. B., and Son.

SQUEEZING MACHINES (Piece).
Davies, Simpson Pty. Ltd.
Lee, Frank, and Co. Pty. Ltd.
Dyson, J., and Sons Pty. Ltd.

SUITINGS.
Amalgamated Textiles (Aust.) Ltd.
R S. and S. Woollen and Worsted Co-op Mfg. Co.
Valley Worsted Mills Pty. Ltd.
Vicars, John, and Co. Ltd.

SULPHUR.
Cuming, Smith and Co.

SWEATERS.
Australian Knitting Mills Ltd.

SWEATER COATS.
Australian Knitting Mills Ltd.

TAPES (Knitting).
Foster, L. J., and Co.
Gibbs Bros.
Vance and McKee.

TESTING MACHINERY.
Nesbitt Ltd., John.

TEXTILE PUBLICATIONS OVERSEAS.
Canadian Textile Journal.
Deutsche Farber-Zeitung.
Indian Textile Journal.
Textile Colorist.
Textile Mercury.

TEXTILE MACHINERY.
Brown, J. C., and Co. Pty. Ltd.
Butterworth and Dickinson Ltd.
Coulston and Co.
Davies, Simpson Pty. Ltd.
Dyson, J., and Sons Pty. Ltd.
Floyd, J. A.
Foster, L. J., and Co.
Goodbrand and Co. Ltd.
Hall Bros. and Co.
Hilscher, G.
Howard and Bullough Ltd.
Hussong Dyeing Machine Co.
Jackson and Co., Wm. C.
Lee, Frank, and Co. Pty. Ltd.
Scharer-Nussbaumer & Co.
Schweiter Ltd.
Societe Alsacienne de Constructions Mecaniques.
Stamp, John W.
Terot Knitting Machines (A/asia) Pty. Ltd.
Vance and McKee.
Wood, J., A.M.I.Mech E.
York, Henry H., and Co. Ltd.

TUBES.
Sonoco Products Co.

TWEEDS.
Albion Woollen Mills Co.
Amalgamated Textiles (Aust.) Ltd.
Hirst, Godfrey, and Co. Pty. Ltd.
R.S. and S. Woollen and Worsted Co-op Mfg. Co.
Tweedside Manufacturing Co. Pty. Ltd.

UNDERWEAR (Pure Wool).
Australian Knitting Mills Ltd.

UNDERWEAR (Wool and Cotton).
Australian Knitting Mills Ltd.

UNDERWEAR (Cotton).
Australian Knitting Mills Ltd.

UNION YARNS.
Foster, L. J., and Co.
Lee, Frank, and Co. Pty. Ltd.
Paton and Baldwin (Aust.) Ltd.
Vance and McKee.

VATS (Indigo).
Dyson, J., and Sons Pty. Ltd.

VELOUR CLOTHS.
Amalgamated Textiles (Aust.) Ltd
Collins Bros. Pty. Ltd.
Hirst, Godfrey, and Co. Pty. Ltd.
R.S. and S. Woollen and Worsted Co-op. Mfg Co.

VEST WOOLS.
Patons and Baldwins Ltd.

WARPING MILLS.
Davies, Simpson Pty. Ltd.
Dyson, J., and Sons Pty. Ltd.
Lee, Frank, and Co. Pty. Ltd.

WASHING MACHINES.
Brown, J. C., and Co. Pty. Ltd.
Lee, Frank, and Co. Pty. Ltd.

WASTE.
Amalgamated Textiles (Aust.) Ltd.
Port Phillip Mills Pty. Ltd.

WATER SOFTENERS.
United Water Softeners Ltd.
Wood, J., A.M.I.Mech.E.

WINDERS (Silk, Cotton and Worsted).
Brown, J. C., and Co. Pty. Ltd
Davies, Simpson Pty. Ltd.
Floyd, J. A.
Lee, Frank, and Co. Pty. Ltd.
Livesey and Crowther Ltd.
Scharer-Nussbaumer and Co.
Schweiter Ltd.
Societe Alsacienne de Constructions Mecaniques.
Stamp, John W.
Vance and McKee.

WOOL (Carbonised).
Port Phillip Mills Pty. Ltd.

WOOL (Greasy).
Port Phillip Mills Pty. Ltd.

WOOL (Knitting).
Patons and Baldwins Ltd.
Wangaratta Woollen Mills Ltd.

WOOL (Scoured).
Port Phillip Mills Pty. Ltd.
Tweedside Manufacturing Co. Pty. Ltd.

WOOLTOPS.
Amalgamated Textiles (Aust.) Ltd.
Lincoln Spinning Mills Pty. Ltd
Port Phillip Mills Pty. Ltd.
Valley Worsted Mills Pty. Ltd.
Yarra Falls Ltd.

WORSTEDS.
Amalgamated Textiles (Aust.) Ltd.
Albion Woollen Mills Co.
Hirst, Godfrey, and Co. Pty. Ltd
R.S. and S. Woollen and Worsted Co-op Mfg. Co.
Tweedside Manufacturing Co. Pty. Ltd.
Valley Worsted Mills Pty. Ltd.
Vicars, John, and Co. Ltd.
Yarra Falls Ltd.

YARNS (Weaving or Knitting).
Coloured Cotton Spinning Co. Ltd.
Dawson and Sons Ltd.
Foster, L. J., and Co.
Hall, Robert
R. P. Lawson and Sons Ltd.
Jackson and Co., Wm. C.
Lee, Frank and Co. Pty. Ltd.
Lincoln Spinning Mills Pty. Ltd.
Patons and Baldwins Ltd.
Valley Worsted Mills Pty. Ltd.
Vance and McKee.
Wangaratta Woollen Mills.
Yarra Falls Ltd

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