Vol. XXXIV No. 8 AUGUST 1943

The Journal of the TEXTILE INSTITUTE

Official Journal for Communications (Transactions) released for Publication by the British Cotton Industry Research Association (including its Rayon and Silk Sections), the Wool Industries Research Association the Linen Industry Research Association and the Technological Laboratory of the Indian Central Cotton Committee

CONTENTS

THE TEXTILE INSTITUTE
ST. MARY'S PARSONAGE, MANCHESTER
TELEPHONE BLACKFRIARS 2016

MADE IN BRITAIN FROM NATIVE RAW MATERIALS

HYDROGEN PEROXIDE

Justifies all expectations for bleaching all fabrics

USE THIS BRITISH MADE PRODUCT WITH CONFIDENCE

Fully accepted throughout the Textile Industries as a product of highest quality and dependability

SALES • SERVICE AND DEVELOPMENT DEPT. INVITE ENQUIRIES

LAPORTE

B. LAPORTE Ltd. LUTON Phone: LUTON 891 Grams: Laporte Luton

THE JOURNAL OF THE
TEXTILE INSTITUTE

Vol. XXXIV AUGUST 1943 No. 8

PROCEEDINGS

Lancashire Section

AUTOMATIC WEAVING DEVELOPMENTS

By H. DE G. GAUDIN

(*Paper delivered to the Lancashire Section, 9th July* 1943)

The subject of automatic weaving developments should be divided into two headings. First, the automatic looms, and secondly the use of these machines in the weaving mills.

We are not like the manufacturer who has continued to make his cloth. With us there has been a complete change over to a product far removed from anything textile. We have not built a loom for over 2½ years; in fact we have almost ceased to be loom-makers. Neither labour, material nor the machinery has been available. Our own work has been to some extent at a standstill. Nevertheless we are now beginning to think about it again, and are very optimistic about the future so far as automatic looms and their uses are concerned, particularly in this country. We shall go ahead as soon as possible. We think that the development of the loom will be fairly quick and to this end we have to try and develop the existing loom. There are many types of automatic looms. A gentleman recently said to me, " I believe that you make an automatic box loom; I have never seen one." Some people are very ignorant of the machinery which has been made and is already available. In facing post-war programmes we feel that we have to take the machinery that we have, and with that as a basis, try to simplify it, not only for use in the mill, but from our own point of view, from the point of view of construction and erection of machines. It has got to be more easily built in order to increase output; and as we have had, during this war, a tremendous amount of experience of building other machinery, this experience I hope will be utilised. There can be simplicity in design and manufacture which should all tend to make machine parts easily replaceable; and if we can arrange for the motions on the loom to be independent of each other then it will be easier for us and better for the men in the mill.

Models of Loom

Many people do not know the types of looms that we have. Some state that the automatic loom is only a machine for the production of plain, twills and bulk cloths. This is, of course, absolutely untrue. You have only to see a range of these looms to realise the number and variety of cloths that can be produced. For instance we have probably about 15 types of shedding motion; 14 types of let-off motion; different types of weft replenishing motions, multi-box motions, etc. Thus you will see that the combination of these is such that the automatic loom can be used for all sort of fabrics. It can be used for jute,

wool, flax, cotton, rayon, etc. Materials from these yarns are now being produced on automatic looms. The idea is to make the machines responsible for turning out a perfect fabric instead of depending on the skill of the operative. We foresee that electricity will be used even more in the design and use of the machine than at present. I think that after the war we are going to have a different outlook in regard to the use of many such facilities. We are going to carry on simplifying what we have, and we shall expect to use new materials in this work. We do not know much yet about the many new materials which are being used entirely for war purposes at the present time. There has been a tremendous amount of development while manufacturing war products. There will be changes in the design of machines when we get the use of such materials as plastics, and we shall have to learn about the properties of these materials by experiment.

Use of the Loom

Immediate developments in the post-war reconstruction will not see nearly so much change in the "machine" as it will in the "use of the machine." There are many types of automatic loom available to different sections of the trade and these have not yet been exploited by it. We must take the looms as they are and apply them, and it is in the application that I see the development in the post-war reconstructing. It is going to be a question of a change in the whole process of manufacture. In this country to-day, there are not 5 per cent. of the looms installed, which are automatic. The percentage is alarmingly small. This has got to change, but it is no use imagining that it is just going to change by putting in automatics in the place of ordinary looms. That would be foolishness. Automatics are *part* of a process. They are of little advantage by themselves. In a comparison of a set of four automatic with four non-automatic looms just the same results will be obtained, but the full benefit of automatic looms will not be obtained; the conditions must be right, and that brings me to the question of automatic weaving.

Automatic Weaving

What does it mean? It will mean more machines for the same amount of labour. It will also mean a different division of labour. It means a different method for the costing of the cloth. It means a different layout of your machines. If the best results are to be got from the automatic looms one must first have the best work in the preparation department. Mr. Nasmith has already covered some of the ground in connection with winding, and I very heartily endorse most of what he has said.

Warp

On automatic looms you will find that warp beams are larger in diameter than those in use on Lancashire looms to-day. The majority of Lancashire's beams are from 16"-20" diameter and now we are going up to 24". Thus the increase gives at least half as much yarn again on each beam. How many slashing frames are there capable of preparing beams up to 24"? Automatic warp drawing-in has to be done in the preparation room before the warp goes to the loom. You may decide that you will tie-up the warp in the weaving shed. That is correct for certain classes of goods, but, generally speaking, it is wise to prepare the warps outside and bring them into the shed so that the loom stoppage is reduced as much as possible. Automatic machinery must not stand idle.

Weft

This is an important problem for automatic loom makers and cloth manufacturers alike. There are shuttle-changing and bobbin-changing looms. In my opinion, 95 per cent. will be bobbin-changing. Weft can be ring spun, it can be rewound, but it is not going to be supplied on mule spun cops. We must rule weft cops out straight away. Weft can be ring-spun or rewound direct on to the automatic pirn. I think that there will be a great deal more rewinding, which may be done either on existing pirn winders, or on the new automatic

pirn winders. On these machines you can wind any package which you require for your looms. To get the best results you must have uniformity in the weft package. We do not ask anything better in the quality, but we do insist on uniformity. When rewinding you can regulate and maintain uniformity better than in ring spinning. With a good package of weft one can build up to the size wanted, and not nearly as many weft bobbins in the mill are needed if one is only going from the winding room to the weaving room. The preparation of warp and weft must receive careful consideration.

Floor Space

This is an indispensable aspect of our reconstruction problems and plans. A gentleman called last week and said: "Could you submit to me a plan for automatic looms of a certain width in my shed?" I said, "Let me see what your floor space is like." I told him that looms could be put in, but that he would not want them, and that we certainly would not want to put them in. He would not have enough space for handling the warp and weft. He would not benefit from automatic looms, because he could not dispose his labour correctly, and unfortunately there are so many mills in this country suffering from lack of space, that I think there will be considerable difficulty in deciding as to who is going to be given the facilities to effect the change over to modern conditions. There are many who are running small businesses who want to instal modern machinery, but cannot do so. There must be a great deal of co-operation between the manufacturers in facing up to this business of adopting modern processes. I think the spinning end of the trade is more easily organised from that point of view. Weaving in this country will probably have to develop as the preparatory processes of warp and weft develop. I suggest therefore that the cost is great, and this can only be met by close co-operation of those interested. It can hardly be done by the small firms; it is out of their reach. We have to get together, get the floor space and then put in the machinery. There has been plenty of co-operation during the war and I do not see why, if we share ideas with each other as we have been doing both here and in America, that this co-operation cannot go on afterwards. Surely if we can work together to save our lives in war, then we can do so to save our industry in peace. There is, however, one danger which can be foreseen. After the war there is going to be plenty of trade. Britain and America are going to have to do much in clothing ourselves and the more unfortunate peoples of Europe. We shall be told that we have to turn out the goods. Business will then be good. We shall in all probability hear the old cry "we have plenty of work, what is all this about your modern methods?" If this attitude prevails, then the textile trade is doomed. This period of brisk and easy business will be only temporary, and we are going to have to compete later on against more severe competition. There are manufacturers in Argentina, Brazil, Australia and India, who have carried out developments during the war. We must recognise this and work out the trade boom and be ready for competition afterwards. Even the operatives are determined that there shall be no *status quo*. It seems to me that Mr. Gray and Mr. Wilkinson have a tremendous task ahead of them to make sure that this trade is not short of operatives. I should like to see Rochdale, Burnley and Blackburn with their Technical Colleges up to date with the latest machinery. I should like to see manufacturers presenting the Colleges with types of the most modern machines. There has been no encouragement to teaching students to learn about these modern machines because they were not using such machines in the mill. Automatic loom overlookers are at a premium to-day, and we constantly get requests to find competent men. It is tragic that this should be so after so many years of lagging behind. In concluding, I want to emphasise that automatic weaving is going to fill a very important place in post-war reconstruction schemes simultaneously with the development of the whole of the manufacturing trade. I am confident that our textile trade will be better in the future and of increasing benefit to those employed in it and those whom it will serve both at home and abroad.

DISCUSSION

Does Mr. Gaudin think that the new set up will be put into new buildings or can they be put into fairly modern present day type of buildings?

Mr. Gaudin: There are quite a number of fairly good sheds at the present time. Some in fact are very good, but generally speaking it is going to mean new buildings. This will all depend on trade. If we are going to remain the size that we were prior to the war it certainly means new plant and new buildings.

What are the prospects with regard to weaving checks on automatic looms?

Mr. Gaudin: We built our first four-colour check loom in 1920-21. The two-colour loom followed afterwards. For over twenty years we have been producing four-colour check looms, and there has been a tremendous amount of development both in cotton and wool during that time. I can't tell you how many we have made but I would be glad for you to see what these looms are like.

Mr. Lovering: What possibilities are there of developing a shuttleless loom?

Mr. Gaudin: Just before the war we in Blackburn, took over the Gledhill Loom designed by a Yorkshire manufacturer. It was shuttleless and worked by means of rapiers. We started to develop it and we were doing some useful experimental work with it, but unfortunately the material which we wanted was also wanted by the Government, and thus we could not carry on with our experiments. It was built particularly for the woollen and worsted trade, and only for a width of about 75 ins. frame size. It was for a particular market. To develop it for other work, which might be furnishing, silks, crepes, etc., we foresee that there would have to be important changes in the design. How far it is going to go I cannot tell you just now. We have, for our own interest, done quite a number of different weaves and it is very pleasing to see the results, but as yet, it is a little early to talk.

Why is Mr. Gaudin very definitely in favour of the bobbin-changer in preference to the shuttle changer?

Mr. Gaudin: There is a definite use for both. We took over the Vickers Stafford Loom, and we have done quite a lot with that type of single-shuttle, shuttle-changing loom. But after the war 95 per cent. are going to be bobbin-changers. You see you can have more variety with the bobbin-changer. There is more similarity in the design of the loom between your single-shuttle and the box-loom with the bobbin-changer. In the narrow widths of loom you have bigger production. You have to change a large package in the shuttle-changer and thus there is a delay, whereas with the bobbin-changer it is easy and can be done at any speed.

Mr. Gaudin speaks of simplicity in design and manufacture after the war due to the knowledge gained in the war. Is this likely to react to any great extent in the cost as compared with the Lancashire loom? In several existing systems we have found that the only way to make automatic looms pay over the Lancashire loom is to run on a three-shift system. We can produce cloth more cheaply on the Lancashire loom. Will all this development of spare parts, etc., counteract this. The main thing is cost per yard to produce cloth.

Mr. Gaudin: Automatic looms always mean a higher capital cost. I do not know whether you have included in the costing of your cloth the modern processes prior to the weaving, nor know how you would be able to put the automatic looms in your floor space. Assuming that you have ideal conditions, it is extremely difficult to show all the savings made. We shall have to learn to face up to high capital costs for I do honestly feel that the textile manufacturing trade has been badly neglected from the point of view of new equipment. As manufacturers you are interested in cloths and that being so you are not necessarily machine-minded. We are anxious that the operatives should learn in the Technical Colleges what machine-mindedness involves. If we can change our outlook we shall begin to appreciate the value of machinery. To show a saving in your calculation may be difficult. But if you also take into consideration the human factor, the extra production you are getting from each operative by virtue of modern machinery and better working conditions, the better quality of cloth off the automatic looms and other economies which you cannot show in a calculation, they nevertheless are all beneficial to production and are due to the application of modern methods.

What is the smallest number of looms estimated to be a complete unit to produce a 40 in. cloth?

Mr. Gaudin: I think for your question I should say 96, that is if the overlooker can look after them. 72 is the absolute minimum. You have to know, first of all, how many looms your weaver is capable of looking after. You have to know your stoppages and reduce them to a minimum; and then estimate what number of looms you are going to give to an overlooker, setting out the looms in so many blocks of four looms, according to the number of machines and unit of labour. The minimum number depends on warp and weft preparation, and you must be able to plan, according to your unit of loom or unit of preparation machinery. One comes to a point where they balance and that is the deciding factor.

Mr. Bayes spoke in support of Mr. Gaudin and thanked him for his excellent lecture. This was seconded by Mr. Sharp, and Mr. Gaudin then suitably replied.

Reviews

Textile Fibres under the X-Rays. By W. T. Astbury, M.A., Sc.D., F.Inst.P., F.R.S. Published (apparently for private circulation) by Imperial Chemical Industries Ltd.

This monograph is the second in a series of scientific monographs which the I.C.I. Dyestuffs Ltd. are publishing as suitable subjects arise. Much more ambitious than the first (*Textile Fibres under the Microscope*) it is a unique collection of reproductions of X-ray photographs of textile and other fibres. These are beautifully printed and reproduced at the original sizes. The value of the album is enhanced by a clearly written account of the technique employed by the author, an acknowledged authority on the use of X-rays in the field of textiles.

ROBERT H. PICKARD.

EXAMINATIONS, 1943

The following passes have been recorded in the Examinations held in relation to the Associateship of the Textile Institute in March and May, 1943, at Belfast, Glasgow, Manchester and Nottingham.

Preliminary Examination

H. Sneyd, Oldham.

Examination in General Textile Technology

*A. G. Flower, Warrington.
J. H. Holden, Blackburn.
*Miss J. M. Lee, Leeds.
*R. F. Meynell, Derby.
J. Rayment, Nottingham.
*D. N. Raynor, Nottingham.
*W. H. Robinson, Bradford.
G. Shoebridge, Derby.
R. Sunderland, Preston.
G. C. Woodcock, Warrington.

Names marked with an asterisk are of candidates who have now completed the qualification requirements for the award of Associateship (A.T.I.).

Institute Membership

At the August meeting of Council the following applicants were elected to membership :—

Ordinary.

John Gordon Bedford, B.Sc., Messrs. J. & T. Firth, Ltd., 131, Thornton Road, Bradford, Yorks. (General Manager and Director).

Alan Ronald Arthur Bettridge, Ellison Insulations Ltd., Perry Barr, Birmingham, 22 (Chief Chemist).

Izrael Bursztyn, 3, Lancaster Road, Salford, 6 (Research Chemist, Mandleberg & Co. Ltd., Cobden Street, Pendleton, Salford, 6).

Norman Frederic Crowder, A.M.C.T., A.I.C., 50, Higher Lane, Lymm, Nr. Warrington (Research Chemist, Tootal Broadhurst Lee Co. Ltd., Manchester 1).

Edard Mayall Gray, M.A., B.Sc., 11, Kenmore Drive, Green Lane, Hale, Cheshire (Director of Recruitment and Training, Cotton Board, Fountain Street, Manchester).

Frank Haworth, 11, Woodend View, Mossley, Nr. Manchester (Director and General Manager, Cotton Spinning and Doubling Mills, Robert Hyde Buckley & Sons, Ltd., Mossley).

Ernest Hirst, Combined Egyptian Mills Ltd., Atherton, Nr. Manchester (Executive-Director).

Arthur Jones, 35, Breakmoor Avenue, Silsden, Nr. Keighley (Textile Designer, Driver Bros., North Street Mills, Silsden).

Alexander Melville, M.I.Mech.E., 60, Chorley Road, Standish, Nr. Wigan (Chief Engineer, Standish Co. Ltd., Worthington, Nr. Wigan).

Nathan Morris, 164, Bromwich Street, Bolton (Works Manager, Cotton Spinning & Doubling, Eckersleys Ltd., Swan Meadow & Western Mills, Wigan).

James Eckersley Myers, O.B.E., D.Sc., A.I.C., College of Technology, Sackville Street, Manchester (Principal).

Geoffrey Lomas Oliver, c/o Fine Cotton Spinners & Doublers Assen. Ltd., 6, St. James's Square, Manchester, 2 (Executive Director).

A. G. Rendall, F.I.C., A.R.C.S., B.Sc., Kalamazoo Print Ltd., Northfield, Birmingham (Research Chemist).

Cecil Rhodes, Traeth Dyfi, Aberdovey, Wales.

Ernest Edgar Riddell, 27 Cromwell Road, Ribbleton, Preston, Lancs. (at present in Forces).

Ernest John Shaw, Arley, Blackburn (Wm. Hollins & Sons Ltd., Pleasley, Mansfield).

Edward Olin Smith, Universal Winding Co., Providence (R.I.), U.S.A. (Senior Vice-President).

Rudolph Stein, "Odd Gable," Windlehurst Road, Hawk Green, Marple, Cheshire (Export and Development, Amalgamated Cotton Mills Trust Ltd., Arkwright House, Manchester, 3).

N. C. Tandon, Assistant Weaving Master Muir Mills Co. Ltd., Cawnpore, U.P., India.

Junior.

Allan Furniss, 1, Borland Avenue, Botcherby, Carlisle (Textile Producer, Morton Sundour Fabrics, Dentonhill Works, Carlisle).

David Leslie Morrall, 71, Lower Stanton Road, Ilkeston, Derbyshire (Assistant Chemist, Springfield Hosiery Finishing Co. Ltd., Hucknall Lane, Bulwell, Nottingham).

NOTICES : INSTITUTE MEETINGS

LANCASHIRE SECTION

Friday, 10th September. *Manchester*—1.0 p.m. Lunch-time meeting. Lecture : "Air Conditioning and Dust Collecting," by F. Wright, Esq., A.M.I.E.E., M.I.H.V.E., of Sturtevant Engineering Co. Ltd., at the Institute's premises.

MIDLANDS SECTION

Saturday, 25th September. *Coventry*—2.30 p.m. Lecture : "Some Aspects of the Shirley Institute's Researches into the Problems of the Rayon and Silk Industries," by Dr. F. C. Toy, F.Inst.P., F.T.I., of Shirley Institute. The meeting will be held jointly with Coventry Textile Society and the Technical College, Coventry. Chairman : H. L. Johnson, F.T.I., President of the Textile Institute.

On this occasion the Institute's Service Medal will be presented to Mr. T. A. Purt, Hon. Secretary of the Midlands Section, by the President.

"An English home – gray twilight pour'd
On dewy pastures, dewy trees,
Softer than sleep – all things in order stored,
A haunt of ancient Peace"

Tennyson.

When that ancient peace is restored, and the alarms of war are but an unpleasant memory, craftsmen who delight in the beauty and freedom of their home land will return to peaceful pursuits.

Their skill, inherited from many generations of forebears, will once more find expression in the fashioning of British Textile Machinery which has served a great industry so long and so well.

HOWARD & BULLOUGH LTD.
ACCRINGTON ENGLAND
TELEPHONE ACCRINGTON 2121. TELEGRAMS "GLOBE" ACCRINGTON

THE JOURNAL OF THE
TEXTILE INSTITUTE

TRANSACTIONS

5—A PHOTOELECTRIC PHOTOMETER

By P. W. CUNLIFFE, PH.D., F.I.C.

Introduction and Summary

In the course of an investigation on the kinetics of dyeing it became necessary to determine the concentration of a large number of dye solutions. The usual visual methods were considered but were rejected because of (i) their slow speed, (ii) their reliance on the Lambert-Beer law of absorption, which might not always be applicable under the contemplated conditions of use, and (iii) their fatiguing effect on the observer. Consideration was given, therefore, to physical meters which in many forms are free from these defects. The use of meters of this type is increasing rapidly, particularly in analytical work, and there exists a considerable literature on the subject; for example, a detailed review of methods has been given by R. H. Müller[1] who quotes 239 authors.

Physical photometers or absorptiometers frequently employ one and sometimes two barrier-layer photoelectric cells and vary in accuracy according to the soundness of the principles on which they are constructed. The subsidiary apparatus used with such cells is frequently of a simple nature, consisting in the main of a galvanometer. The emission type of photocell is sometimes employed, particularly in the photometry of electric lamps. The vacuum emission photocell is indeed a precision measuring device when suitably used. It has the disadvantage of producing a very small photocurrent which renders amplification necessary and this adds considerably to the amount of subsidiary apparatus required.

It was decided, however, that a vacuum emission cell should be used in the proposed instrument and the problem of the subsidiary apparatus was solved in a manner which it is thought may be of interest to others. Briefly, this was to use the valve potentiometer portion of a glass electrode *p*H meter, which, in common with many other laboratories, is installed in the author's laboratory. This apparatus is designed for the measurement of E.M.F. and takes virtually zero current, conditions which may be made to apply to the vacuum photocell as to the glass electrode.

The paper describes the photoelectric photometer or absorptiometer which was constructed in the laboratory and used in conjunction with a Cambridge potentiometer. There are also outlined some examples of its use in determining the absorption of dyes from their solutions, of its application to chemical analysis by colorimetric methods and of its value in "approximate" or "abridged spectrophotometry."

Construction

The essential components of the instrument are as follows:—

The radiation from an electric lamp S (Figs. 1 and 2), operated from the mains through a voltage regulator, is made approximately parallel by means of a lens L_1. At A an aperture is placed to regulate the dimensions of the beam, and at F a filter which is chosen to isolate any desired portion

of the spectrum. After passing A and F, the beam passes through one of two glass cells C_1 and C_2, one of which ordinarily contains the test solution and the other the solvent. The cells C_1 and C_2 are mounted on a carriage C which can be moved by means of a control situated on the outside of the instrument, thereby enabling either cell to be brought into the beam at will. After undergoing absorption in the cell C_1 or C_2, the beam falls on a second lens L_2 which projects an enlarged image of the filament of the lamp S on to the cathode of the photocell PE. A shutter Sh, also operated from the outside of the instrument, serves to cut off all radiation from the photocell

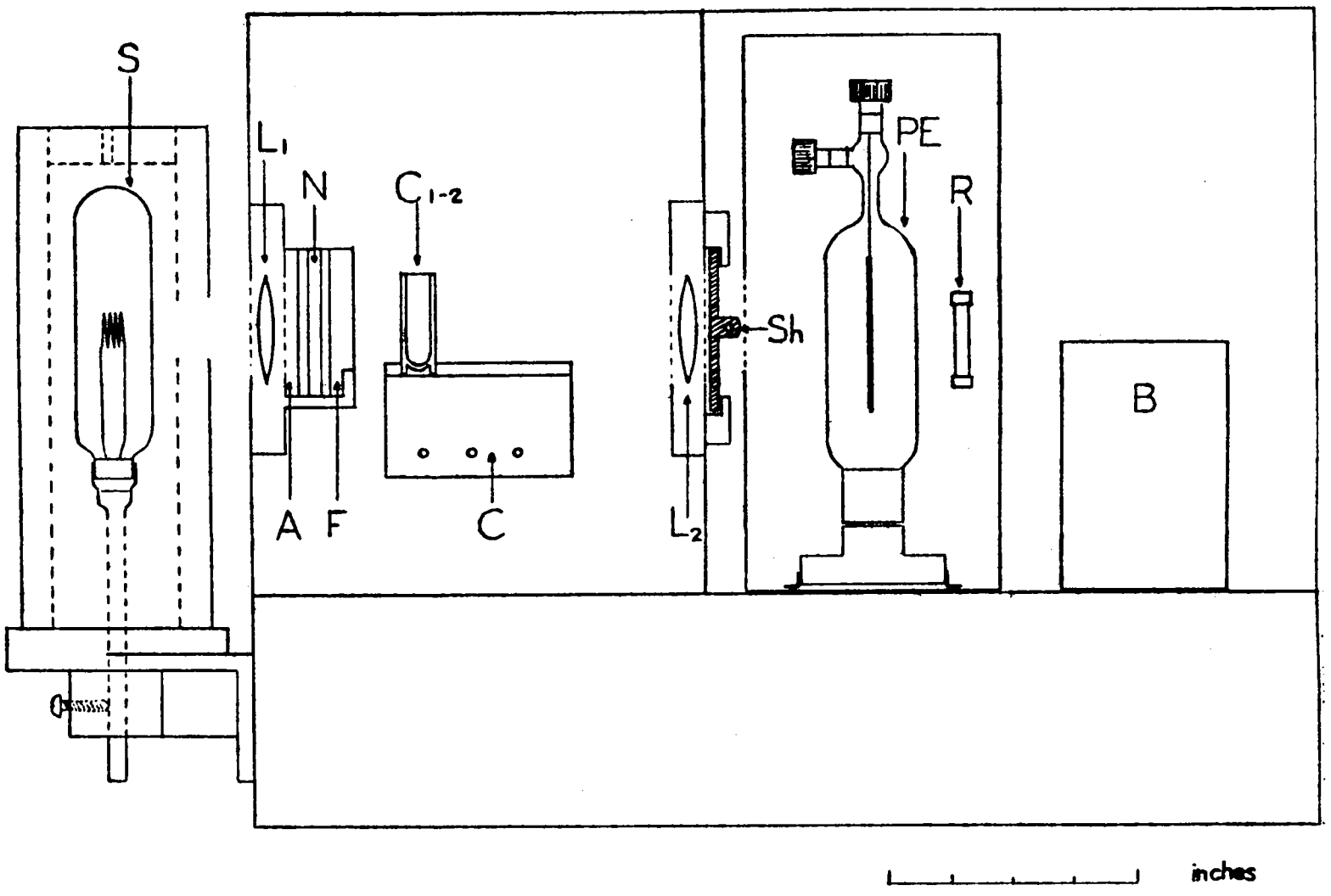


Fig. 1.

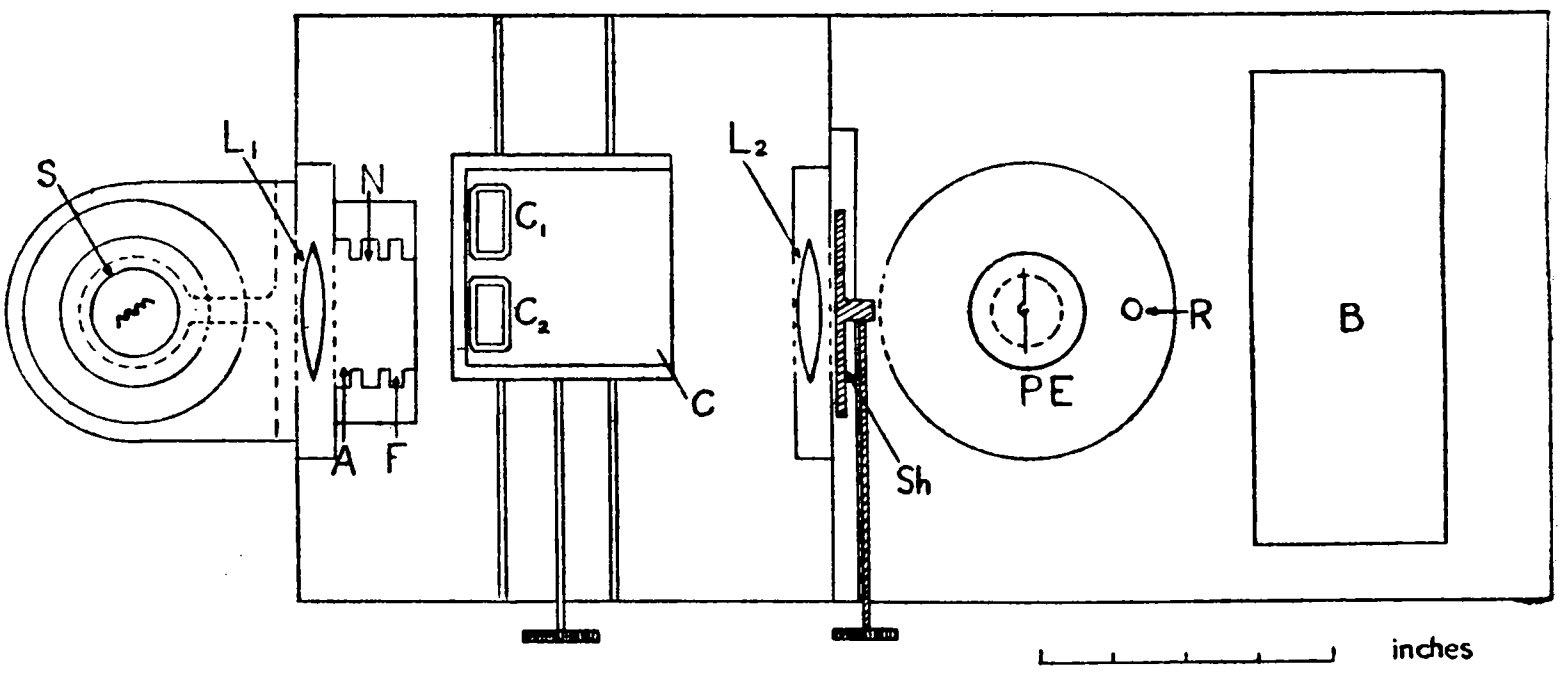


Fig. 2.

when desired. The auxiliary battery for the photocell is housed at B. A shutter (not shown) is also provided between the lamp and the lens L_1. It is an advantage to provide either a glass cell containing a copper chloride solution, or a piece of heat absorbing glass between the source and the filter, since this prevents any appreciable rise in temperature within the apparatus. (See remarks under "Filters.")

The following paragraphs give further details of the components.

Source of Light.—As used in the author's instrument, this comprises a 100-watt projection lamp, mounted adjustably within a double walled housing provided with adequate ventilation. The filament of the lamp forms a rectangular grid but as the ratio of length to breadth of the grid is

less than that of the cathode of the photocell, on to which its image is projected, it is desirable to fix the lamp with the plane of the grid at some 40°—50° to the axis of the beam.

The lamp is run off the mains through a constant voltage transformer (manufactured by Advance Components Ltd.) which serves to reduce considerably the fluctuations of the mains. Further, in order to prolong the life of the lamp, the voltage is reduced from the normal 230 volts to 200 volts by means of a resistance in series. The use of a low voltage lamp run from storage cells might perhaps be preferable to the present arrangement although the linear form of the filament would not allow the cathode of the photocell to be uniformly illuminated. It is sometimes necessary to reduce the intensity of the beam of light and this is conveniently done by means of either a neutral filter in glass or gelatine, or a blackened wire gauze, or by means of both devices, placed in a slot provided for this purpose at N.

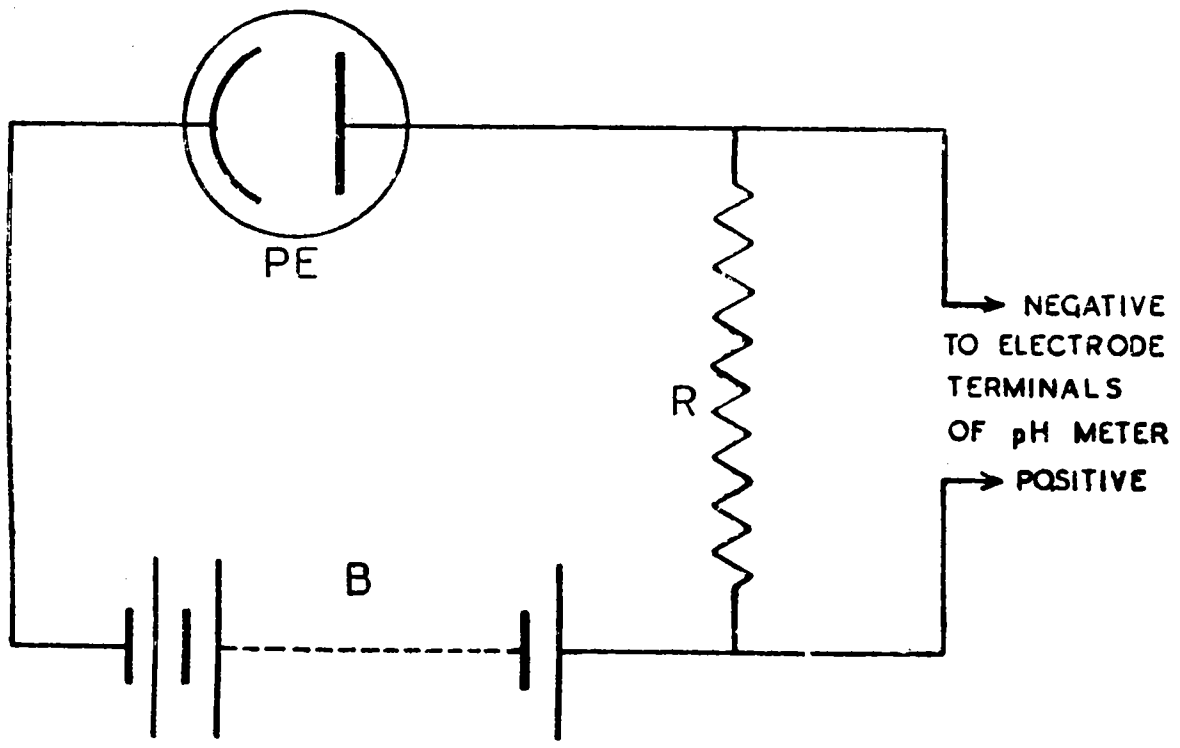


Fig. 3. Photometer Circuit.

Photocell and its Connections.—The cell is of the vacuum emission type, which has a strictly proportional response to radiation of a given wavelength (General Electric Co., Ltd., potassium-silver oxide-vacuum cell, known as the KMV6 cell). The wiring diagram is the standard G.E.C. circuit[2] (Fig. 3), using a battery B of 18-22 volts. The value of the resistance R may be varied according to the sensitivity which is required. Using the 100-watt projection lamp described above in conjunction with filters of wide spectral transmission, such as the Chance-Parsons glass filters, the resistance may be 5 megohms. If, however, the narrow " spectrum " filters are to be used, it is desirable to use a higher value; in the author's instrument a 15 megohm resistance is normally used but a value as high as 50 megohms has been used without any circuit instability. If the potential difference which is produced across the ends of this resistance when using the wide filters is too great for measurement, the intensity of the beam of light which falls on the cell may be reduced as described in the previous section. The photocell and resistance are housed together in a metal case provided with a rectangular aperture through which the beam of light passes on to the cathode of the cell. The battery B is separately shielded, although one general shielding would be equally satisfactory. The metal containers and the inner guard ring terminal of the photocell are each wired to a terminal on the outside of the instrument. In use, a lead is taken from this terminal to the " earth " terminal of the *p*H meter but is not actually connected to earth itself. The leads from the resistance R which are taken out of the instrument are shielded, and are as short as possible. They are connected to the *p*H meter in place of the glass electrode leads.

Absorption Cells.—The usual type of plane-parallel glass cell is used, convenient dimensions being about 4 cms. by 3 cms. A cell thickness of 1 cm. is suitable for many measurements but the carriage will take cells up to 4 cms. in thickness.

Filters.—For many purposes the Chance-Parsons all-glass filters are suitable but where measurements are required in a more restricted spectral band it is found that either a range of Wratten filters[3] or the Ilford spectrum filters[4] are suitable. The table below gives details of a range of filters which have been used in another instrument[5] designed by the author and which also have been employed in the present apparatus. These Wratten filters may be bought in the form of dyed gelatine sheets and in the 2″ × 2″ size they may be mounted, with or without balsam, between two thin pieces of glass such as are used to make miniature (2″ × 2″) lantern slides.

The transmission of many filters varies appreciably with temperature and for this reason they should be protected from the heat of the lamp as much as possible. It should also be noted that some of the Wratten filters transmit a portion of the infra-red spectrum. Reference may be made in this respect to the results given in the later section headed "Reproducibility." Although the second example serves the purpose of illustrating the use of the Wratten filters and the reproducibility which is obtained with the instrument, the values obtained with the green filter (530 $m\mu$) are much too high, due to the inclusion of some infra-red radiation which is passed by this filter. A true reading would be obtained by interposing a liquid filter containing copper chloride between the source and the filter, since a suitable filter of this type absorbs the infra-red radiation.

Wratten Filters

Filter colour...	Violet	Blue	Blue-green	Green	Orange	Red	Deep red
Wratten Filters No.	36 + 64	49C	75	62	23A + 52	71A	89A
Wavelength range ($m\mu$)	400–430	430–480	465–510	510–550	560–650	620–660	690–740
Mean wavelength ($m\mu$)	415	455	480	530	590	635	715

Applications of Instrument

An instrument of this type measures the light absorption of a liquid rather than its "colour." As a tool for use in analytical work, it becomes a comparator in which the human eye is replaced by photo-electric cell. For such analytical purposes, it is necessary to calibrate the instrument in terms of a series of solutions of known concentration to form a standard curve. The concentration of the unknown solution is then determined from a knowledge of its transmission by reference to the curve. (For a general discussion on colorimetric analysis see a text book of quantitative analysis, e.g. [6], see also [7].)

Absorption of Dyes.—The instrument has been used extensively to determine the absorption curve of textile fibres for dyes. In this application it is first necessary to select a filter appropriate to the solution under measurement. This normally is one which transmits light in that portion of the spectrum in which the test solution exhibits maximum absorption, since it is under these conditions that the greatest sensitivity is obtained. The instrument itself may be used to determine the approximate spectral absorption curve as described later.

The transmission-concentration curve is then determined using light of the selected spectral region. The course of dye absorption during dyeing can thus be followed readily by removing small volumes of the dyebath at

intervals, diluting to a convenient and known extent and measuring the transmission of the resulting solution. It is obvious that the method can only be employed with accuracy when no change of hue occurs during dyeing.

Chemical Analysis.—The instrument may be used with advantage in those chemical analyses for which colorimetric methods are available; for example, the determination of iron by the thiocyanate or the thioglycollic acid method, or of chromium by the dichromate method. As with the applications of the instrument already mentioned, a reference curve is first obtained by carrying out measurements through an appropriate filter on a series of solutions of known concentration. Standard solutions are not required in the actual analysis.

Approximate or Abridged Spectrophotometry —The use of the narrow spectral filters previously described enables the transmission of a liquid to be determined at sufficient points in the spectrum to form a partial spectral transmission curve. This procedure is often referred to as "approximate" or "abridged spectrophotometry," and whilst it is of little value with liquids which possess sharp spectral absorption bands, it is a very valuable tool in many problems in which the full detail given by a complete spectrophotometric curve is not required.

Reproducibility.—The following examples are given:—

(*a*) During the course of the routine use of the instrument, the transmission of a solution containing 0·1 g. per litre of Thionol Green BS was measured on three consecutive days, with each of three Chance-Parsons glass filters, viz., No. 1 (red), No. 5 (green) and No. 7 (blue), with the following results:—

Chance-Parsons Filter	% Transmission of Dye Solution		
No. 1. Red	51·6	51·7	51·7
No. 5. Green	47·8	47·8	47·9
No. 7. Blue	61·2	61·1	61·3

(*b*) The transmission of the No. 1 red Chance-Parsons glass filter, which embraces a wide spectral band, was analysed on three different days, in terms of the more nearly monochromatic Wratten filters described earlier. The results are as follows:—

Wratten Filter Wavelength ($m\mu$)	% Transmission of Red Chance-Parsons Filter		
480	nil	nil	nil
530	14·4	14·3	14·0
590	2·5	2·4	2·5
635	49·8	49·8	49·7
715	87·7	87·4	87·3

Slight disturbances which occurred during the above measurements, due to heating of the filters, indicated the desirability of providing a heat absorber in the light beam.

Acknowledgements

Thanks are given to the British Cotton Industry Research Association who kindly loaned a vacuum photoelectric cell to enable the preliminary trials to be carried out.

The author thanks the Chairman and Executive Directors of The British Cotton and Wool Dyers' Association Limited for permission to publish this paper.

REFERENCES

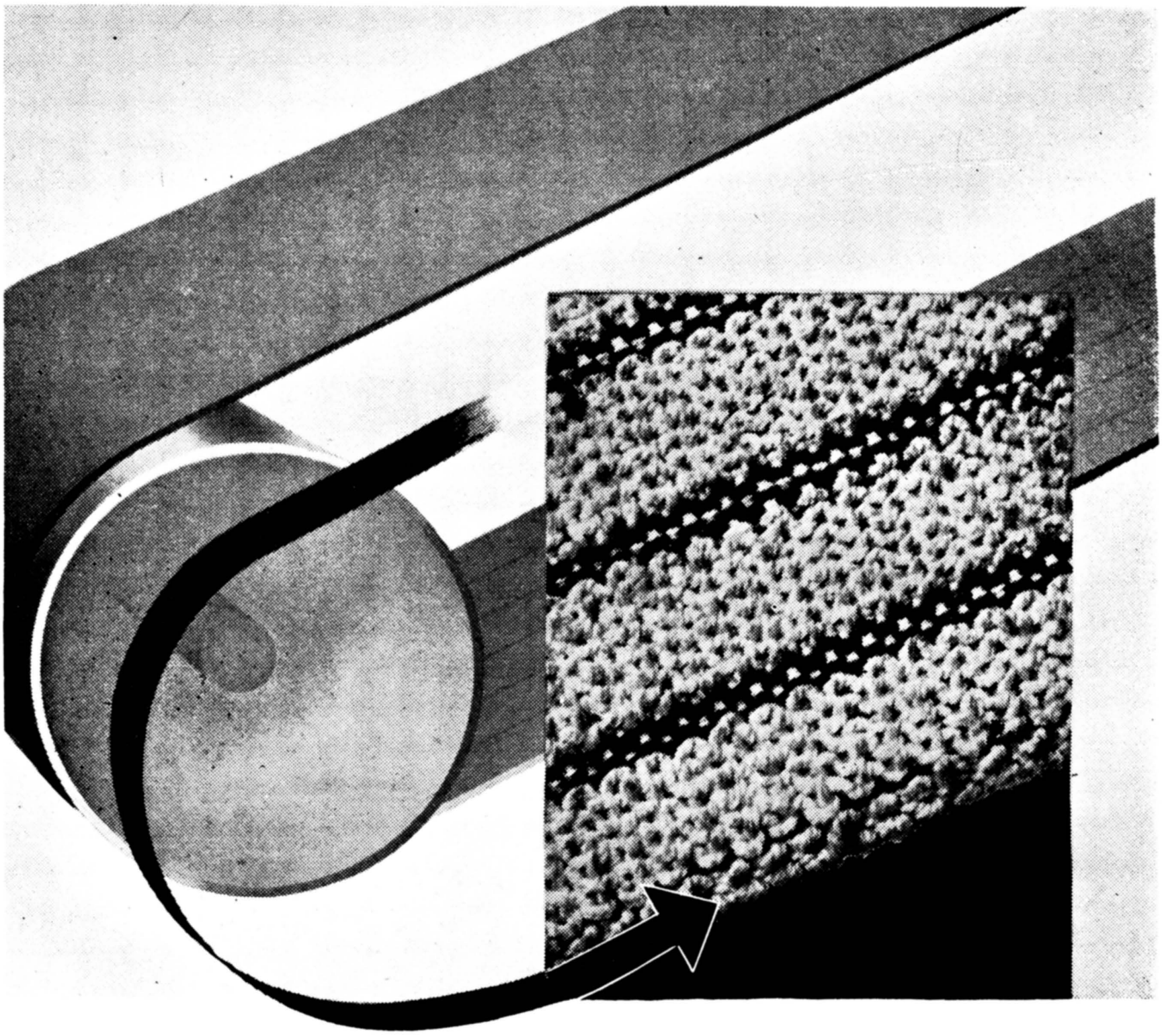
[1] R. H. Müller. "Photoelectric Methods in Analytical Chemistry." *Ind. Eng. Chem.*, Anal Edit., 1939, **11**, 1-17.
[2] Walker and Lance. "Photoelectric Cell Applications." (Pitman, 3rd Edition, 1938).
[3] Eastman Kodak Co. "Wratten Light Filters." (Eastman Kodak Company, Rochester, New York).
[4] Ilford Ltd. "Ilford Colour Filters," (Ilford, Ltd., Ilford, London).
[5] P. W. Cunliffe, *J. Text. Inst.*, 1927, **18**, T291-302.
[6] A. I. Vogel. "Quantitative Inorganic Analysis." (Longmans Green & Co., 1941).
[7] E. J. Vaughan. "Use of the Spekker Photo-Electric Absorptiometer in Metallurgical Analysis." Institute of Chemistry, London, 1941.
E. J. Vaughan. "Further Advantages in the Use of the Spekker Photo-Electric Absorptiometer in Metallurgical Analysis." Institute of Chemistry, London, 1942.

The immediate return of all empty drums has become imperative to our war effort.

There are barely enough metal drums for the transport of essential chemicals and dyestuffs. Every drum is needed. Every drum must be used again and again. Dirty or clean, it must be handled with care. Damage takes time to repair and wastes labour. Above all, empties **must** be promptly returned. Get them all on the move now. We need them — URGENTLY.

IMPERIAL CHEMICAL INDUSTRIES LTD.
LONDON, S.W.1

D1212C



The original NON-FRAY EDGE

This cabled cotton cord woven into the edge of "Grooved Roko" belting resists the wear of guide forks and prevents premature fraying and failure. Just one of the many points about "Grooved Roko" belting—others are ★ Elasticity to withstand shock loads, due to 100% pure Camels Hair Yarn in the warp. ★ Solid weave. ★ Patent Grooves give maximum efficiency. ★ Patent Pile Driving surface—better grip—protects the body of the belt.

"PATENT GROOVED ROKO" BELTING

SMALL PARKES SP PRODUCT

Warp still guaranteed 100% Pure Camels Hair Yarn

SMALL & PARKES LTD., MANCHESTER, 9. LONDON: 18 HIGH STREET, WIMBLEDON, S.W.19.

RK.3.

THE JOURNAL OF THE
TEXTILE INSTITUTE

ABSTRACTS

1—FIBRES AND THEIR PRODUCTION

(B)—ANIMAL.

Silkworms: Feeding Experiments; Effect on Silk Quality. (1) V. A. Rozhdestvenskaya. (2) S. Y. Demyanovskii. *Uchenye Zapiski Moskov. Gosudarst. Pedagog. Inst.*, 1940, **21**, No. 4, 111-124, 135-144 (through *Khim. Referat. Zhurn.*, 1941, **4**, No. 1, 62 and *Chem. Abstr.*, 1943, **37**, 1782[4]). (1) Feeding *Bombyx mori* larvae with upper-tier mulberry leaves that had been treated at 50° C. with a 2 per cent. sugar solution accelerated development, increased the yield of silk and improved its quality. (2) Protein and carbohydrate metabolism of *Bombyx mori* was studied in feeding experiments with mulberry and oak leaves. Methods for increasing the yield of cocoons and for improving the treatment of raw silk are described. C.

Camel Family Fibres. A. C. Whitford. *Text. Col.*, 1943, **65**, 97-101. A chart is given showing the evolution and development of the Camelidae from about 55,000,000 years ago to recent times, with a short account of their geographical history. The types, characteristics and uses are described of the hair of the camel, guanaco, llama, alpaca, vicuna, huarizo and misti, the two latter being crosses of the llama and alpaca. A table is given showing maximum and average hair diameters, per cent. hairs over 33 microns, number of scales per inch and type of medullation of the fibres of the camel family. W.

Present-day Hampshire Type. W. G. Kammlade. *Natl. Wool Grower*, 1943, **33**, No. 4, 14-16. W.

(C)—VEGETABLE

Indian Cotton: Cultivation in the Chittagong Hill Tracts. M. P. Singh. *Indian Text. J.*, 1943, **53**, 144. The Chittagong Hill Tracts are a primary or secondary centre of distribution of the cottons found in the Ganges basin and Central India and may have given rise even to some of the coarse cottons of China. About 90,000 acres of the hill slopes are under cotton, and the exports reached nearly 3,000 tons in 1934-35. A survey of the tracts was made in 1937. The bulk of the crop came within the range 15-21 mm. in staple length, with an average of 17 mm. Some varieties have brown lint. The outstanding feature, however, is the high ginning percentage, ranging from 23-57 with a maximum frequency at 44. It is recommended that the cottons should be developed for mixing with wool. C.

Plant Hormones: Effect on Cottonseed. S. G. Lehman. *Proc. Annl. Conv., Assoc. Southern Agric. Workers*, 1942, **43**, 208 (through *Chem. Abstr.*, 1943, **37**, 1822[7]). Germination and yields of cotton were not improved by treating cottonseed with dust containing either indolebutyric acid or K naphthaleneacetate (1 : 113,000). Ceresan (1 : 160) also had no effect, but treatment with Spergon (1 : 480) gave increases in the number of seedlings and yield of cotton. C.

Cotton Seedling Diseases: Control by Seed Disinfection. R. Weindling. *Plant Disease Reptr.*, 1943, **27**, 68-70 (through *Chem. Abstr.*, 1943, **37**, 1824[6]). Field and greenhouse tests have shown that the quantities of mercurial disinfectants usually employed to treat cottonseed when infested, for example, with *Glomerella gossypii*, can be reduced to one-eighth or less without lowering the control. The bulk of the dust should be made up with a filler, such as flour. C.

Cotton Aphids, Boll-weevil and Boll-worm: Control. (1) R. L. McGarr. (2) G. L. Smith, A. L. Scales and J. A. Fontenot. (3) G. L. Smith and J. A. Fontenot. (4) and (5) M. T. Young, G. L. Garrison and R. C. Gaines. (5) K. P. Ewing and E. E. Ivy. *Proc. Annl.*

Conv., Assoc. Southern Agric. Workers, 1942, **43**, 140-144 (through *Chem. Abstr.*, 1943, **37**, 1823⁶-1824⁴). This series of papers describes further work on the increase of the aphid population consequent on dusting with Ca arsenate against the boll-weevil and boll-worm, and demonstrates the value of adding nicotine to the dust. C.

Cotton Leaf-worm: Effect on Cotton Quality. E. Hixson and L. F. Bewick. *Proc. Annl. Conv., Assoc. Southern Agric. Workers,* 1942, **43**, 146 (through *Chem. Abstr.*, 1943, **37**, 1824⁵). Defoliation of the plant by the leaf-worm does not harm the cotton or the seed except, possibly, while the bolls are less than 30 days old. C.

Raw Cotton: Supply and Market Conditions. J. A. Todd. *Textile Manufacturer,* 1943, **69**, 250-251. The full season's consumption of cotton in the United States is expected to reach 11,350,000 bales and the carry-over at the end of July 10,700,000 bales. The Commodity Credit Corporation is offering for sale 2,701,000 bales, mostly of lower grades and staples, but can draw on 2,600,000 bales of 1942 loan cotton of which a fair amount is about Middling grade and $\frac{15}{16}$-inch staple. The Indian crop for 1942-43 is now estimated at the low figure of 4,554,000 bales, the area planted being only 18,812,000 acres. The Government of India is checking the rise in price of Indian cottons. The South Brazil crop is good and expected to reach 1,750,000 bales. The Argentine crop should provide a surplus for export of 50,000 bales. Acreage planted in Peru is 20 per cent. below last year's. C.

Cotton: Cultivation in Nigeria. J. K. Mayo and O. J. Voelcker. *Empire Cotton Grow. Corp. Progress Repts. from Experiment Stations,* 1941-1942, 166-167. Work on cotton in the Northern Provinces included routine maintenance of the three best strains of cotton and their derivatives, multiplication of a mixture of these, and mass selection in the ordinary crop. In the Southern Provinces, routine maintenance of the purity of Ishan A was continued and the examination of rough-linted local selections was commenced. Growth and yield of the Ishan A selection and multiplication plots were disappointing and *Helopeltis* damage was again severe. C.

Cotton: Cultivation in Nyasaland. H. C. Ducker, E. O. Pearson, W. L. Miller and B. L. Mitchell. *Empire Cotton Grow. Corp. Progress Repts. from Experiment Stations,* 1941-1942, 135-165. The suitability of the soil and climate in various districts of Nyasaland for cotton cultivation is discussed and conditions in the three main cotton-growing sections are described. At the Domira Bay Station, work on agricultural problems has progressed satisfactorily and it has been decided to increase the "rest" years in the main rotation to three, and the rotation itself to an eight-course. Work with the "920" strain of U.4 has been carried to the large-scale commercial stage in the S.W. lake shore section of the Central areas, but on the Station will now be abandoned in favour of work on the selections which have been made from Crown Land Bulk U.4 mixture, and on various East African Uplands, especially certain cottons from Tanganyika. It is considered unlikely that "920" will prove superior to the existing commercial cotton in the Lower River area. A detailed report is given of entomological work which included studies of crop production and crop loss, bollworm activity, stainer infestation and damage, red bollworm pupation and pupal mortality, stainer breeding, the effects of humidity, larval food and other factors on the length of pupal life of the red bollworm, the effects of various conditions on pupal mortality, and moth migration. C.

Cotton: Cultivation in Queensland. W. G. Wells. *Empire Cotton Grow. Corp. Progress Repts. from Experiment Stations,* 1941-1942, 1-26. The history of cotton cultivation in Queensland is outlined, the foundation and work of the Cotton Research Station at Biloela, is discussed, and some of the problems to be solved are indicated. A progress report of the Cotton Research Station for the season 1941-42 is given. It includes reports of meteorological conditions, progress in the breeding of jassid-resistant cotton, strain tests, varietal tests, studies of Rhodes grass-rotation, row and plant spacing experiments, irrigation experiments, and entomological observations. The proposed programme for 1942-43 is outlined. C.

Cotton: Cultivation in South Africa. F. R. Parnell and D. Macdonald. *Empire Cotton Grow. Corp. Progress Repts. from Experiment Stations,* 1941-1942, 27-45. Unfavourable conditions and poorer commercial crops than usual

are reported. A progress report for the Cotton Experiment Station, Barberton, for the season 1941-42 describes breeding work, studies of plant hairiness and premature leaf-fall, analyses of spinning test results, and studies of rotation crops. In a variety trial of U.4 strains, 5143, now in general cultivation, was about equal to its derivatives, but was beaten for yield by three strains of other families. A small trial was planted with Barberton 920 and a derivative, alongside 920 as modified after some years at Domira Bay and a derivative raised there. Barberton 920 gave a higher yield than the last two. Lint samples have been sent for spinning tests. In the work on hybrid material crosses inside U.4 offered no promise and were discarded, U.4 × Cambodia lots were again good, and U.4 × M.U.8, F_2 lots gave excellent plants in the field, but rather low lint lengths. New types of hairiness appeared in U.4 × Sea Island and Egyptian, F_2's. Both U.4 and M.U.8 have been crossed with several *hirsutum* parents carrying high quality lint. The work on hairiness showed the immense range and complexity of this character and illustrated the connection normally found between hairiness and jassid-resistance. A manurial experiment in connection with premature leaf-fall associated with *Alternaria,* showed that both potash and compost delayed the onset of the disease, but did not prevent it. The programme of work for 1942-43 includes further cotton breeding work and variety trials of rotation (maize) crops. C.

Cotton: Cultivation in Southern Rhodesia. G. S. Cameron. *Empire Cotton Grow. Corp. Progress Repts. from Experiment Stations,* 1941-1942, 60-67. The history of cotton growing in Southern Rhodesia is briefly reviewed and the Government's decision to manufacture absorbent cotton wool and to erect a spinning mill to absorb the locally grown crop is reported. Weaving is being left to private enterprise and there are indications that there will be sufficient looms in operation to take up the total output of the spinning mill early in 1943. A report is given of work at the Gatooma Station during the 1941-42 season, which included strain trials, plant selection work, and the multiplication of improved strains. The season was characterised by severe drought periods, but cotton yields were well above the average, and the crop opened early in comparison with past seasons. Two possible strains have been selected to follow 7 LI, the strain now in general cultivation. F_3 progenies of "doctored" plants have shown prolific flowering and fruiting. Mention is made of the progeny of a native cotton subjected to acenaphthene treatment. Very little damage was done by insects and the theory is advanced that anti-ratooning measures have been effective. The only disease to be recorded was sore shin in the early part of the season. C.

Cotton: Cultivation in Swaziland. J. V. Lochrie and H. Hutchinson. *Empire Cotton Grow. Corp. Progress Repts. from Experiment Stations,* 1941-1942, 46-59. A progress report is given for the Cotton Experiment Stations, Bremersdorp and Croydon, for the season 1941-42. The main work of the stations was on soil fertility problems, whilst station tests of cotton, maize and kaffir corn, and studies of miscellaneous crops were continued. The season was marked by fairly high, but poorly distributed rainfall, a short cotton season at both stations, and the heaviest red bollworm attack for many years. Bacterial bollrot also reduced the Bremersdorp crop. Fertilizer experiments showed the importance of phosphate in increasing yield and in promoting earliness. Sodium nitrate gave increases in yield, but tended to delay flowering. Potassium and nitrogen had a delaying effect on flowering. In the cotton strain trials only one strain—of the 921 family—yielded significantly higher than 5143, which is now the standard strain in general cultivation. In a note on native cotton production it is pointed out that the results of the 1940-41 season were such as to encourage the hope that the number of cotton growers would increase to several hundreds, but the unfavourable planting season kept the number down to 90, an increase of only 10 per cent. The acreage fell by 25 per cent. and owing to the adverse season the average yield per acre fell from 186 lb. to 118 lb. Total production was 11,215 lb., compared with 21,941 lb. in the previous year. Prospects for 1942-43 are, however, still considered to be encouraging. C.

Cotton: Cultivation in Tanganyika. R. W. R. Miller, J. E. Peat, A. N. Prentice, A. H. McKinstry and A. G. Bebbington. *Empire Cotton Grow. Corp. Progress Repts. from Experiment Stations,* 1941-1942, 104-134. In the 1941-42 season, the weather resulted in much water-logging and favoured the

spread of pests. In the Lake Province the normal acreage produced approximately 32,000 bales as compared with the five years' average of 36,400 bales. The same conditions affected the coastal belt also and, in addition, economic factors such as competition with highly-priced food crops for war production reduced the acreage. In the circumstances the estimated production of 47,000 bales is not unduly low compared with the average of 63,880 bales during the period 1937-42. At the Ukiriguru Station jassid and American bollworm attack affected trials and some of the better grown cotton. Rotational benefits to millet following cotton in the rotation are recorded. The cultivation of Mz. 561 is being extended to the limit of the available seed. It shows lint quality akin to that of "Local." Mz. 457 has no jassid resistance, and reports on lint quality do not show the improvement on "Local" anticipated. Mz. 561/6 shows value in the field, but has certain defects. Selection work is proceeding and in the selected material there are "possibles" with the essential qualities of jassid resistance, yielding power, and lint quality, in varying degrees. In the report of the Lubago Station, Shinyanga, figures are given of yields of the best of the new local selections of varied origin in comparison with the district stock strain, U. 4/998. The Uganda Upland strain Mz. 561 is to replace all U. 4 in Shinyanga in the coming season. Mz. 561, although by no means a "final" strain, compares favourably with U.4/998 in the essential qualities, and behaved well in extensive district trials. Observations of insect pests made at the Kingolwira Extension Farm are reported and future work is discussed. C.

Cotton: Cultivation in Uganda. G. W. Nye and J. D. Jameson. *Empire Cotton Grow. Corp Progress Repts. from Experiment Stations,* 1941-1942, 93-103. The 1941-42 cotton season was characterised by generally unsatisfactory weather conditions which resulted in a much reduced crop of 230,000 bales. Prices paid to the grower were low, especially for the poorer quality growths. African cultivators are adopting improved methods of cultivation and further distribution of the new variety B.P. 52 has been made in Buganda. In the Kawanda zone, considering the balance of a dozen trials, B.P. 52 gave a higher yield than Buganda Local. Eight miniature trials in the selection plots tended to give an opposite result. B. 181 gave the highest yields of all and was also markedly resistant to both Blackarm and wilt, but it had irregular lint. Mixtures of B.P. 52 and B. 181 did well, and also achieved good spinning reports. B.P. 50 yielded quite well. The relation between fuzzless seeds and low ginning percentage in Buganda Local was proved conclusively. In the Serere zone experiments on general agronomy gave information on *Lygus,* Blackarm, fibre quality and ginning percentage in relation to manuring and different ways of resting land. Interplanting cotton with tepary beans brought about some loss of cotton, but gave a big return of beans. Gap-filling did not benefit yield. Planting seed in continuous lines after treatment with mud used less seed and took less time. A large number of types were brought together in the cotton breeding plot, and most of these were purified for fuzzy seed and then carried on for examination for Blackarm resistance. The relation between fuzzless seeds and low ginning percentage was demonstrated. B.P. 52, B.P. 50 and B. 181 were pre-eminent in spinning tests. C.

Cotton: Cultivation in the West Indies. J. B. Hutchinson, R. A. Silow, S. G. Stephens, T. G. Mason, E. Phillis and H. L. Manning. *Empire Cotton Grow. Corp. Progress Repts. from Experiment Stations,* 1941-1942, 168-183. A report is given of genetic research at the Cotton Research Station, Trinidad, which included studies of the crinkled dwarf allelomorph series, the St. Vincent semi-sterile rogue, leaf shape, anthocyanin inheritance, lint colour, inheritance of "corky," inheritance of fuzz and tuft, cytological work and the effect of colchicine, interspecific incompatibility, and quantitative inheritance. Cotton prospects in Jamaica and the Bahamas are discussed and it is pointed out that the basic problem is the stainer. If stainers can be controlled or avoided it will be worth while attempting to develop a perennial cotton cultivation. Conditions are not favourable for the development of Sea Island cotton. A report on the work of the physiological department outlines investigations of hydration and mineral nutrition. In St. Vincent, climatic conditions were normal throughout the island, and but for extensive attacks of cotton leaf worm it is estimated that good yields would have been obtained. The total area under cotton amounted to 4,827 acres of which 2,765 were peasant cultivation. The peasant yield per acre was 79 lb. of white lint and that of the estates 160 lb.

The island yield of 547,283 lb. of white lint gave an average yield of 113 lb. per acre. Work at the Cotton Experiment Station included a superfine breeding trial, VH breeding and small bulk trials, variety trials, and manurial experiments. C.

Cotton Plant: Breeding Work in Anglo-Egyptian Sudan. S. H. Evelyn, R. L. Knight and R. R. Anson. *Empire Cotton Grow. Corp. Progress Repts. from Experiment Stations,* 1941-1942, 68-92. Reports are given of work on cotton breeding and testing carried out at the Gezira Research Farm, and the Shambat and Kadugli Stations, and in Equatoria. In the work on the development of Blackarm resistant strains, 9th backcrosses of N.T. 2 and X 1730 types were grown and seed produced for sowing propagation plots at Shambat next season. Seed of the 7th backcross of N.T. 2 type was produced in sufficient quantity to enable a 45-feddan increase area and a series of plots for testing to be sown. Seed of the 7th backcross of X 1730 type was also produced for testing and propagation. Small quantities of other types were produced, including an N.T. 2 backcross homozygous for both factors $\mathbf{B}_1$ and $\mathbf{B}_2$, and therefore highly resistant to Blackarm. The 6th backcross stage has been reached with crosses involving factor $\mathbf{B}_3$ which is expected to confer a still greater measure of Blackarm resistance. The addition of a gene conferring reddish flowers and leaves has been continued and has reached the 9th backcross. Crosses between Sakel and Tanguis, made in order to transfer the hairy leaf of the Tanguis strain to a plant of Sakel lint with a view to promoting jassid resistance, have been taken to the 3rd backcross stage and are being continued. Work on leaf curl resistance is progressing favourably. Three promising strains of American cotton are being bulked for further testing, and several promising selections from S.P. 20 and S.P. 84 (both Uganda cottons) have been isolated. Some 335 types of dura have been collected and the most promising are being tested. C.

Cotton Verticillium Wilt Pathogen: Isolation. T. B. Barducci and G. G. Rada. *Bol. Estac. exp. agric. La Molina* 23, 1942, 46 pp. (through *Rev. Appl. Mycol.*, 1943, **22**, 166). The species of *Verticillium* responsible for cotton wilt in Peru has been determined as *V. albo-atrum,* the optimum temperature and *p*H for which in cultures on various agar media were 22° C. and *p*H 7, respectively. The pathogen, which produces a systematic disease in its host, may easily be isolated from fresh material, the tips of the plant and of the branches and the secondary rootlets yielding the maximum percentages of fungal colonies (43·7, 59·5, and 43·4, respectively, compared with 34·3, 26, and 6·2 for the petioles, boll peduncles, and tap-root, respectively). C.

(D)—Artificial

Arundo Donax Pulp: Production. *Industrial Chemist,* 1943, **19**, 258-259. Italy's output of pulp, which in 1940 was as large as the normal Italian consumption of cotton and probably amounted to 150,000-200,000 tons a year, has since risen by 11 per cent. In one plant alone, that of Torviscosa, the Società Agricola Industriale Cellulosa Italiana produces 60,000-65,000 tons a year of high-grade cellulose pulp largely from the common reed *(Arundo donax)* grown on 15,000-acre plantations on reclaimed marshy ground. The reeds are collected in winter and allowed to dry in the open for a few months. They are then brought into the factory and cut up, partially freed from dust, earth, seeds, etc., and boiled with calcium bisulphite to remove the lignin and other undesirable substances. The residue, which is already crude cellulose pulp, is washed and then decomposed; the by-products of the decomposition, which are largely non-fibrous, are used in the manufacture of wrapping paper. The decomposed mass is again treated for the removal of sand, etc., and then digested a second time, with caustic soda, to remove silica and other inherent inorganic impurities; this second boiling produces a tolerably pure cellulose pulp which is further purified by treatment with chlorine to eliminate the last traces of lignin. Finally the mass is washed again, dried and made up into sheets or any other desired form. The pulp compares well in quality with pulps from beech and fir woods, and has an α-cellulose content of 96-97 per cent. C.

Viscose Spinning Machines: Developments. V. S. Burlakov. *Legkaya Prom.,* 1940, No. 6, 26-29 (through *Khim. Referat. Zhur.,* 1940, No. 12, 79 and *Chem. Abstr.,* 1943, **37**, 1598[9]). New Russian machines for the production of viscose rayon and details of their performance are described. The shape of the spinning pot has been modified and the pot is made of bakelite. Transmission belts

have been replaced by a worm transmission, the number of revolutions of the pot has been increased to 6,000 per min., and the time of washing of the bobbins reduced to 2 hours. Three-piston pumps with compensators to equalize the pressure are used. Spinning machines for the continuous production of viscose rayon have been developed. Washing, drying and spinning are carried out simultaneously in these machines. C.

Dyed Viscose Rayon: Production. D. T. Kanter. *Legkaya Prom.*, 1940, No. 6, 29-30 (through *Khim. Referat. Zhur.*, 1940, No. 12, 68 and *Chem. Abstr.*, 1943, **37**, 1599[1]). Methods are being devised for increasing the uniformity of colour of viscose rayon (in the production of decorative fabrics), for increasing the intensity of the colour and for increasing the number of colours obtainable by dyeing during the spinning process. A number of stable colours are proposed which are prepared in the same manner as indigo dyes. This increases the number of colours from 8 to 20. Mixtures of colours are also described. The physical properties of rayon are but little affected by dyeing. C.

" Neochrome " Rayon Yarns: Application. Harben's (V.S.M.) Ltd. *Textile Weekly*, 1943, **31**, 845-6. " Neochrome " yarns are obtained by adding suitable pigments to viscose before spinning. They are available on weavers' beams in more than 24 colours and are fast to washing with 0·25 per cent. soap solution at the boil or to bleaching with hypochlorite. Their value in striped or check cloths and patterned knitted goods is emphasized. C.

" Greenfield Top " Rayon Staple: Production and Application. H. Ashton. *Textile Manufacturer*, 1943, **69**, 259-261, 264. The author announces the commercial production by Messrs. Courtaulds (first at their Greenfield mill in June, 1939) of rayon staple tops for the worsted, flax and silk waste spinning industries. The process, mainly covered by British patents 511,867, 518,995, 523,579, 535,793 and 537,742, consists in forming tows of continuous filaments, up to a total denier of 300,000 or more, feeding them in parallel form from a creel capable of carrying a number of packages, each weighing some 400 lb., to a pair of rollers that cut the sheet at an angle of 5-15°, and forwarding the cut sheet to an endless apron that feeds an intersecting gill box of standard design, set to give sufficient draft and pin action to deliver a sliver or top into a can or as a ball in the usual way. The gilling is preferably repeated twice so as to secure adequate overlapping of the cut ends in the sliver. The types on the market at present are (1) 8-in. staple, 8-den. bright viscose, (2) 4-in., 4½-den. bright and matt viscose, (3) 4-in. 1½-den. bright and matt viscose, and (4) 4-in., 1¼-den. bright strong viscose. The last is recommended for the schappe and English systems of waste silk spinning. C.

Rayon Factory: Economy Measures. Jan Kolbert. *Silk and Rayon*, 1942, **16**, 228-230, 294-6, 552. A number of practical hints are given on economies that can be effected in steeping the pulp, expressing the soda-cellulose, filtering the viscose solution, and steam distribution. C.

Rayon Spinning Baths: Regeneration by Electrolysis. M. S. Tartakovskiĭ and V. D. Matveev. *J. Appl. Chem. (U.S.S.R.)*, 1941, **14**, 778-782 (through *Chem. Abstr.*, 1943, **37**, 2274[4]). The spent bath contains sodium sulphate and sulphuric acid. Baths free from zinc sulphate can be raised in sulphuric acid concentration from 125 up to 150-160 g./l. Current yields of sulphuric acid for a 2-component cell were 60-75 per cent. of theoretical. C.

Tantalum Rayon Spinning Equipment: Advantages. C. C. Downie. *Silk and Rayon*, 1943, **17**, 362 and 364. A discussion of the properties of tantalum that are of importance in connection with its use for rayon spinning jets, nozzles, injectors and ejectors and other equipment, the need for reclaiming all damaged and worn tantalum parts, and methods of handling and fabricating the fresh and reclaimed metal. C.

Cellulose Acetate Films: Increasing Stability at Low Temperatures. Z. A. Rogovin and Z. Ivanova. *J. Appl. Chem. (U.S.S.R.)*, 1941, **14**, 834-842 (through *Chem. Abstr.*, 1943, **37**, 2572[3]). Methods for improving the stability of cellulose acetate films at low temperatures (−50°) without plasticization were studied. On lowering the temperature, the films show increased tensile strength, decreased elongation and sharply decreased flexural strength. The fragility to flexure can be reduced by the use of homogeneous cellulose acetate of high molecular weight free from fractions of low molecular weight; use of

more concentrated solutions for film deposition is also of assistance. Films so prepared even at −50° approach the elasticity of the usual films at 20°. C.

Casein Fibres: Production. P. Eckert and E. Swatek. *Klepzig's Textil-Z.*, 1941, **44**, 1211-1215 (through *Chem. Zentr.*, 1942, i, 557 and *Chem. Abstr.*, 1943, **37**, 2582[9]). A report is made on the processing of grades of casein which are precipitated at *p*H values of 2·5-2·8. A bath containing 35-42 g. of sulphuric acid and 350-420 g. of calcined sodium sulphate per l. is best suited for the production of the fibre and gives the latter the best properties. A decrease of the sodium sulphate concentration causes difficulties in later spinning operations. If the fibre should become brittle after it has been placed on the winding spool and has been exposed freely to the air, this difficulty can be eliminated by means of a bath containing 100 g. sodium chloride and 20 g. sulphuric acid monohydrate per l. The addition of carbon disulphide to the alkaline spinning solution causes neither an improvement of the spinning operation nor an improvement of the properties of the fibre. For the manufacture of fibres from casein-urea solutions, casein precipitated at a *p*H of 4·8 gave the best products. Because of the excessive stickiness of these solutions it is often difficult to carry out the spinning operation; the physical properties of the spun fibre, particularly the strength, are highly unsatisfactory and are poorer than the properties of the fibres made from caustic soda solutions. Casein-urea solution which had been treated with superheated steam yielded solutions of a viscosity satisfactory for spinning operations. The properties of fibres obtained from various baths are given in tables. C.

Soybean Glycinate Sols: Stability. E. N. Volkov and I. L. Dvinyaninova. *J. Appl. Chem. (U.S.S.R.)*, 1941, **14**, 856-858 (through *Chem. Abstr.*, 1943, **37**, 1913[9]). The stability of sols of the sodium derivative of glycinin of soybean was studied in connection with the preparation of synthetic fibres from this protein. For 10-12 per cent. solutions the surface tension of the system water-protein-caustic soda decreases with caustic soda concentration when the protein concentration remains constant. Ten per cent. sodium glycinate sols break down rapidly, and the surface tension of the liquid phase drops rapidly. Twelve per cent. solutions containing 4·5-6 per cent. of caustic soda form stable sols; with less than 4-5 per cent. of caustic soda there is a tendency for gel formation; but higher concentrations of caustic soda lead to unstable sols. C.

Broom Fibre: Isolation. Y. Mayor. *Rev. prod. chim.*, 1941, **44**, 225-228 (through *Chem. Zentr.*, 1942, i, 289 and *Chem. Abstr.*, 1943, **37**, 2186[9]). A general account is given of the broom plant and its occurrence in Germany, France and Italy. The principal species are *Sarothamnus scoparius* (Scotch broom) and *Spartium junceum* (marsh grass). Broom yields a very strong fibre suitable for cordage and strong fabric. The fibres are produced by boiling with caustic soda solution, defibering either by hand or by machine and, if desired, bleaching with hypochlorite or preferably with perborate. Before pulping, tannin may be extracted from the bark. Scotch broom may be extracted with dilute sulphuric acid, treated with caustic soda and distilled to yield the medicinally valuable alkaloid sparteine. C.

Patents

Woolled Skins: Burr Removal. Turner Tanning Machinery Co. Ltd. and G. A. Schettler. B.P.552,616 of 16/4/1943. The skins are simultaneously spread out and combed by a rotary drum furnished with a combination of spreader and burring knives, under a supply of cleansing liquid, the surplus liquid being removed during the combing. W.

Wool or Hair: Mechanical Removal from Skins. Turner Tanning Machinery Co. Ltd. and G. A. Schettler. B.P.553,342 of 18/5/1943. The skins are simultaneously spread out and sheared; the cut wool or hair is removed by means of suction, and automatically separated into different lengths. W.

Viscose Spinning Solution Handling Apparatus. American Viscose Corporation. B.P.553,490 of 1/10/1942: 24/5/1943 (Conv. 4/10/1941). A method of handling dispersions, such as viscose spinning solutions, which undergo change on keeping involving withdrawal of the same from a series of supply tanks in succession comprises reducing the heel left in any of the tanks by withdrawing from it at a controlled relatively slow rate and discharging the effluent into a stream of the dispersion being withdrawn from a second supply tank. Apparatus for carrying out this method comprises a series of supply

tanks for containing the dispersion, main means for withdrawing dispersion from any of the tanks, auxiliary means for withdrawing dispersion from any of the tanks at a slower volumetric rate than the main means, and means for combining the effluents from the main and auxiliary means into a common stream. C.

Vegetable Globulin Solutions: Storage. R. H. K. Thomson and Imperial Chemical Industries Ltd. B.P.553,539 of 22/10/1941: 26/5/1943. In order to prevent or delay the surface gelation of a viscous solution of a vegetable globulin in a dilute aqueous solution of a strong base, a partial pressure of ammonia substantially in excess of that occasioned by the incipient hydrolysis of the protein by the strong base in the solution is maintained in the atmosphere over the surface of the solution. C.

Viscose Rayon: Spinning. British Cellophane Ltd. B.P.553,797 of 3/12/1941: 7/6/1943 (Conv. 3/12/1940). Regenerated cellulose yarns, filaments, films, etc., are made by spinning or casting viscose at a speed of at least 5000 in. per min. into an acid coagulating and regenerating bath at a temperature of at least 60° C. C.

Rayon Tow Wet Treatment Apparatus. O. von Kohorn zu Kornegg and American Patent Development Co. U.S.P.2,308,576. Rayon tow collected from a number of spinnerettes is made to pass spirally around a set of three horizontal rollers arranged in a triangle with the base pair partly submerged in a counter-current stream of treatment liquid. On the side where the tow rises to the top roller it meets a descending spray of liquid. C.

Cottonseed: Continuous Acid Delinting. Chemical Seed Treating and Delinting Corporation. U.S.P.2,308,883. In a continuous process for delinting cottonseed the seed is passed through acid at a fixed temperature, drained, washed with water while in motion, and conveyed into a bath of water below its surface. The light material floats and the heavy seed is carried forward and dried by forcing hot air through it. C.

Viscose Rayon: Continuous Production. Industrial Rayon Corporation. U.S.P.2,309,072. Viscose is extruded into an acid bath maintained at a concentration of 8-14 per cent., and the incompletely coagulated yarn is stretched by about 10 per cent., subjected to treatment with 1-5 per cent. acid, then with 0·015-0·5 per cent. acid, and dried. C.

Soya Protein Filaments: Softening. Glidden Co. (Cleveland, Ohio). U.S.P. 2,309,113. Filaments spun from soya protein are soaked in a solution of glycerol, glycol, or glycol ether (at least 20 per cent. by volume), dried at a temperature below 60° C., and then heated for a short time at a temperature above 100° C. The filaments are rendered flexible and do not lose much flexibility when washed. C.

Cottonseed Delinting Machine. G. C. Walsmith and J. M. Ethridge. U.S.P. 2,309,423. A machine for delinting cottonseed consists of a series of round-bottomed chambers containing liquid and fitted with rotary agitators, the chambers being arranged in the form of a cascade. A partition separates one chamber from the next in the series and on lifting it the cottonseed is transferred to the lower level. (The liquid in the top chambers is, presumably, sulphuric acid.) C.

Rayon Filament Processing Apparatus. Industrial Rayon Corporation. U.S.P.2,309,771, 2,309,821. (1) A thread-advancing reel of cantilever construction comprises a first reel formed of spaced bars, a second reel mounted for rotation in offset and inclined relation to the first with their bars interdigitating, a hollow member supporting the first reel and enclosed in a chamber to which temperature-changing fluid can be directed. (2) Rayon thread is advanced in a succession of closely spaced helices and subjected to the action of a temperature-changing fluid which is applied to one helix at a pre-determined temperature. C.

Viscose Spinneret Anti-fouling Agents. North American Rayon Corporation. U.S.P.2,310,207/8. The incrustation of a spinneret in a viscose spinning bath is inhibited by adding to the acid a cation-active monosaccharide higher-alkyl derivative of phosphine or arsine of the formula

$$C_n(OH)_{n-1}H_{n+2}\cdot P \text{ (or As)}R_1R_2R_3Ac,$$

where n is 5 or 6, R_1 is an alkyl group with at least 8 C atoms, R_2 and R_3 are lower alkyl groups or H, and Ac is OH or an acid radical. [The simplest of a

long list of bases claimed in the full specifications are called *n*-octylglucyl-phosphine or -arsine.] C.

Cellulose Ether Xanthate Spinning Bath. Lilienfeld Patents Inc. (Boston). U.S.P.2,310,969. Cellulose ether xanthate solution containing not more than 4 per cent. of caustic soda is coagulated by spinning into a bath of alkali carbonate-free from ammonium salts of strong mineral acids. C.

Rayon Filament Crinkling Machine. E. I. Du Pont de Nemours & Co. U.S.P. 2,311,174. Apparatus for crinkling bundles of rayon filaments consists of a pair of positively-driven, smooth rollers providing a nip, means for permitting the movement of one roller down and away from the other against a spring resistance, a chamber beneath the nip formed of vertical front and rear walls and side walls that reach with knife edges into the nip and then follow the curvature of the rollers, and a pivoted plate in the chamber to act as a baffle against the free flow of the bundle of filaments. C.

Ginned Cotton: Conditioning. R. M. Joyce (Greenville, Miss.). U.S.P. 2,312,557. Humidified air is conveyed into the stream of cotton emerging from the lint flue of the gin and the cotton is then baled. C.

Polyamide Filaments: Production. E. I. Du Pont de Nemours & Co. U.S.P. 2,312,879. A mono-amino mono-hydric alcohol with at least one H atom in the amino group is condensed under polymerizing conditions with a dibasic carboxylic acid and a glycol, the carboxyl groups in the mixture being equivalent to the amino + alcohol groups. C.

Rayon Processing Apparatus. American Rayon Co., Inc. U.S.P.2,313,140. Apparatus for laying up thread in the form of a continuously advancing helix comprises a rotating cage-like cylinder made up of two concentric sets of bars, those in one set being interspersed between the others, the bars being connected together to form a number of units each with a number of component bars, and the connecting pieces carrying radially disposed members. Mechanism is provided for imparting a to-and-fro longitudinal movement and in-and-out radial movement to the bar units of each set independently through the radial members. C.

Rayon Cake Treatment Apparatus. Harry Rubinstein (Brooklyn). U.S.P. 2,313,267/8. The claims are for the provision in centrifugal spinning buckets of liners to grip the cake and protect it from damage. In the second patent two liners are used, one being fitted into the opening of the cake before removal from the bucket. C.

2—CONVERSION OF FIBRES INTO FINISHED YARNS

(A)—Preparatory Processes

Blowroom: Reorganisation. Green River Mills, Inc. (Tuxedo, N.C.). *Textile World,* 1943, **93**, No. 3, 84-85. An illustrated account is given of the reorganisation of an opening and scutching department on the one-process system. Particulars are given of the machinery installed and the duties of the personnel. Much floor space has been saved and is used for laying down mixes; the mill runs four different mixes and lays down 30 bales for a mix. Labour costs have been decreased from 3,500 to 1,500 dollars per annum. C.

Scutcher Laps: Weight Control. R. W. Mitchem. *Textile World,* 1943, **93**, No. 3, 86-87. The writer stresses the importance of uniform lap weights and enumerates the controlling factors. He recommends the use of the Saco-Lowell Lap meter, and auxiliary moisture regain indicator for recording corrected yard-by-yard weights and shows examples of good and bad records. C.

Cardroom Operatives: Task Assignment. E. H. Helliwell. *Textile World,* 1943, **93**, No. 3, 62-63. In connection with the problem of replacing men by women where possible in American mills the author recommends making time analyses of the various jobs, and takes carding as an example. Allowing 20 per cent. for free time in an 8-hour day, leaving 384 minutes for actual work, he calculates that each card will demand the following distribution of attention in minutes: (1) Racking laps 0·84, (2) creeling 0·90, (3) stripping and assisting stripping 4·92, (4) cleaning 1·10, (5) sweeping 0·86, (6) oiling 1·20, (7) removing flat strip 0·72, (8) removing fly waste 0·65, (9) patrol and atten-

tion 1·92, (10) doffing 3·20. On this basis he considers the following staff sufficient for 200 cards: jobs (1) and (2) one man, (3) three men, (4)-(9) four women in all, (10) two women. C.

(B)—Spinning and Doubling

Rayon Staple: Blending with Wool and Ramie. W. Hardacre. *J. Text. Inst.*, 1943, **34**, P71-77.

Ring Frame: Maintenance. *Textile World*, 1943, **93**, No. 3, 82-83. Directions are given for the routine cleaning, oiling and adjustment of the various parts of the ring frame. C.

Single Carded Yarns: Contraction in Spinning. *See* Section 5B.

Cotton Yarn: Doubling. J. Pilkington. *Textile Weekly*, 1943, **31**, 695-6, 734-5, 740, 766-8, 804-6. A report of a lecture on the underlying principles and practice of cotton doubling. The main headings are (1) preparation of creel package, (2) the doubler winder frame, (3) dual process winding, (4) doubling, its objects and influence on strength, lustre and extension, and (5) doubling machinery—the ring doubler, the flyer doubler, and the Andrews and Langstreth double twist doubler. C.

Dirac String Problem. *See* Section 9.

Mule Spinning: Yarn Control. "D.W." *Wool Rec.*, 1943, **63**, 578, 581. Winding-on, drafting control, winding tension, cop building, twist distribution, carriage gain and "double" yarn are discussed. W.

Problems for the Worsted Spinning Industry. "D.W." *Wool Rec.*, 1943, **63**, 648, 651. The small amount of attention given to the development of worsted machinery is due to the fact that more profit is made from buying the raw material and selling the yarn than from getting the maximum production from the machinery. Except for refinements in construction and strength of parts, the mechanical principles of worsted drawing and spinning machinery have not advanced for 150 years. Examples of improvements are the introduction of mechanical doffing devices, the making of bigger packages, and improvements in winding. The following problems await solution:—Overcoming the limitation which the material imposes on the speed and improvement of the machinery; high drafting of long and short fibres without reducing the levelness of the resultant yarn; fewer operations in drawing without reducing ratio of production; facility to wind-on in spinning, independent of form of receiving device and of the strength or twist of the yarn; standardised machinery capable of easy adaptation to difference in length and diameter of fibres; lifting yarn production to an occupation in which adults may find attractive work and satisfactory remuneration in suitable environment. W.

Drag in Worsted Drawing and Spinning. "H.D." *Text. Rec.*, 1943, **60**, No. 772, 31-32, 34. The practical aspects are discussed of maintaining and regulating drag in drawing or flyer spinning and in cap and ring spinning and twisting. W.

(D)—Yarns and Cords

Indian Cotton Warps: Quality. J. H. Strong. *Indian Text. J.*, 1943, **53**, 145-146. The author discusses the question of the qualities in warp yarns that "the weaving section has a right to expect." He suggests that the maximum number of ends or picks per inch that can be reasonably demanded in cloths woven from the better Indian cottons is given by the formula $14\sqrt{\text{count}}$, and he also gives a table of suitable lea strengths, ranging from 143·0 lb. in 6's to 76·0 lb. in 25's. The extensibility of the yarn should be at least 4 per cent. Questions of excessive twist and breaks in warp preparation are discussed. C.

Patents

Staple Fibre Web Condensing Apparatus. N. S. Campbell (Greenwich, Conn., U.S.A.). B.P.553,473 of 2/6/1942: 24/5/1943. An improvement in the apparatus for condensing webs of staple fibre described in B.P.537,366, comprises the provision of an upper apron arranged so that the web is confined between it and the supporting apron. The upper and lower aprons may each comprise an endless travelling belt carried by a pair of rotatably mounted rolls. The upper apron is preferably so positioned that it acts as a clearer for the upper roll of the gilling apparatus from which the web is taken. C.

Mineral Oil Textile Lubricating Compositions. Shell Development Co. B.P. 553,562 of 21/7/1941:27/5/1943 (Conv. 7/8/1940). Textile fibres and/or textile processing machinery are lubricated with a composition consisting essentially of a mixture of a mineral oil or a compounded oil containing more than approximately 20 per cent. of mineral oil, a partial ester or esters of a polyhydric alcohol with a fatty acid containing more than 8 C atoms in the molecule, and a soap such as Na or K oleate or a mixture of a soap and a free fatty acid, or analogous material such as neutral salts of sulphonated oils, sulphated alcohols and the Na or K salts of aryl or alkylaryl sulphonic acids, the content of partial ester being not more than about 30 per cent. of the weight of the mineral oil. The compositions may be readily removed from textile fibres by scouring. C.

Drafting Mechanism. Casablancas High Draft Co. Ltd. and J. Noguera. B.P.553,748 of 1/12/1941:3/6/1943. In a drafting mechanism of the type in which the strand of fibres passes between each of three or more pairs of rollers, the intermediate pair or pairs of rollers acting as drawing rollers with respect to the preceding pair and as retaining rollers with respect to the succeeding pair, the rollers are arranged in such manner that the plane containing the axes of one pair of rollers is at right angles to the planes containing the axes of the preceding and succeeding pairs respectively, whereby the strand on leaving each of two consecutive pairs of rollers is pulled round over about a quarter of the surface of one of the rollers of each pair, after which it passes straight into the nip of the succeeding pair. This arrangement is particularly suitable for the drafting of thick strands of fibre. C.

Novelty Cored Yarn: Production. E. and L. Bry, Inc. U.S.P.2,309,095. A decorative yarn (1) is wrapped loosely about a core, being fed at a substantially faster rate, and a second decorative yarn (2) is wrapped tightly about (1) and bound back, its rate of feed being less than that of (1) and its mode of twisting being such that it is spaced from (1). C.

Card Sliver Compacting Calender Rollers. J. P. Garrett (Thomaston, Ga.). U.S.P.2,310,581. One of the calender rollers above the coiler has a circumferential groove and the other a corresponding rib between which the sliver is compacted. The rollers are of the same diameter at the base of the groove and top of the rib, respectively, and are driven at a uniform speed. C.

Yarn Conditioning and Spinning Process. L. C. Greene (Sanford, Maine). U.S.P.2,310,951. The process comprises progressively moistening a spun strand (*a*), simultaneously drafting a roving (*b*), twisting (*a*) and (*b*) together into a yarn, and passing this over a heated surface. C.

Drawframe Knock-off Mechanism. Whitin Machine Works. U.S.P.2,312,558. When the knock-off device operates to stop the drawframe it actuates means for moving the sliver trumpets out of their normal running position between the drafting and calender rollers. C.

Ply Yarn with Thermoplastic Component: Production. Sylvania Industrial Corporation. U.S.P.2,313,058. A thermoplastic yarn is twisted with a non-thermoplastic yarn and so treated that the two are bonded together. C.

Bonded Ply Yarn: Production. Sylvania Industrial Corporation. U.S.P. 2,313,104. Two or more yarns are twisted together, at least one component being a singles yarn that contains a minor proportion of potentially adhesive fibres, and the plied yarn is compacted together while these fibres are in an adhesive condition. The product is flexible and more resistant to heat and finer in count after the compacting treatment. C.

3—CONVERSION OF YARNS INTO FABRICS

(A)—Preparatory Processes

Warp Entering Room: Management. I Laird. *Textile Manufacturer,* 1943, **69**, 242, 244, 264. Practical suggestions are made for improving the working conditions for warp enterers, reachers and twisters, including the provision of facilities for washing, and questions of seating, ventilation, heating, lighting and the painting of walls, ceilings and appliances. C.

(C)—Weaving

Auxiliary Terry Motions. O. Pomfret. *Textile Manufacturer,* 1943, **69**, 245-6, 268. A detailed description is given of pile warp control and let-off motions (including Hacking's) for use in terry weaving. C.

Terry Motions. O. Pomfret. *Textile Manufacturer,* 1943, **69,** 194-198. A detailed, illustrated description is given of the following types of terry motion and their relative merits for various purposes are discussed: (1) hinged crank-arm, (2) eccentric slay-sword, (3) moving reed-case, and (4) swinging reed. C.

Circular Box Loom: Setting. I. Hartley. *Textile Manufacturer,* 1942, **68,** 389-390, 430-2, 466-8. A detailed, illustrated account is given of the various parts of the circular box loom, their wear, adjustment and setting. C.

Duck and Canvas Looms. Wilson and Longbottom Ltd. *Textile Recorder,* 1942, **60,** Oct., 28-31; Nov., 32-33; Dec., 28-30. An illustrated description is given of the various parts of duck and canvas looms, including the driving mechanism. C.

Electro-magnetic Dobby Loom Patterning Control Device. T. Reich and N. H. Chamberlain. *Textile Manufacturer,* 1943, **69,** 215-218. The authors refer to the difficulties encountered by designers in proceeding from the medium of paper and ink to actual cloth and present suggestions for an electro-magnetic device for formulating ideas directly in terms of fabric. The device, for which illustrations and a wiring plan are given, is summarised in the following terms: " The shafts of the [dobby] looms are controlled individually by means of an electro-magnetic device which enables any predetermined number of shafts to be raised for each weft pick. This is effected by arranging that initially, for each pick, all the shafts in the harness are raised to the upper shed position, in which each shaft makes contact with an electro-magnetic catch. The catches of the selected shafts are energised by depressing corresponding keys on a key-board, and consequently these shafts are kept in the raised position while the remainder fall to the lower shed position. After the passage of the shuttle, a cancelling mechanism demagnetises all catches so that the raised shafts are dropped again. The cycle is then repeated for the next pick. Thus, every shaft is provided with its own key on the keyboard and any desired combination of shafts may be selected for each and every pick. This enables the repeat of the pattern warp-ways to be of any desired length, up to several hundred picks; the weft-ways repeat depends on the number of shafts in the loom." Several ancillary devices are also described for the following purposes: (1) making a point-paper record as each pick is selected; and (2) punching a paper tape that can be inserted into a shaft-control box to perform the same functions as the keys when weaving warp-way repeats of the pattern. C.

Laminated Dogwood Shuttle. Draper Corporation. *Cotton (U.S.),* 1943, **107,** No. 3, 90. Laminated shuttles are made from the small pieces of dog-wood log left over when sawing out regular shuttle blocks, united by means of a special adhesive under powerful pressure. Shearing tests have shown that the joints are stronger than the wood even in blocks that have been soaked for 48 hours. The firm has not yet found a satisfactory substitute for dogwood in the field of plastics. C.

Single-lift Jacquard Loom Card Saving Device. *Indian Text. J.,* 1943, **53,** 146. In order to save cards in the weaving of floral patterns on plain grounds by a single-lift Jacquard, the 4-sided " cylinder " is made in two parts joined by a common axle. The small " cylinder " is holed for weaving plain or twill cloth and makes a quarter of a revolution at every pick, a stud at each corner of the " cylinder " engaging a forked catch. The larger " cylinder " is holed for weaving the floral pattern and is advanced at alternate picks only. It has a stud at each corner at one end, but the corresponding forked catch is tilted slightly every other pick so as to miss engagement with a stud. This tilting is worked from the end of the small cylinder where a bar with a bowl at each end is fixed diagonally across the cylinder to trip a lever that tilts the catch every alternate pick. One card only is perforated, laced and wired instead of the usual two. C.

Webbing Looms. W. Shuttleworth. *Textile Weekly,* 1943, **31,** 738, 740, 808, 810. A practical, illustrated account is given of looms by Wilson and Long-bottom Ltd. for weaving military webbing. C.

Loom Mechanism: Timing. *Textile Recorder,* 1942, **60,** Nov., 28-30; 1943, **60,** Jan., 38-40, 53; Feb., 28-31; March, 34-37; April, 25-28. An illustrated explanation is given of the various factors that control the timing of a loom. C.

Viscose and Acetate Rayon Combination Fabrics: Weaving. A. C. Wayman. *Textile World,* 1943, **93**, No. 3, 78-79. Common defects that may occur in the weaving of fabrics with both viscose and acetate yarns are briefly described and hints on their prevention are given. C.

Weaver's Wage: Calculation. *See* Section 10.

Nylon Loom Temple. J. W. Hutchinson. *Silk and Rayon,* 1943, **17**, 358. A temple for use in the weaving of nylon fabrics is described and details of its construction are shown in a diagram. This temple is usually made the width of the reed space and in it the fabric passes around a steel rod rotating in a groove made by two castings. Temples with rods of diameters of $\frac{3}{16}$-in. and $\frac{1}{4}$-in. are available and have so far proved sufficient. The hold on the fabric can be varied as required. In this arrangement there are no pins to dislodge or damage the threads and any friction applied is equally distributed over the face of the fabric. C.

Weaving Industry: Reorganisation. E. Snowden. *J. Textile Inst.,* 1943, **34**, P89-94.

(D)—KNITTING

Men's Half-hose: Knitting. J. B. Lancashire. *Textile Recorder,* 1942, **60**, September, 31-2. A general account is given of the production of men's half-hose for the Services, with detailed descriptions of knitting mechanisms of machines with stationary needle cylinders. C.

(G)—FABRICS

American Army Shirting: Production. *Textile World,* 1943, **93**, No. 3, 72-74. Army Specification No. 6-311 for a 6-oz. cotton twill shirting is reproduced and a complete schedule of blowroom, cardroom, spinning, winding, warping, sizing, weaving, dyeing and finishing particulars is given for meeting it. C.

Oriental Silk Fabrics: Design; History. A. Varron. *Indian Text. J.,* 1943, **53**, 138-140. The history of design in silk fabrics is traced from the period of geometrical patterns of the Han dynasty in China and the Sassanids of the 6th century in Persia, and through the periods of naturalistic, Coptic, Cufic and Byzantine styles. C.

Terry Towelling Fabrics: Design. O. Pomfret. *Textile Manufacturer,* 1943, **69**, 70, 81-2, 101-4, 148-150. An illustrated general account is given of various weaves for terry towelling. C.

Utility Dress Cloths: Design. *Textile Weekly,* 1942, **30**, 74-6, 188-191, 215. Point-paper diagrams and other particulars are given to illustrate various combinations of material, weave and colour effects in utility dress cloths. C.

PATENTS

Automatic Loom with Weft-winding Attachment. Maschinenfabrik Rüti. B.P.553,074 of 13/11/1941:6/5/1943 (Conv. 3/2/1941). In a loom of the type described in B.P.546,143, the thread waste from an exhausted bobbin is pushed out of the shuttle by air under pressure and thrown into an opening exposed to a suction action and retained there, the threading-thread of the following bobbin, after the first pick of this bobbin has been inserted, is released from the holding tong and also sucked into the suction air opening, and the sucked pieces of thread are cut off on the selvedge by means of the tension-rod-cutter and then entirely sucked into the tension opening. C.

Thread Lubricating Devices. (1) Courtaulds Ltd., J. C. Herrington and A. Walker. (2) Courtaulds Ltd., H. M. Averns and W. Briggs. B.P.553,101/2 of 5/11/1941:7/5/1943. (1) A small regular quantity of a liquid can be applied to a travelling thread in an amount not exceeding 8 per cent. by weight of the thread by passing the thread in contact with a surface supplied with liquid from a reservoir by means of a device with two limbs, one of which dips into the liquid and to the top of which the liquid can rise by capillary action whilst the other limb constitutes an arm down which the travelling thread takes up the liquid. The device may conveniently consist of a piece of woven or knitted material and preferably comprises a wick bent over so that one end of it dips into the reservoir containing the liquid and the other end constitutes the second limb down which the liquid flows to the travelling thread. (2) The lubricating device consists of a capillary tube in the form of a syphon, arranged so that the short limb dips into the liquid in the reservoir and the long limb delivers the liquid without pressure to a surface over which the travelling thread passes. The surface in contact with the travelling thread may be a pad, e.g. a piece of

wick, a guide of metal, porcelain or glass, or merely the end of the capillary tube. The devices are particularly suitable for applying to dry-spun cellulose acetate thread a small regular quantity of a lubricating liquid in amount not exceeding 8 per cent. by weight of the thread. C.

Flexible Hose. Automotive Products Co. Ltd. (Leamington Spa) and C. E. S. Clench. B.P.553,110 of 15/12/1941 : 7/5/1943. A flexible hose for conveying fluids at high pressures of the kind comprising a tubular core of rubber or equivalent flexible and resilient material and reinforcing layers of textile threads or metal wires which are either wound helically all parallel to each other or are interlaced to form a braiding, is characterised by the feature that between the core and the inner helical wrapping or the inner reinforcing braiding is formed an intermediate layer of relatively fine and closely braided textile threads through the interstices of which the material of the core cannot be forced during the curing of the hose. C.

Knitting Machine Yarn Feeding Mechanism. Scott & Williams Inc. B.P. 553,199 of 20/9/1941 : 12/5/1943 (Conv. 20/9/1940). Yarn feeding mechanism for textile machines, particularly knitting machines, comprises co-operating members rotatable about angularly disposed axes and having conical surfaces intersected by intermeshing teeth and grooves, in combination with a guide movable to direct a strand between the conical surfaces in paths at different distances from their small ends or from approximately the point of intersection of the axes of the conical surfaces. Such mechanism may be operated continuously at appropriate and convenient uniform speed and positive feeding movement imparted to the strand by the action of the teeth and grooves and the rate of feed may be varied by shifting the path of the strand with respect to the conical faces. The intermeshing teeth and grooves positively engage the thread and advance it in bites without noticeable slippage and are shaped to facilitate ready introduction of the thread into feeding position. C.

Cushioned, Absorbent Socks: Knitting. J. Lipson and N. Lipson (Toronto). B.P.553,245 of 20/11/1941 : 13/5/1943. A sock or like article having enhanced cushioning and moisture-absorbing properties, particularly in the sole region, is knitted with two or more threads throughout the entire structure of the fabric, and has all the threads knitted in regular close knitted loops in certain well-defined areas and certain of the threads in definite areas drawn out to form loose pile loops of equal length projecting from the face of the regularly knitted ground or backing fabric. By employing a single set of reciprocating needles, to which two or more threads are directed to the same knitting zone, the character of the knitting may be accurately controlled by the co-operative inter-positioning of reciprocal sinker members at controlled periods to provide a product which will be thickly overlaid on the surface with an overlapping looped or pile effect in pre-determined and clearly defined areas. C.

Weft Fork. Lupton Bros., Ltd. (Accrington) and W. J. Lupton. B.P.553,253 of 30/1/1942 : 13/5/1943. The weft fork comprises a saddle member having a central trough or channel and a flange along each edge, to which are attached, e.g. by brazing, the fork prongs and tail, and also a member forming a bearing for the supporting pin. Usually, the member forming the bearing will be a tubular bush, and the saddle member may fit above the bush or in some instances may fit below the bush. Alternatively, two saddle members could be provided shaped so as collectively to form the bearing space between them, to dispense with the bush. In a preferred embodiment of the invention, the saddle member is provided with a depending perforated lug or lugs, through which the ends of the wire prongs are passed, and the lateral flange which receives the tail piece is shaped to receive the end of the tail piece between transverse positioning formations. The prongs may be made of hard-drawn, spring-steel wire. C.

Polyvinyl Sizing Solutions. E. I. Du Pont de Nemours & Co. B.P.553,303 of 12/9/1941 : 17/5/1943 (Conv. 21/9/1940). Sizing solutions comprise 3 per cent. to 12 per cent. by weight of a polyvinyl compound bearing hydroxyl groups, e.g. a partially saponified polyvinyl acetate, 5 per cent. to 25 per cent. of boric acid based on the weight of the polyvinyl compound and 5 per cent. to 30 per cent. of a polyethylene oxide based on the weight of the polyvinyl compound. Such sizing solutions may be applied to various types of yarns but are particularly suitable for the sizing of synthetic linear polyamide yarns which are to be used in the knitting of sheer hosiery. C.

Straight-bar Knitting Machine. Mellor Bromley & Co. Ltd., T. C. Bromley and A. Shortland. B.P.553,375 of 17/10/1941: 19/5/1943. A Cotton's patent or other straight-bar knitting machine of the type wherein jack sinkers or their equivalent are advanced one by one, dividing sinkers are advanced in unison up to a verge or falling bar, and all the sinkers are retracted in unison, has a catch bar consisting of two separately but unidirectionally movable parts:—a front part for engaging in front of butts on the jack and dividing sinkers to retract all the sinkers, and a rear part for engaging behind the butts of the dividing sinkers to advance them to the verge or falling bar, in combination with operating means for effecting the following unidirectional movements of the catch bar parts:—forward movement of the front part prior to the projection of the jack sinkers; forward movement of the rear part, subsequent to the projection of the jack sinkers, to advance the dividing sinkers in unison to the verge or falling bar; retraction of the front part to retract all sinkers. Thus rising and falling movements of the catch bar are obviated. In one construction, the rear part is also provided with means engaging in front of the dividing sinker butts so that the dividing sinkers are at all times under complete control, which means is arranged to clear the jack sinker butts. In another construction the machine has common operating means for moving both parts of the catch bar and frictional means for connecting the two parts together and for transmitting the moving effort to one of them and for permitting this one to remain stationary while the other moves. C.

Straight-bar Knitting Machine. G. Blackburn & Sons, Ltd. and H. W. & E. Start. B.P.553,419 of 5/2/1942: 20/5/1943. A straight-bar knitting machine is provided with means for adjusting the position of the picot points so that they can be lowered into engagement with the needles, while the latter are in their normal position for a course to be drawn thereon. A further feature of the invention is that the adjustment provided permits of the points being lowered without engaging the needles when the latter are in their fashioning position. The means for adjusting the position of the picot points may comprise a shaft interconnected therewith and movable laterally with respect to its axis. C.

Straight-bar Knitting Machine. Mellor Bromley & Co. Ltd., T. C. Bromley and A. Shortland. B.P.553,469 of 20/10/1941: 24/5/1943. In a Cotton's patent or other straight-bar knitting machine, Coulier or draw mechanism of the type comprising a rotatable draw cam and a draw bar or lever carrying a truck or other cam follower normally engaging the cam is characterised by means for disengaging the cam and the truck whereby the cam continues to revolve, but the draw lever remains stationary. Preferably the draw cam is mounted on the main cam shaft to be shogged therewith and the disengagement and engagement of the cam and follower is effected by the shogging movement of the shaft. In some cases it may be desirable to provide means for retaining the draw lever in the position occupied by it at the moment of disengagement. For this purpose the cam shaft may be provided with a plain cam which, when the draw cam and follower are shogged out of engagement is itself engaged with the follower or another follower on or associated with the draw lever. C.

Closely Woven Fabrics: Weaving. Sulzer Frères Soc. Anon. (Winterthur, Switzerland). B.P.553,543 of 21/11/1941: 26/5/1943 (Conv. 31/12/1940). In a method of weaving closely woven fabrics, particularly of calico weave, the groups of warp threads moving alternately to form the shed cross at a point between the mid-position and one and the same extreme position of the shaft lift and the beating up is delayed with respect to the time of the crossing of the warp threads. The warp threads from the back rail to the fabric are preferably in one single plane when the corresponding shafts are in the middle between their two extreme positions. The difference in tension of the two groups of warp threads may be adjustable. The shaft movement may be effected by superimposing on one main shaft movement an additional movement, the amplitude of which is adjustable. C.

Winding Machine Yarn Traverse System. J. Mackie & Sons, Ltd. (Belfast) and J. P. Mackie. B.P.553,725 of 20/2/1942: 2/6/1943. In a winding machine yarn is guided from a position near the centre toward either end of the traverse by a grooved roller with oppositely directed helices on its two end portions, which helices may overlap a little at the centre, but do not cross one another.

The traverse of the yarn toward the two ends is effected by the two helical grooves, whilst the return toward the mid-position is effected by the lateral pull of the yarn from a guide eye associated with a fixed finger or abutment situated in front of the roller in a position approximately on a centre line through the middle of the roller such that the lateral pull suffices to bring back the yarn from either end of the roller to the point at which the helical groove for transferring it to the opposite end of the roller begins. C.

Fabric Containing Electrically Conducting Wires: Production. British Thomson-Houston Co. Ltd., W. J. Sims and B. P. Brunt. B.P.553,804 of 29/12/1941:7/6/1943. An electric heating element is formed from a textile fabric which embodies zones with wire warps and wefts separated by electrically insulating threads. The weft and warp threads, depending upon the ultimate form of the heating element, are cut between two adjacent zones of conducting wire warp or weft threads as the case may be, so as to produce conducting warp threads in one zone connected in parallel by conducting wire weft threads in an adjacent zone. The insulating threads may be of cotton, silk, etc., or of asbestos or glass fibre. C.

Mine-laying Parachutes: Production. British Celanese Ltd. B.P.553,829 of 16/9/1941:8/6/1943 (Conv. 3/6/1943). Parachutes for use in aerial mine-laying are made of a textile material which is disintegrated by water. Fabrics woven from zein yarns are suitable for this purpose. Materials made from yarns of polyvinyl alcohols (containing a sufficient proportion of hydroxy groups to render the yarns soluble or dispersible in water) and of water-soluble cellulose ethers may also be used. C.

Tapered Yarn Package Winding Machine. Universal Winding Co. B.P. 553,834 of 4/12/1941:8/6/1943 (Conv. 12/12/1940). A winding machine comprising a rotary winding spindle, reciprocable means comprising a traverse-member reciprocable opposite the winding spindle, a thread guide arranged to be reciprocated by the traverse member and adapted to be shifted in the general direction of the traverse motion for traversing the yarn longitudinally of the winding spindle, and control means for shifting the thread-guide outwardly and inwardly on the traverse member in the direction alternately to increase and diminish the length of traverse stroke of the thread guide during the reciprocation of the traverse-member, is characterised in that the control means is constructed and arranged so as alternately to increase and diminish the length of traverse of the thread guide uniformly at both ends of its stroke throughout the winding of a package on the winding spindle. This arrangement enables a package to be formed with gradually tapered portions at each end with the taper feathered to a thin edge at the ends of the package. Preferably the thread guide is pivoted to the traverse member to adapt it to oscillate with respect thereto in the general direction of the traverse motion, and the control means is arranged to oscillate the thread guide in relation to the traverse member first in one direction and then in the opposite direction during it reciprocation. C.

Tapered Yarn Packages: Winding. Universal Winding Co. and A. Abbey. B.P.553,858 of 4/12/1941:8/6/1943. The yarn is disposed at various angles throughout the winding with the traverses of yarn alternately increasing from a constant minimum to a constant maximum, and the winding is discontinued when the mass of material is relatively thin with respect to the diameter of the core so that the mass is formed with gradually tapered portions at each end and with the taper feathered to a thin edge at the ends of the package to avoid building the ends up in planes perpendicular to the longitudinal axis of the core. C.

Full-fashioned Stocking: Knitting. National Hosiery Mills Inc. (Indianapolis, U.S.A.). B.P.553,859/60 of 24/5/1941:8/6/1943 (Conv. 24/5/1940). (1) A full-fashioned flat knit stocking is knitted with a widened upper heel portion and a narrowed lower heel portion, and immediately forward of the heel there is a zone of elasticity less than that around the heel formed by knitting a narrowed rear instep area in the foot sole produced by loop transfer, this zone being defined by fashioning lines which are inclined to the bottom seam. The narrowing lines in the rear instep area may converge forwards towards the bottom seam so that the elasticity beneath the instep arch of the foot is gradually decreased in a forward direction and is at a minimum in the vicinity

of the highest point of the sole arch. The zone of lower elasticity may then be so produced that the fashioning lines defining the narrowed instep area are parallel to the wales of the stocking in the unnarrowed portion of the instep. The upper heel is preferably so widened that the edge in the upper part is at a relatively small inclination to the wales and at a, or the lower zone, is at a sharper inclination to the wales. The upper heel is preferably widened by the addition of loops. (2) In a full-fashioned flat knit stocking the heel is widened above and narrowed below the zone of maximum width, the upper heel portion being so widened that the angle of inclination of the edge of the stocking blank to the wales in the body of the stocking is varied along its length so that the heel of the stocking adapts itself to the contour of the concave upper portion of the human heel. The variation is obtained by varying the course frequency of widening. Widening is preferably effected by adding edge loops. C.

Full-fashioned Stocking Heel. National Silk Hosiery Mills, Inc. U.S.P. 2,308,506. The claim is for a full-fashioned stocking, the heel sections of which incorporate narrowing fashioning areas as shown in an illustration. C.

Colour Patterned Fabric Knitting Machine. Colorspace Patent Corporation. U.S.P.2,308,580. A machine for knitting polychrome yarn having a recurring sequence of coloured spots into a fabric with a pre-determined colour pattern has a colour guide adjacent to the yarn bearing visible elements corresponding to at least one of the spots on the yarn, means for moving the yarn and the guide so that the visible elements and the spots remain in correspondence if the pattern is knitted as pre-determined, and means for varying the size of the stitches to compensate for displacement of the spots with respect to their corresponding visible elements. C.

Flat Knitting Machine Thread Carrier Bar. K. P. Tuchscherer, J. E. Kunze and R. O. Harnack (Germany; vested in the U.S. Alien Property Custodian). U.S.P.2,308,661. The claim is for lever and cam means for driving the thread carrier bars of flat knitting machines so that a uniform lead of the carrier with respect to the first operated sinkers in each direction is always obtained. C.

Warping Machine. G. Wiggermann (Germany; vested in the U.S. Alien Property Custodian). U.S.P.2,308,663. The warp beam is carried by a rockable support mounted on a frame that also carries the pressing roller, and the beam brake is adapted to utilize the momentum of the decelerating beam to rock the support so as to separate the beam and the pressing roller. C.

Straight Bar Knitting Machine. Hosiery Patents Incorporated. U.S.P. 2,308,730. The claim is for improved means for arresting end movement of the needle bar of a multi-section straight knitting machine so as to maintain proper alignment between the sinker beds and the needle bar during knitting operations. C.

Yarn Tensioning Mechanism. Nolde and Horst Co. U.S.P.2,309,026. A device for the equal tensioning of a number of yarns fed to a machine consists of an axially turnable rod carrying a number of diametral guide eyes, and cam means by which the rod may be turned so that each yarn passes freely through its particular guide eye or so that the same inclination between yarn and eye, and therefore the same tension, is established at each eye. C.

Winding Machine Automatic End Finding and Tying Device. Abbott Machine Co. U.S.P.2,309,085. An automatic winding machine is fitted with (1) means for finding a yarn end of a package, (2) yarn uniting means, and (3) means for detaining the found thread from engagement with the uniting means until after a pre-determined cycle of operations of the finding means so as to prevent premature uniting of an early-found end. C.

Rotary Knitting Machine Electric Ring. Michael Wachsman (Brooklyn). U.S.P.2,309,367. An inner and an outer ring are provided for mutual sliding engagement with flanges that form annular grooves. C.

Decorative Warp Fabric: Construction. Pacific Mills. U.S.P.2,309,825. A fancy fabric has interwoven ground warp and weft and a decorative warp alternately interwoven and floating. The ground warp threads lie alongside the decorative threads where these are interwoven but lies under the floats so that the fabric is not open at these places. C.

Elastic Fabric: Knitting. Hemphill Co. U.S.P.2,310,070. Non-elastic and elastic yarns are incorporated in a plain knitted fabric by drawing the non-

elastic yarn over sinker edges and the elastic yarn over the nibs of sinkers placed above the aforesaid sinker edges. C.

Loom Temple. A. B. Shelton (Columbus, Ohio). U.S.P.2,310,125. The claim is for trigger and spring controlled selvedge clamping jaws for a loom temple. C.

Hosiery Shaping Device. Vaughan Knitting Co. U.S.P.2,310,330. A hosiery form with foot, leg and ankle portions is fitted with creasing cavities, grooves and presser blocks to crease a stocking down the front and back and across the ankle. C.

Full-fashioned Hosiery Knitting Machine Welt Mechanism. Alfred Hofmann, Inc. U.S.P.2,310,368. A single ware roller shaft is fitted with (1) means for engaging the welt rod, and (2) a pulley and strap with its ends wrapped in opposite directions and engaging the first means to move the welt rod in either operative direction. C.

Automatic Weft-replenishing Loom Shuttle Box Front Plate. W. L. Hicks (Trion, Ga.). U.S.P.2,310,369. The front plate for a shuttle box has an upper member that extends over the whole length of the box, and a lower member that stops short of the inner end of the box and is rigidly secured to the sley, and the two members are spaced to form a longitudinal slot for the shuttle. The free inner end of the upper member yields resiliently under the impact of the shuttle but assumes a fixed position against a boxed shuttle. C.

Circular Knitting Machine. L. A. Miller and C. C. Foil. U.S.P.2,311,119. A circular knitting machine with latch needles interspersed with butted needles is fitted with cams, hooks and yarn guides so that the portion of yarn extending between the butted needles will be laid straight along the surface of one side of the fabric. C.

Elastic Fabric: Knitting. Hemphill Co. U.S.P.2,311,166. Elastic yarn is incorporated under tension at non-adjacent wales (*a*) for drawing the wales together, also incorporated in pre-determined courses but tucked at (*a*), and inelastic yarn is tucked at (*a*). C.

Gravity-actuated Winding Bobbin Brake. E. I. Du Pont de Nemours & Co. U.S.P.2,311,175. A hollow winding bobbin, positively driven by a surface driving roller, has an internal brake element mounted on a pivot, of such proportions that when the assembly is in a winding position the centre of gravity of the brake is to one side of a line passing vertically through the pivot so that the brake swings out of action, but when the bobbin is ready for doffing the centre of gravity is on the opposite side of the line and the brake swings into action. C.

Photo-electric Tape Length Measuring and Correcting Device. General Electric Co. U.S.P.2,311,406. In apparatus for the weaving of a continuous strip in which sections of pre-determined length are marked off by inserting weft portions that present a distinctly different optical effect, light beams are made to emanate from the strip at intervals equal to the desired standard length and means are employed to give an indication in response to a time difference in the occurrence of corresponding variations in the light beams. C.

Nylon Knitting Yarn: Sizing. E. I. Du Pont de Nemours & Co. U.S.P. 2,312,469. Nylon yarn is dressed for making into sheer knit goods with a protein size (insoluble in water) containing a plasticizing agent and a hardening agent. C.

Electric Weft Feeler. Charlton Woolen Co. U.S.P.2,312,515. Contact with the weft is made by two groups of electric feeler contacts, of opposite polarity, secured to and insulated from the end of a tubular member that slides through a limited path in a tubular housing and is urged outwards by a spring. C.

Flat Bed Knitting Machine Cam Carriage Drive. S. W. Lippitt (Cleveland, Ohio). U.S.P.2,312,565. Mechanism for reciprocating the cam carriage of a flat bed knitting machine comprises a cylinder and piston, linkage for multiplying the travel of the carriage in relation to the travel of the piston, and means for varying the travel of the piston. C.

Circular Loom Warp Tensioning Device. Henri Pelcé (France; vested in the U.S. Alien Property Custodian). U.S.P.2,313;000. A device for stretching the warp threads behind the shed comprises two deviating elements for each warp thread, an eye between these elements for the warp thread, resilient means for

pushing and guiding the eye for spacing away the deviating elements and thus causing the warp thread to deviate, and locking means for holding the eye close to the deviating elements in opposition to the action of the resilient means. C.

Thread Isolating Device. S. S. C. Fleischer and J. J. Hansen (Denmark; vested in the U.S. Alien Property Custodian). U.S.P.2,313,195. A device for isolating single ends in a sheet of warp combines an edge feeler pivotally connected to the frame of a conventional machine for handling the warp threads in a loom and held by springs to the edge thread, with selector members that isolate the edge thread and are guided by the edge feeler. C.

Flat-knitted Stocking Selvedge: Construction. Jean Garric (France; vested in the U.S. Alien Property Custodian). U.S.P.2,313,294. A flat, non-ravelling selvedge is formed for parts of the sole of a stocking on flat frames by completely knitting a pre-determined number of rows of plain loops, transferring by means of the usual narrowing machine each second loop of at least a part of a succeeding row to the following second needle, and unravelling the first formed rows to expose the row of transferred loops. C.

Elastic Knitted Fabric: Construction. Hemphill Co. U.S.P.2,313,332. The fabric has elastic yarn knitted under tension so as to contract and draw it together laterally, and inelastic yarn that is lighter at and adjacent to the edges of the fabric than elsewhere, so that the fabric is drawn together to a greater extent at the edges than in the following courses. C.

Rubber Loom Picker. Gates Rubber Co. U.S.P.2,313,354. The picker has a body of rubbery material, rectangular in cross-section except where it is struck by the shuttle. Here the block is compressed into a cylinder and held in this form by a taut band. C.

Non-curling Knitted Fabric Selvedge: Construction. Hemphill Co. U.S.P. 2,313,446. A selvedge that is without rib stitches and does not curl has courses that form a picot edge, and adjacent courses in the fabric contain an elastic yarn. C.

4—CHEMICAL AND FINISHING PROCESSES

(A)—Preparatory Processes

Organic Solvents: Production, Properties and Textile Applications. *Silk and Rayon,* 1942, **16**, 222, 230, 352, 366, 486, 508, 610, 612; 1943, **17**, 34-6, 96-8, 122, 236-8, 308, 316. A broad review of the chemistry and textile applications of organic solvents under the main headings (1)-(3) Use in the manufacture of rayon, (4) acetone, (5) alcohol and ether, and (6)-(8) wetting agents and detergents. C.

Textile Assistants: Composition and Properties. *Silk and Rayon,* 1941, **15**, 458; 1942, **16**, 56. Further instalments of a tabulation of trade names, makers' names, constitution, properties and uses of textile assistants. These contributions are Series 58 and 59 and individual entries 455-477. C.

(B)—Boiling, Scouring, Degumming and Washing

Synthetic Textile Fabrics: Processing. C. Heydon. *Amer. Dyes. Rept.,* 1943, **32**, 172-174. A general discussion of developments in the scouring, dyeing and finishing of rayon, nylon, Aralac and Vinyon fabrics. C.

Silk: Degumming. *Silk and Rayon,* 1943, **17**, 366-367. A discussion of the objects of degumming, the nature of impurities to be removed in degumming, substances used in degumming baths and the action of soap, and some degumming problems, such as the degumming of silk in mixtures with cellulose acetate. C.

(C)—Weighting

Rayon Fabrics: Chemical Finishes. H. H. Mosher. *Amer. Dyes. Rept.,* 1943, **32**, 150-152, 156. Inherent rayon defects and their correction by finishing treatments are briefly discussed and developments in softening, dulling and sizing agents for rayon are reviewed. C.

Resin-finished Goods; Formation of Methylamines in —. H. Rath, H. Georgi and M. Dettinger. *Textilberichte,* 1941, **22**, 477-478 (through *Chem. Zentr.,* 1942, i, 288 and *Chem. Abstr.,* 1943, **37**, 2586[6]). Goods finished with urea-formaldehyde condensates occasionally develop a difficultly removable fishy

odour due to methylamines, especially trimethylamine. Ammonium ion is necessary for their formation. This can result from high condensation temperatures, too long a time of condensation, excess formaldehyde and low acidity. Odour develops only when the bases are set free, e.g. by hydrolysis, which is increased by heat and moisture and by having the goods neutral in reaction. To decompose the methylamine salts in the finished goods it is recommended that they be given a weak sodium carbonate wash in the presence of an emulsifying agent, followed by a thorough rinsing. C.

(E)—Drying and Conditioning

Textile Fibres: Moisture Relations and Drying Problems. *See* Section 5A.

Cotton, Linen and Wool Fabrics: Deterioration in Storage. *See* Section 5C.

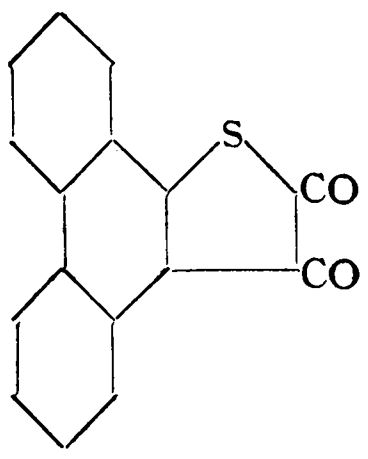
(F)—Carbonising

Carbonising Problem. W. v. Bergen. *Text. World,* 1943, **93**, No. 2, 135. To maintain effective carbonising, the strength of the acid rises as the age of the bath increases; after a certain stage it is more economical to replace the bath with new acid. The bath accumulates inorganic sulphates, e.g. calcium, magnesium, iron, sodium and potassium, and organic matter, and these materials set up buffer action, necessitating a high concentration of acid in the bath. In determining the strength of the acid by titration with alkali, a sharper endpoint is obtained with methyl orange than with phenolphthalein. W.

(I)—Dyeing

Indigosols: Developing. E. Y. Podreshetnikov and N. E. Fedorova. *Tekstil. Vestnik,* 1940, No. 2-3, 46-48 (through *Khim. Referat. Zhur.,* 1940, No. 12, 67 and *Chem. Abstr.,* 1943, **37**, 1605[5]). A new method dispenses with such substances as ammonium thiocyanate and vanadate, which are needed for developing Indigosols by the steaming chlorate method. Ammonium dichromate is added to the dye. It dissociates with the liberation of chromic acid which immediately oxidises the Indigosol. When neutralised ammonium chromate is used (sodium chromate as well as ammonium chromate is present), it is recommended to add ammonium chloride for a complete utilization of chromic acid. The method was tried for Indigosol O and O_4B (bromoindigosol). Methods for dyeing, for reserve colouring and for printing are given. C.

Phenanthrothiophene Azine and Indigoid Dyes: Preparation. P. C. Dutta (and R. M. Sinha). *J. Indian Chem. Soc.,* 1941, **18**, 469-471, 477-478; 1942, **19**, 239-240 (through *Chem. Abstr.,* 1942, **36**, 4505[3], 4505[9]; 1943, **37**, 1873[1]). (1) The author describes the preparation of 9 : 10-phenanthrothiophene-2′ : 3′-dione (annexed formula) from 9-phenanthrenesulphonic acid, through the thiol which is condensed with oxalyl chloride. (2) The diketone is condensed with *o*-phenylenediamine and similar diamines to give several azine dyes. (3) The diketone is also condensed with hydroxythianaphthene, and with 6 : 7-, 4 : 5-, and 5 : 6-benzothioindoxyl to give indigoid dyes. The products are described and the relationships between colour and constitution are noted. C.



Sulphur Dyes: Application. A. M. Serebryakov. *Sherstyanoe Delo,* 1940, **19**, No. 7, 22-24 (through *Chem. Abstr.,* 1943, **37**, 1607[2]). Numerous formulae are given for dyeing cellulose fibres with sulphur dyes at low temperatures. Tests were made with cotton fabrics, cuprammonium staple fibre and viscose staple fibre. The temperature of the dye bath was varied from 20 to 70°. Sodium sulphide (150 per cent.) and soda (70 per cent.) calculated on the weight of the dye were used. The modulus of the bath was in all cases 1 : 30. Dyeing was done with S Black, S Direct Blue and S Khaki. In all cases the cuprammonium fibre dyed evenly at 20°, whilst a bath temperature of 30° or more was necessary to dye the cotton and viscose staple fibre satisfactorily. C.

Cellulose Acetate Rayon: Dyeing. G. H. Lister. *J. Soc. Dyers & Col.,* 1943, **59**, 89-91. A discussion of some problems of the cellulose acetate rayon dyer, such as the dispersion of cellulose acetate rayon dyes and faults arising from incorrect dispersion, fading due to burnt gas fumes, " tarring," the effect of alkaline dyebaths, difficulties encountered in the production of compound shades and of developed blacks, problems in the dyeing of union materials

containing cellulose acetate rayon, changes in colour due to heat and water, and abnormal fading. C.

Nylon: Dyeing with Dispersed Dyes. T. Vickerstaff. *J. Soc. Dyers & Col.*, 1943, **59**, 92-101. Rate of dyeing isotherms at 40° C., 60° C., 80° C. and 95° C., covering the first hour of dyeing, have been determined for 22 different dyes on nylon. The curves can be expressed approximately as hyperbolae and the dyes have been arranged in order of their rates of dyeing at 80° C., based upon a velocity coefficient derived from the best fitting hyperbola. The order is closely similar to that based upon half-dyeing time. It is shown that the more rapid-dyeing dyes have better levelling properties. By means of a graphical method, it is possible to predict the course of dyeing with varying temperature, and this has been confirmed experimentally. Rate of dyeing varies with initial concentration and, as a rough guide may be assumed to vary inversely as the concentration. The velocity coefficients may be used to select dyes which will be compatible in mixtures. It is shown that the addition of a second dye to a dyebath has little effect on the rate of dyeing of the original dye. The effect of temperature is discussed, and the usual tests of temperature behaviour are explained in terms of the isotherms. Rate of dyeing varies exponentially with the reciprocal of the absolute temperature in the same way as most chemical reactions or diffusion processes, and the activation energies of the dyeing process for the various dyes lie in the region of 22,000 g.-cal. Under special dyeing conditions, the rate of diffusion of dyes inside nylon may be measured. The diffusion coefficients of 11 of the dyes have been determined by the use of Hill's equation for diffusion into cylindrical rods. With Dispersols, the coefficients decrease with increasing molecular weight. The coefficients bear no relation to technical rates of dyeing. The solubilities of all the dyes in nylon and cellulose acetate run parallel, with lower solubility in nylon; but the solubility cannot be related to diffusion coefficient, technical rate of dyeing, visual judgment of washing fastness, or quantitative measure of the dye removed in a very severe wash. C.

Rayon Fabrics: Dyeing. J. Hopwood. *Amer. Dyes. Rept.*, 1943, **32**, 153-156. Procedures for the scouring and dyeing of full-fashioned viscose and acetate hosiery and seamless rayon hosiery, the dyeing and finishing of warp knit fabrics, and the scouring, dyeing and finishing of viscose woven fabrics are described and necessary precautions are indicated. Methods of selecting suitable dyes, particularly the method depending on determination of "time of half-dyeing," are briefly discussed. General developments in the rayon industry, such as the production of high tenacity yarns, rayon staple, Rayolanda, and Vinyon are reviewed. C.

Spun Rayon Fabrics: Dyeing with Vat Colours. A. R. Wachter. *Textile World*, 1943, **93**, No. 3, 71. Practical hints are given on preventing defects that are commonly encountered in the vat dyeing of spun rayon fabrics. C.

Textone: Use in Vat Dyeing. A. L. Dubeau, E. G. Fenrich and G. P. Vincent. *Amer. Dyes. Rept.*, 1943, **32**, 175-176. Details are given of a jig method of dyeing with vat dyes in which a solution of Textone (sodium chlorite) is used as the oxidising agent. It is pointed out that when Textone is used for oxidising the end product of the reaction is common salt which is easily washed out. Fewer washings are therefore needed and it is possible for dyers to increase output by as much as 30 per cent. In addition, there is no danger of dulling the shade, the goods are more absorbent and have a softer handle, and no health hazards are involved. In many cases the use of acid may be eliminated and the Textone used in alkaline solution. The chemical costs of the Textone and the dichromate processes are about the same but, as the Textone process is more rapid, the cost of operating the jig per unit length of cloth processed is materially reduced. C.

Dyed Wool: Microscopical Study. G. L. Royer and C. Maresh. *Amer. Dyes. Rept.*, 1943, **32**, 181-186. Photo-micrographs of dyed wool fibres in which concentrations of colour appear as specks are presented and discussed. It is suggested that as the dye solution diffuses the fibre swells and the cells of the wool partially separate. The greater the swelling, the greater is the stress applied between the cells and the larger are the voids formed. The dye solution fills up the voids and becomes concentrated because of the surface tension forces in capillaries. Acids and salts added during the dyeing also diffuse into the voids and may cause precipitation of the colour within the voids during the

dyeing operation. When the fibre is dried the water in the voids diffuses out leaving the solid dye on the walls of the voids. In the case of chromed and other insoluble dyes, the dye is converted into an insoluble form and solution of the dye on subsequent wetting would be difficult. The part played by this phenomenon in certain types of dyeing is briefly discussed. C.

Dyed Utility Cloths: Fastness Tests. *See* Section 5C.

Aminoanthraquinone 2-Hydroxy-3-naphthoyl Derivatives: Preparation and Properties. R. V. Bhat, K. D. Gavankar and K. Venkataraman. *J. Indian Chem. Soc., Ind. & News Ed.*, 1942, **5**, 171-177 (through *Chem. Abstr.*, 1943, **37**, 2579[5]). Details are given of procedures for the preparation of 2-(2-hydroxy-3′-naphthoylamino)anthraquinone (I), 1:4-bis(2-hydroxy-3-naphthoylamino) anthraquinone (II), 5-(2-hydroxy-3-naphthoylamino)-1-aminoanthraquinone (III) and 2-[*p*-(2-hydroxy-3-naphthoylamino)benzoylamino]-anthraquinone(IV). Melting points of the products and various derivatives are given. Product IV was a highly substantive vat dye, giving a lemon-yellow dyeing; it was not more soluble in caustic soda solution than I, II or III. Because of their slight solubility in caustic soda only light shades were obtained in test dyeings when the dyes were used as "naphthols" with Fast Red Salt TR and Fast Blue Salt 2B. As vat dyes, I, II and III were inferior in tinctorial power to commercial (acylamino) anthraquinones. Product IV had a great affinity for cotton, giving bright lemon-yellow dyeings superior to those obtained with commercial dyes; development with Fast Red Salt TR gave a deep reddish orange shade. Due to the light shades of the dyeings no definite conclusions could be drawn on the relation of structure to fastness to kier-boiling and rubbing. C.

Indanthrene Dyes: Dispersion by Means of Ultrasonic Waves. A. A. Morozov and G. V. Milinskaya. *Byull. Ivanov. Nauch.-Issledovatel. Tekstil. Inst.*, 1940, **15**, No. 5-6, 427-432 (through *Khim. Referat. Zhur.*, 1941, **4**, No. 1, 130 and *Chem. Abstr.*, 1943, **37**, 2185[3]). Indanthrene Green GG (0·15-0·30 g. in 50 c.c. of water) was exposed to the action of ultrasonic waves for 15-60 min. The quality of the suspension obtained was evaluated by dyeing samples of mercerised satin with it and measuring the intensity of the colours in the Strelkov colorimeter. The size of the dye particles reached 1-2μ during the dispersion. A preliminary grinding of the dye does not facilitate its dispersion. Replacing water with solutions of caustic soda, hydrosulphite, etc., has no effect on the degree of dispersion but produces poorer dyeing. C.

Basic Dyes: Sorption by Cellulose. D. Krüger. *Textilberichte*, 1941, **22**, 428-431 (through *Chem. Zentr.*, 1942, i, 269 and *Chem. Abstr.*, 1943, **37**, 2579[9]). Comparison of the absorption spectra of basic dyes in aqueous solution and dyed on cellulose films shows that the absorption maxima in the dyed films are shifted toward the longer wave lengths. Significant differences in the shapes of the absorption curves are also noted. The dye appears to exist in the cellulose film as a polymeric rather than as a simple ion. The number of previously existing free acid groups in the cellulose is a likely measure of the quantity of basic dye which will be taken up in such a manner as to be reasonably wash-fast. The size of the intermicellar spaces is of importance in affecting the velocity of sorption and desorption. C.

Dyed Wool: Microscopy. G. L. Royer and C. Maresh. *Amer. Dyes. Rep.*, 1943, **32**, 181-186. The occurrence is investigated of specks apparently due to the deposition of solid dyestuff in the openings formed at the interstices of the cells in the wool fibre during high concentration dyeing. Photomicrographs are given showing specks in dyeings with chrome colours (e.g., Colour Index No. 202) and with fast-to-washing colours, e.g. Sulphon Cyanine dyes (e.g. Colour Index No. 289). A conception of the mechanism of the speck formation is postulated. W.

Khaki on Wool: Fastness to Light. E. I. Noble and others. *Text. J. Australia*, 1943, **18**, 40-42. Combinations of dyes used throughout the British Empire and the U.S.A. for the production of khaki are classified and methods for improving their light fastness suggested and discussed. A plea is made for the marketing by British dyestuff makers of one of the faster types of chrome greys. The importance is stressed of a balanced combination, i.e. one which would fade "on tone." A worsted shirting made up from slubbing dyed to a heavier shade and then blended with white would be 1-2 points higher in light

fastness than the present piece-dyed material. The adoption of the after-chrome method for dyeing would widen the choice of available dyestuffs. W.

(J)—PRINTING

Photographic Textile Prints: Production. *Silk and Rayon,* 1943, **17**, 296-298. Directions are given for printing marine blue, dark green, reddish brown and sepia tones, and copper ferrocyanide mordants for basic dyes, on textiles by first forming a silver image. C.

(K)—FINISHING

Softening Agents: Composition and Properties. *Silk J. Rayon World,* 1943, **19**, No. 227, 20-21; No. 228, 27-31. A simple account is given of the chemistry of modern softeners, a number of proprietary products being mentioned under the headings: (1) Emulsions of oils, fats and waxes (e.g. the Waxols and Cirrasols, Tallowmulse, Castor ABW, Moawax, and Moapol); (2) Soaps (including triethanolamine soaps); (3) Soluble (sulphonated) oils (Monopol, Prestabit V, Avirol AH, Humectol C, Calsolene oils, and Aerosol O.T.); (4) Sulphated alcohols (Lissapols, Gardinols, Lorols, Ocenols, and Amco); (5) Fatty Acid condensation products (Igepons, Lamepon, Meliorans, Ultravons, and Medialan A.); (6) Cation-active compounds (Sapamines and Igepals); (7) Quaternary ammonium compounds (Fixanols and Velan), and (8) Hygroscopic compounds. C.

Phenolic Resins and Resin Emulsions: Application to Textiles. W. H. Butler. *Amer. Dyes. Rept.,* 1943, **32**, 128-133. The chemistry of phenolic resins is briefly discussed and a table is given showing available types and their applications with textiles. Their use in the production of laminated and moulding materials, chemical-resistant fabrics, and "empire" and "cable" cloth (varnished fabric) for insulation is described. Resin emulsions and their use for the production of coated cloth and of paints for protective, camouflage and decorative purposes are also discussed. C.

Plastics: Production and Uses. *British Plastics,* 1943, **14**, 738-758. The general methods of producing casein plastics, cellulose plastics, phenolic moulding powders, phenolic laminated materials, miscellaneous phenolic products, urea formaldehyde plastics, polymethyl methacrylate, styrene plastics, vinyl resins and nylon are briefly described and charts are given showing the raw materials, methods of production, and uses of each type. A comprehensive chart is also given showing the principal plastics materials, the raw materials used, and the chief applications, and the division of the materials into two classes, namely, thermo-setting and thermo-plastic products. C.

Vinyl Resins: Application to Textiles. C. W. Patton. *Amer. Dyes. Rept.,* 1943, **32**, 124-127, 133. The properties of vinyl resins are discussed and an account is given of applications in the production of coated fabrics for pontoons, covers for trucks, planes, equipment, etc., shoe uppers and toe tips, raincoats, food and water bags, and hospital sheeting, and as adhesives in the production of pile fabrics and laminated materials. C.

Green Kersey: Finishing. *Text. World,* 1943, **93**, No. 3, 70-71. Detailed procedure is given for the finishing to U.S. Marine Corps specifications of 16 oz. green kersey. In obtaining the final shade, the importance is stressed of the neutralization of residual acid after carbonising. W.

(L)—PROOFING

Rubber-proofed Fabrics: Production. W. Lord. *Textile Manufacturer,* 1943, **69**, 211-213, 256-258, 263. A useful, illustrated account of the production of single-texture (S.T.) and single-faced (S.F.) fabrics (spread with rubber on one face only), double-faced sheetings (coated both sides or C.B.S.), and double textures with rubber between two layers of fabric (D.T.). Manufacturing particulars are tabulated for the principal proofing cloths, and practical notes are given on their weaving, common defects, specification and testing. C.

American Service Fabrics: Flameproofing. E. Croen. *Cotton (U.S.),* 1943, **107**, No. 3, 71-74. Methods of flameproofing fabrics and treatments giving a combination of fire-resistant and water-repellent qualities are reviewed with special reference to cotton fabrics and fabrics used by the American army and navy. Methods of testing the treated fabrics are briefly described. C.

Fire-proofed Cloth: Testing. Terry Towels: Water Absorbency Tests. *See* Section 5C.

American Service Textiles: Production. R. W. Jacoby. *Amer. Dyes. Rept.*, 1943, **32**, 192-199. A report is given of a lecture and discussion on the subject of meeting changing conditions in which consideration was given to quantities of various textile materials required for the American armed forces, requirements in regard to fire-, water-, mildew- and weather-proofing, the toxicity of fungicides, the blending of fibres, the printing of tricot or bobbinet nets with vat dyes, the *p*H of cloth, moth-repellent finishes, coated and gas-resistant fabrics, goods dyed with sulphur dyes, specifications for goods dyed with direct dyes, the sewing of goods dyed with mineral khaki, restrictions of certain vat dyes to materials for the armed forces, shortages of indigo and alizarin-dyed goods and the acceptance by the U.S. navy of goods dyed with leuco esters and chrome dyes, shortages of starches and gums and suggested alternatives for these materials, and various U.S. government orders affecting the textile industry. C.

Helmet Linings: Production. *Modern Plastics*, 1943, **20**, No. 8, 49-52, 152, 154. In an economical method for the production of army helmet linings, 4-oz. 40-in. cotton sheeting is impregnated with a quick-drying, heat- and water-resistant, fast-curing resin, dried and cut into long ribbons, 2 in. and ¾ in. wide. The wider ribbon is wound longitudinally around an egg-shaped heated mandrel. The narrow ribbon is wound transversely round the centre portion to form the lower half and brim portions and the wound product is cut into two, each half making a helmet form. The edges are trimmed and a brim collar consisting of three die-cut strips of 1·60 enamel duck bond, stapled together, is slipped over the edge of the wrapped form. The form is then moulded over a rubber bag in a small press. A 3½ in. disc cut from the impregnated sheet which is used as a crown patch for extra strength at the top of the hat is placed directly in the mould before the preformed helmet is placed in the press. The edges of the moulded liner are trimmed, buffed and burnished, holes are punched for the attachment of badges, straps and harness, and the liner is sprayed with a walnut shell flour-filled compound which provides a dull, pebbly, non-reflecting surface. Details of the procedures and apparatus are given, and the advantages of the machine wrap preform technique for this and other purposes are pointed out. C.

3,2′-Nicotyrine: Insecticidal Properties of Certain Azo Derivatives. R. L. Frank, R. W. Holley and D. M. Wikholm. *J. Amer. Chem. Soc.*, 1942, **64**, 2825-2828. 3,2′-Nicotyrine prepared from nicotine by means of palladium-on-asbestos catalyst couples readily with diazonium salts to form azo dyes which show activity as insect-proofing agents. Samples of wool cloth dyed with four of the azo dyes were much less affected than an undyed sample when exposed to attack by larvae of the black carpet beetle. W.

PATENTS

Cellulose Derivative Materials: Shrinking. British Celanese Ltd. B.P. 553,236 of 19/9/1941 : 13/5/1943 (Conv. 15/5/1941). The extensibility of threads, yarns, ribbons, fabrics and similar materials having a basis of an organic derivative of cellulose is improved by shrinking them with a solution of acetaldehyde in a liquid hydrocarbon, preferably xylene. Especially valuable results are obtained when the treatment is applied to materials that have first been stretched. C.

Coloured Yarns: Production. J. S. Taylor and T. Welch. B.P.553,307 of 7/10/1941 : 17/5/1943. In a process for the production of coloured yarn, the yarn is thoroughly penetrated with dye and a gum-like carrier which may also act as a sizing agent, the penetration being effected progressively by mechanical pressure aided where possible by wetting agents, and the treated yarn being dried before beaming and developed before or after beaming the whole of the operations up to and including the beaming being done as succeeding steps of one operation continuously operated. Gums of the locust-bean type are suitable for use as carriers. The yarn may be passed through a size-box charged with the dye and the gum-like carrier and then between one or more pairs of nip rollers. C.

Nylon Fibres and Fabrics: Parchmentising Treatment with Phenols. British Nylon Spinners Ltd., G. Loasby and D. L. C. Jackson. B.P.553,442 of 19/11/1941 : 21/5/1943. Nylon in the form of fibres or fabrics is treated for a short time with a swelling agent comprising a solution of a phenolic substance, e.g. a mono-, di- or tri-hydric phenol, under such conditions of concentration and temperature that a substantial shrinkage in the length of the fibres occurs

and, after removal of the swelling agent from the fibres, the density of the fibres remains substantially the same as before the treatment. Nylon fibres treated in this way show a marked shrinkage and acquire an increased extensibility. Nylon fabrics may be stiffened or parchmentised according to the concentration and temperature of the treating liquid used. Parchmentisation of the fabric is produced when the treatment is carried out at a raised temperature using a strong solution of the phenolic substance and the parchmentised fabric can be used for dialysing purposes. Novel effects can be produced by treatment of mixtures of nylon with other fibres. C.

Felt Production: Hardening Laps. W. O. Street. B.P.553,459 of 21/5/1943. Wool laps, with interleaved sheetings and wetted or steamed at appropriate places, are passed through a succession of co-operating flat hardening machines, which are spaced so that their oscillating plates act upon different areas of the lengths of felt, and thus prevent the formation of soft places. W.

Electrical Insulating Materials: Impregnation with Polystyrene. Standard Telephones and Cables Ltd., A. A. New and S. G. Foord. B.P.553,545 of 21/11/1941:26/5/1943. A process for impregnating organic fibrous material, e.g. paper, with polystyrene or a plasticised polystyrene containing at least 46 per cent. polystyrene comprises impregnating the material at a temperature not exceeding 250° C. with a homogeneous mixture containing polystyrene, the mixture having sufficiently low viscosity, and treating the material during or after impregnation in such manner that on cooling to room temperature the viscosity of the impregnant in the material is substantially greater than 10^6 poises. The fibrous material may be impregnated with the mixture containing polystyrene by frictioning, hot rolling or vacuum impregnation. The fibrous material may be impregnated with a mixture of polystyrene and a plasticiser for polystyrene that has such a steep viscosity/temperature characteristic that the viscosity is appreciably greater than 10^6 poises at room temperature but is so low at the temperature of impregnation as to allow of satisfactory impregnation, in which case the material is cooled in air after impregnation before being wound into the form in which it may be stored ready for use, or the fibrous material may be impregnated with a mixture of polystyrene (with or without a plasticiser) and a solvent having a boiling point not lower than the temperature at which impregnation takes place, such mixture having a low enough viscosity at that temperature, and the impregnation (and in some cases heating after impregnation) takes place under such conditions that sufficient of the solvent is slowly evaporated to leave an impregnant having a viscosity appreciably greater than 10^6 poises at room temperature. C.

Iodised Fabrics: Production. C. R. H. Ritter. B.P.553,564 of 25/8/1941: 27/5/1943. A method of impregnating a textile fabric with iodine comprises the steps of freeing the fabric from hot pressing ingredients, immersing the fabric in an aqueous solution of sugar, glycerin and isinglass, drying the fabric, immersing it in an aqueous solution of iodine until it is saturated, wringing the fabric slightly, drying, passing the fabric quickly through a second solution of iodine in water containing in addition alcohol and sugar, and again drying. If the fabric is intended for surgical purposes it may be sterilised by means of saturated steam at a temperature of about 150° to 180° C. after it has been freed from hot pressing ingredients. C.

Crease Lines in Collar and Cuff Fabrics: Production. Tootal Broadhurst Lee Co. Ltd. and H. Corteen. B.P.553,634 of 27/9/1941:31/5/1943. In a method of forming a collar or cuff having a tendency to fold along a predetermined main crease line, solid thermoplastic material, especially a cellulose derivative, is applied to the fabric and the folded fabric is hot pressed at the crease line first so that less of the thermoplastic material remains in the crease line than in the surrounding area. The thermoplastic material may be applied as a separate layer or as separate threads, or as a layer including separate threads. In a three-ply cloth the stiffening effect produced in the areas adjacent the crease line is largely due to cementing the plies and/or threads of the treated fabric together. In a modified process, the folded fabric is pressed in a direction normal to the plane of the fabric, but not so as to press the crease line last. The folds of the fabric may be separated by a thin rigid strip during pressing. The thermoplastic material is preferably cellulose acetate and is incorporated as a layer of woven material or continuous sheets between two layers of cloth, along and on either side of the fold line. The fabric is then stiffened by hot

pressing by fusing the thermoplastic part with or without the use of acetone or other suitable solvent or mixed solvents. C.

Hose Pipes: Impregnation with Rubber. F. S. Zabala (San Sebastian, Spain). B.P.553,669 of 11/7/1941: 1/6/1943 (Conv. 12/11/1940). A process for impregnating with rubber latex hose pipes or other tubes woven from vegetable, animal, mineral or synthetic fibres is characterised by the feature that the woven and completely finished pipe is treated in a slightly acid bath, or some other bath that has a coagulating effect, before or after being impregnated with a moistening material, and after being allowed to dry, if desired, is arranged in an inclined position, or else with one of its ends supported at a higher level than the other, and its interior is then filled with rubber latex, duly stabilised, which contains the materials necessary for vulcanisation and also if desired a moistening material, the ends of the pipe being maintained in this position until the latex contained in its interior has passed through its walls, for which purpose a light pressure is exerted upon the latex at the upper end by means of air or gas, or by compressing the same between two rollers starting from the upper end. When the latex has passed through the walls, a current of hot air, steam or gas is passed into the interior of the pipe in order to complete the coagulation of the internal and external coatings of latex, dry the impregnated hose, and effect vulcanisation. Talcum powder may be blown in with the hot air or steam. Finally, the internal and external surfaces may be coated with a suitable paint, e.g. one having a basis of rubber solution. For the impregnation of the woven pipe it is possible to use, instead of latex, a solution of rubber or other similar plastic material, in which case the preliminary treatment of the hose comprises treatment with the solvent used in the preparation of the solution or with a similar liquid. C.

Rubber and Fibre: Recovery from Waste Vulcanised Products. Dunlop Rubber Co. Ltd., D. F. Twiss and A. J. Hughes. B.P.553,674 of 28/11/1941: 1/6/1943. A method of recovering rubber from vulcanised rubber or the like containing embedded textile fibrous material comprises disintegration between rollers maintained at 100-140° C. and separating the rubber by sieving or by agitating the disintegrated material in water containing a wetting agent, such as potassium castor oil soap, allowing the fibrous material to separate, and removing the rubber crumb from the upper layers of the water. C.

Quaternary Ammonium Compound Finishing Agents: Preparation. J. R. Geigy A.-G. (Basle). B.P.553,681 of 29/11/1941: 1/6/1943 (Conv. 30/11/1940). Quaternary ammonium compounds which impart washing-fast, water-repellent properties to textiles are produced by adding tertiary aliphatic or heterocyclic amines to compounds of given general formula. In examples, 5-octadecyloxymethyl-2-hydroxybenzoic acid, 2-octadecyloxymethyl-4-chlorophenol, and 4-octadecyloxymethylanisole are condensed with para-formaldehyde in ethereal hydrochloric acid solution and the brown wax-like masses obtained are heated with pyridine at 60-65° C. until water-soluble products are obtained. C.

Bias-cut Fabrics: Coating or Printing. J. C. Jackson and J. G. Brown. B.P. 553,837 of 10/12/1941: 8/6/1943. In a method of printing or coating fabrics which are liable to stretch or suffer distortion while under treatment, the fabric is applied to a stenter frame and the printing or coating material is applied to its surface while passing under a roller, doctor blade or the like which bears on the fabric between the stenter clips, the fabric being supported from the other side by a roller, table or the like at or close to and on both sides of the point where the doctor blade, roller or the like acts. The supporting roller or table preferably has a resilient surface. C.

Nylon: Dyeing and Reserving. Courtaulds Ltd. and J. H. Macgregor. B.P. 553,872 of 6/11/1941: 9/6/1943. Improved dyeing effects can be produced on nylon with direct cotton dyes by dyeing in the presence of 0·1-1·0 per cent. of a cationic soap. The nylon may be treated with the cationic soap before dyeing or the dyeing may be carried out in an acid bath containing not more than 1 per cent., calculated on the weight of the nylon, of the cationic soap. The absorption of direct cotton dyes from an acid dyebath by nylon is inhibited by the presence of 2 per cent. or more of a cationic soap, calculated on the weight of the nylon. The requisite quantity of the soap may be added to the dyebath or the nylon may be pretreated with the cationic soap, or these two procedures may be combined. Inhibiting the absorption of direct cotton dyes by nylon is

particularly valuable when it is desired to produce two-tone or tone-in-tone effects on mixed fabrics containing nylon and another fibre, e.g. viscose. C.

Animal Fibres: Dyeing. G. T. Hug (to E. I. Du Pont de Nemours & Co.). U.S.P.2,297,701/3 of 6/10/1942 (through *Chem. Abs.*, 1943, **37**, 1610). U.S.P. 2,297,701. Wool is heated in an aqueous bath containing a sulphur-containing vat-reducing agent, e.g. $\geqslant 4$ oz. per gal. formamidine sulphinic acid, but no added alkali or colouring matter; it is then rinsed, and dyed for $\geqslant 3$ min. in an alkaline aqueous bath containing a reduced anthraquinone or indigoid vat dye, and oxidised. U.S.P.2,297,702. To increase its affinity for organic compounds (e.g. vat dyes and azoic ice colours which dissolve in water only after transformation into an OM-type compound, in which M=an alkali metal), animal fibre is impregnated at 160-300° F. with a sulphur-containing vat reducing agent, the concentration of the agent and the temperature and duration of treatment being less than those which would reduce the fibre to a rubber-like condition. U.S.P.2,297,703. (G. T. Hug and G. O. Linberg; to same assignee). Use is made of a water-soluble bisulphite or hyposulphite in a smaller quantity than would reduce the wool treated to a rubber-like condition, the material being dried at 240-275° F. W.

Mothproofing Agents. H. Martin, R. Hirt and H. Zaeslin (to J. R. Geigy, A.-G.). U.S.P.2,299,834 of 27/10/1942 (through *Chem. Abs.*, 1943, **37**, 1880). Details are given of the manufacture of halogen-substituted acylamino sulphonic acids, which are suitable for use as mothproofing agents. W.

Fur Carrotting. C. F. Fabian. U.S.P.2,300,660/2 of 3/11/1943 (through *Chem. Abs.*, 1943, **37**, 2196). U.S.P.2,300,660. A carrotting solution contains perchloric acid (68-70 per cent.), 4-9, hydrogen peroxide (100 vols.), 14-20, and nitric acid (40 Bé.), 1·5-3 per cent. by weight. U.S.P.2,300,661. A carrotting solution contains water, nitric acid (12 per cent. or more), hydrogen peroxide, and gelatin (3 per cent. or less). U.S.P.2,300,662. A similar solution is used, the gelatin being replaced by an amino acid obtained by protein degradation. W.

Wool Reserving Agents. W. Zerweck and H. Ritter (to General Aniline & Film Corp.). U.S.P.2,301,002 of 3/11/1942 (through *Chem. Abs.*, 1943, **37**, 2194). Reserving agents for wool are prepared by heating phenol, sulphur and a water-soluble tin compound, e.g. stannous chloride, in an alkaline medium, e.g. an aqueous sodium hydroxide solution, to produce a water-soluble tin complex of the sulphurized phenol, and then heating the tin complex with a sulphurous salt, e.g. sodium sulphite. W.

Cellulose Derivative Fabrics: Shrinking for Delustring. Celanese Corporation of America. U.S.P.2,308,511. As a preparation for delustring, cellulose derivative fabrics are treated with a liquid while moving down an inclined surface so that free shrinkage occurs. Obstructions keep the fabric spread out and thus prevent longitudinal creasing. C.

Aluminium Cellulose Glycollate Coating Composition. Dow Chemical Co. U.S.P.2,308,664. A coating composition comprises an emulsion of 1-15 parts of wax in an ammoniacal solution of aluminium cellulose glycollate (1 per cent. of the Al salt). C.

Anthraquinone Vat Dye: Conversion into Pigment Form. Sherwin-Williams Co. U.S.P.2,308,711. A solid anthraquinone vat dye is mixed with a liquid aniline and this base is then removed, leaving the dye in a form suitable for use as a pigment. C.

Pigment Printing Paste. Hercules Powder Co. U.S.P.2,308,763. A pigment is dispersed in an emulsion of a film-forming agent in an organic solvent and a terpene ether is added as a penetrating agent. C.

Hygrostatically Controlled Yarn Drying Apparatus. M. W. Mayes (Marietta, Ga.). U.S.P.2,308,767. The yarn is conveyed through a conduit in which a forced draught of air is established. The conduit is fitted at an intermediate point with a by-pass, the entrance to which is through a valve that is operated by hygrostatically controlled means, so as to regulate the current of air through the conduit. C.

Cellulose Acetate Azo Dye. Eastman Kodak Co. U.S.P.2,309,129. Cellulose acetate is coloured by means of the azo dye

$$X\cdot C_6H_2(NO_2)_2\cdot N:N\cdot C_6H_2Me(OMe)\cdot NH\cdot CH_2\cdot CH_2\cdot CH_2\cdot OH,$$

(6) (2,4) (2) (5) (4)

where X is halogen. C.

Hosiery Boarding Machine. Paramount Textile Machinery Co. U.S.P. 2,309,659. Apparatus for setting the shape of textile articles (e.g. stockings) comprises a (steam) chamber that can be closed and locked, forms mounted on rocker arms for receiving the articles, and a mobile carrier, with shaft and stop bar common to all the arms, that conveys the forms into and out of the chamber. C.

Stencil Printing Machine. Linen Guild, Inc., New York. U.S.P.2,309,914. A machine for the continuous printing of fabric by means of a stencil comprises means for advancing the fabric over a table and causing it to halt while a stencil is lowered on it, a carriage with a scraper for applying the colour, and means for raising the stencil at the end of the stroke of the scraper and advancing the fabric another stage. C.

Triazene Printing Emulsion. Interchemical Corporation. U.S.P.2,309,946. A composition that forms a textile printing paste on mixing with aqueous fluid consists of (*a*) a solution of an organic film-forming agent in an organic solvent, immiscible with water but capable of forming a stable emulsion of the water-in-oil type and containing (*b*) a diazoamino or diazoimino compound, microscopically dispersed, which remains unaffected in the organic continuous phase if solution (*a*) is emulsified with alkali but forms a dispersible diazo salt if (*a*) is emulsified with a strong acid. C.

Yarn Drying Apparatus. G. T. and W. C. King (Lancaster, S.C.). U.S.P. 2,309,961. Apparatus for drying yarn (warps) consists of two heated drums, one large and one small, mounted for parallel rotation in close proximity, and a hood that almost encircles the smaller drum except for an air-inlet slot at the bottom and for the top portion where it ceases to be concentric with the drum and runs off at a tangent until it almost reaches the large drum. A draught is established by means of a fan in the chamber bounded by the hood and the two drums. The yarn passes from the large to the small drum. C.

Azo Dye Coupling Components Printing Emulsion. Interchemical Corporation. U.S.P.2,309,982, 2,310,012 and 2,310,013. (1) and (2) A printing emulsion has as external phase a solution of a film-forming substance in a volatile organic solvent and as internal phase an aqueous liquid; one phase contains the amine and nitrite ingredients for forming a diazonium salt and the other phase contains a coupling component. (3) The claim is for diazotisation of a base while in contact with water that forms the inner phase of a water-in-oil emulsion. C.

Cloth: Tentering to Pre-determined Width. Pacific Mills. U.S.P.2,310,245. Cloth with irregular selvedges and wider than the desired width is wetted and fed to the open clips of two series of tenter clips that induce slackness in the weft by engaging the web and withdrawing its selvedges outwardly of the open clips, the tenter clips are made to diverge to effect automatic closure on the opposite selvedges while the fabric is advancing faster than the clips so that fabric accumulates between the clips to provide warp slackness, the clips are then made parallel to bring the selvedges parallel and spaced apart the desired width while retaining some of the weft slackness, and the fabric is then shrunk warp- and weft-wise. C.

Copper Salt Rot-proofing Composition. Albi Chemical Corporation. U.S.P. 2,310,257. A rot-proofing composition contains a copper fluoride, arsenite or arsenate, ammonia, a hydroxy-amine of low volatility that stabilizes dilute cuprammonium salt solutions and enhances their wetting and impregnating powers, and a mordant consisting of phthalic acid and naphthol compounds. C.

Plastic Printing Film: Application. Pittsburgh Plate Glass Co. U.S.P. 2,310,436. A dyed fabric is printed with a discontinuous film comprising 10-15 parts of urea-formaldehyde resin in its final stage of hardening upon the fabric, the film containing 6-15 parts of sebacic acid, modified alkyd resin as a plasticizer, and 30-65 parts of pigment that renders the film opaque to and contrasts with the ground colour. C.

Yarn Dyeing Apparatus. H. H. Denhof (New York). U.S.P.2,310,764. The yarn is mounted on a reel which travels over a series of heated dye vats and a corresponding series of vessels containing heated after-treatment liquids, the vats and vessels containing different dyes, etc., and means are provided for plunging the yarn into a pre-determined vat and vessel and then passing it to a heated drying cylinder. C.

Upholstery Fabric. Conrad Hermann (Germany; vested in the U.S. Alien Property Custodian). U.S.P.2,310,785. Two laminae of regenerated cellulose, fully shrunk, are bonded together to make up the thickness of horsehair, one sheet being under compression and the other under tension so that the structure tends to form a spiral. C.

Textile Dressing Emulsion. Stein, Hall & Co., Inc. U.S.P.2,310,795. An emulsion for treating textiles consists of an alkali-soluble protein (5-30 parts), an organic solubilising agent for protein (3-10), urea (5-20), water (5-75), and a hydrocarbon of b.p. 50 to 250° C. C.

Vinyl Plastic Waterproofing Agent. S. Buchsbaum & Co. U.S.P.2,310,889. A composition for use in the manufacture of raincoats, gloves, etc., comprises a vinyl chloride-acetate co-polymer (60-90 per cent.) a thermo-setting phenol-aldehyde resin (1-10), and a methyl methacrylate resin (5-35). C.

Laminated Fabric: Production. Celanese Corporation of America. U.S.P. 2,311,012/3. (1) Stiffened fabric is produced by hot pressing together two cellulosic fabrics and an intermediate layer of cellulose derivative fabric containing a plasticiser. The layers are placed on a damp surface with what is intended to be the reverse face downwards. (2) This claim is for the pressing machine. C.

Formaldehyde: Application in Finishing. E. I. Du Pont de Nemours & Co. U.S.P.2,311,027 and 2,311,080. (1) Textile material is impregnated with formaldehyde solution and an acid-reacting catalyst, dried, and immersed in an organic base heated to a temperature at which reaction sets in. (2) The temperature is specified as 70-200° C. and the process is claimed to prevent "objectionable embrittlement" of the material. C.

Mechanical Fabric: Increasing Porosity by Waterproofing. Albany Felt Co. U.S.P.2,312,710. The porosity to water vapour of a fabric that has to be exposed to heat and moisture (e.g. a drying machine felt or Sanforizing range blanket) is increased, and its useful life thereby prolonged, by immersion in a waterproofing agent, centrifuging, and drying. C.

Semi-stiff Collar: Construction. E. I. Du Pont de Nemours & Co. U.S.P. 2,312,925. The fabric plies are bonded together by means of a mixture of a methyl methacrylate resin and a softer resin of the vinyl, alkyd or aromatic sulphonamide-formaldehyde type, free from oils. The mixed resin does not flow at the temperature of boiling water. C.

Cellulose Derivative Particles: Dyeing. Maas and Waldstein Co. U.S.P. 2,313,076. Cellulose ester or ether particles are suspended in water and treated with an alkaline solution of a leuco colour base followed by a developing agent that includes an acid and deposits the insoluble dye within the particles. C.

Thermoplastic Fabric: Removing Creases. Celanese Corporation of America. U.S.P.2,313,173. Creases are removed from fabrics containing thermoplastic yarns, without applying pressure with a heated surface, by subjecting the tautened fabric, at its natural moisture regain, to a temperature of 250-900° F. for 0·1 to 15 seconds. C.

Animal Fibres: Protection Against Pests. H. Krzikalla and O. Ferrares (to I.G. Farbenind. A.-G.). D.R.P.706,680 of 30/4/1941 (through *Chem. Abs.*, 1943, **37**, 2196). Animal fibres are protected against pests by using a sulphonic acid ester of the type $R_1SO_2OR_2$ (R_1 = the residue of a halogenated hydroxybenzene, and R_2 = a substituted aryl residue). W.

Fibres: Rendering Water-repellent. A. Doser, O. Bayer and K. Hintzmann (to I.G. Farbenind. A.-G.). D.R.P.719,056 of 5/3/1942 (through *Chem. Abs.*, 1943, **37**, 1880). Plant or animal fibres are rendered water-repellent by treatment with substances containing hydrophobic groups, e.g. salicylic acid or thiosalicylic acid groups, capable of forming stable complexes, and with soluble metal compounds, e.g. zirconium salts capable of combining into stable compounds. The treatment can be done at any stage of processing and in any sequence. W.

Synthetic Fabrics: Refining. E. Elöd and H. Rudolph (to E. Elöd). D.R.P. 719,433 of 12/3/1942 (through *Chem. Abs.*, 1943, **37**, 1879). Synthetic fabrics, e.g. cellulose hydrate rayon or mixtures of rayon and staple fibre, are saturated, before mercerisation, with aqueous emulsions containing wool fat or other high-molecular fat or waxes, and dried. W

5—ANALYSIS, TESTING, GRADING AND DEFECTS

(A)—Fibres

Cellulose Fibres: Behaviour under the Electron Microscope. A. Hamann. *Kolloid Z.*, 1942, **100**, 248-254 (through *Bull. Inst. Paper Chem.*, 1943, **13**, 235 and *Chem. Abstr.*, 1943, **37**, 1597[6]). Under the influence of the radiation with electrons in the electron microscope, there is a gradual loss in substance until a complete destruction of the fibre structure occurs. The author followed these changes in cellulose with moving pictures. The changes often take place in a violent manner. Methods of preparing specimens are discussed. C.

Cotton Fibre: X-ray Structure and Strength. H. W. Barre and E. E. Berkley. *Proc. Annl. Conv., Assoc. Southern Agric. Workers*, 1942, **43**, 83-84 (through *Chem. Abstr.*, 1943, **37**, 1874[5]). There is a reasonably good correlation between the orientation of crystalline cellulose with respect to the long axis of the fibre and the tensile strength as determined by the Chandler bundle method. The X-ray patterns are not much changed in the early stages of biological decay though the strength may be greatly reduced. Varieties and strains of cotton vary widely in the arrangement of crystalline cellulose in the fibre. Some have a characteristically small angle between the spiral of the cellulose strands and the fibre axis, whilst others have a large angle; the angle ranges from 20 to 44°, approx. The fibre structure of all varieties is apparently affected by climate, especially heat and moisture. C.

Lanital, Aralac and Soybean Fibres: Microscopic Identification. G. L. Royer. *Amer. Dyes. Rept.*, 1943, **32**, 165-166. Lanital, Aralac and soybean fibres can be identified by the appearance of diamond shapes on treatment with concentrated sulphuric acid. The dry fibres are teased apart and placed under a cover glass on a slide under the microscope and a drop of concentrated sulphuric acid is placed on the slide. The effect of the acid as it penetrates into the individual fibres can be followed by means of the changes in index of refraction at the diffusion front. If dyed fibres are used the acid destroys or dissolves the dye and this aids in making the diffusion front more prominent. Just before complete diffusion is reached, a narrow strip remains unpenetrated in the centre of the fibre. At this time the fibre suddenly seems to contract slightly at certain places along the sides and at these places small well-formed diamonds appear within the fibre. Shortly thereafter, as the acid penetrates to the very centre of the fibre, the diamonds slowly close again to cracks perpendicular to the edges of the fibre and then disappear entirely. It is believed that the diamonds form as a result of the stress in the fibre when the latter is partially softened by the acid. Complete softening of the fibre releases the stress and the figures disappear. Tests with lower concentrations of acid on Aralac, Lanital and soybean fibres have shown that the diamonds form at different times after adding the acid depending both upon the type of fibre and the acid concentration. It has been possible to differentiate between the different types of synthetic protein fibres on this basis. C.

Textile Fibres: Electrical Properties. J. W. Illingworth. *Textile Recorder*, 1943, **60**, Feb., 39-43; March, 42-46; April, 36-39; May, 46-50; June, 52 (correspondence). A broad general review dealing with (1) Electrical insulating power of fibres, and the influence of electrolyte content, humidity and temperature, (2) Electrical measurement of moisture regain (including the Shirley Moisture Meter), and (3) Static electrification, its effects on yarn strength, and its suppression. C.

Textile Fibres: Moisture Relations and Drying Problems. A. C. Walker. *Textile Research*, 1943, **13**, No. 5, 15-35. A report of a lecture on the effects of temperature and humidity on the physical properties of fibres. The subjects covered are (1) moisture absorption and desorption (based on the work of Urquhart and of Wiegerink), (2) hysteresis in the effects of humidity on moisture sorption and electrical resistance, (3) combined effects of heat and humidity during the drying of textiles (*see* Wiegerink's work), (4) the effects of

scouring and finishing agents on sorption by wool, rayon and cotton, (5) package drying of cotton yarn (advantages are claimed for a high rate of air flow), and (6) the theory of moisture distribution in fibres, with special reference to the bad effects on the electrical resistance of drying cotton so far that the initial monomolecular layer of moisture is removed from the internal surfaces. C.

Cellulose Fibres: Honeycomb Structure. A. Wieler. *Cellulosechemie,* 1942, **20**, 50-52 (through *Chem. Abstr.*, 1943, **37**, 2172[6]). Thickening of the plant cell wall is not due to the formation of a definite chemical compound but to the laying down of an organised structure, as indicated by the work of Dippel. The fact that this is a honeycomb structure was indicated by microscopic studies. The genesis of such structures is discussed briefly, and the hypothesis advanced that this is the result of a precipitation of carbohydrates from solution. A microscopic study of sections of various staple fibres lends support to this, because all of them show such a honeycomb structure (after treatment with acid) and all of them were precipitated from cellulose solutions. C.

Cotton Fibres: Swelling and Solution. W. Shramek and A. Stenzel. *Cellulosechemie,* 1942, **20**, 38-43 (through *Chem. Abstr.*, 1943, **37**, 2172[4]). The authors have made motion pictures of the swelling and gradual disintegration and solution of cotton fibre and seek to interpret their results by reference to the 17 photomicrographs included in the original paper. The secondary layer of the cell wall appears to dissolve spirally. Differences in behaviour between cotton and spruce tracheids are briefly discussed. C.

Fibre Refractometer. K. Freeman and J. M. Preston. *J. Textile Inst.*, 1943, **34**, T19-28.

Nylon Fibre: Production and Properties. *Silk and Rayon,* 1942, **16**, 670-2; 1943, **17**, 26-30, 88-92. A popular account is given of work that led up to the discovery of nylon and its subsequent development. The following physical properties are recorded by Messrs. Du Pont de Nemours & Co.: Breaking load, dry 5 gm., wet 4·5 gm., per denier; Extensibility, dry 20 per cent., wet 30 per cent.; Loop strength, 95 per cent. of tensile strength (dry); Recovery from stretch, complete up to 8 per cent. stretch, 91 per cent. after 16 per cent. stretch; Specific gravity, 1·14; Moisture regain as follows:—

R.H. % :	10	20	30	40	50	60	70	80	90
Regain % :	0·75	1·35	1·95	2·50	3·00	3·70	4·55	5·55	6·70

Dyeing properties are reviewed and dyeing and printing recipes given. C.

Wyoming Wools: Fleece Weights, Yield and Relative Values. R. H. Burns. *Natl. Wool Grower,* 1943, **33**, No. 4, 13. W.

(B)—YARNS

Single Carded Yarns: Contraction in Spinning. A. J. Woodbury. *Textile World,* 1943, **93**, No. 3, 81. Middling Texas Upland cotton, $1\frac{1}{16}$-in., was spun from single roving into yarns ranging from 12's to 29·25's (nominal) with twist factors, 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$, 5, $5\frac{1}{2}$ and 6, and the contraction measured by reference to the length of a two-ply knitting yarn (of about the same thickness as the ribbon of roving) that was fed at the same time to the front rollers, about 120 yards being spun in each test. The results are summarised in a table and graphs of percentage contraction against twist factor. They show that (1) the contraction increases with rise of twist factor, (2) the slope of the curve is less steep from t.f. 3 to 4 than above 4, and (3) the rate of change in contraction is greater for counts up to 20 than for the finer counts. C.

(C)—FABRICS

American Textile Standardisation Agencies. W. D. Appel. *Proc. 8th Amer. Sci. Congr.*, 1942, **7**, *Phys. and Chem. Sci.*, 209-215 (through *Chem. Abstr.*, 1943, **37**, 1873[6]). The agencies engaged in standardizing textiles in the United States are briefly described. Progress in the application of scientific methods, the establishment of nationally recognized trade practices, improvements in purchase specifications, and the search for guides to quality in relation to performance are discussed. C.

Blanket-and-Sheet Combination: Air Permeability and Thermal Tranmission. H. F. Schiefer. *J. Res. Natl. Bur. Stnds.*, 1943, **30**, 209-214. Blankets varying greatly in air permeability were tested alone and in combination with one and with two sheets for air permeability and thermal transmission. The air

permeability of the sheets was low in comparison with that of the blankets. The air permeability of the combination of a blanket and one or two sheets was found to be practically independent of the air permeability of the blanket and was equal to or slightly less than that of the sheet or sheets alone. The thermal transmission in still air decreased considerably when one or two sheets were used in combination with a blanket. The average decrease in thermal transmission for all the blankets tested was 7 per cent. when a sheet was used under the blanket, 15 per cent. when the sheet was used over the blanket, and 19 per cent. when the blanket was used between two sheets. In air moving 15 miles per hour, the decrease in thermal transmission was considerably greater when the blanket was used between two sheets. The weight, thickness, and breaking strength of the blankets increased on laundering and the compressibility and air permeability decreased. These changes are attributed to the shrinkages of the blankets during laundering. The compressional resilience of the blankets and the air permeability of the combination of a blanket and one or two sheets were not affected significantly by the number of washings. It is concluded that for outdoor use, where protection against the wind and rain or snow is important, as in an open lifeboat at sea, a combination of a blanket and sheet or wind-resistant cloth would afford far more protection than a blanket alone. C.

Cotton, Linen and Wool Fabrics: Deterioration in Storage. Ruth E. Rogers and Margaret Hays. *Textile Research,* 1943, **13**, No. 6, 20-35. Bleached cotton sheeting (74 ends, 66 picks per inch, 4·7 oz. per sq. yd., 4·9 per cent. of starch filling), filled and desized; bleached linen sheeting, desized (56 × 56; 5·2 oz.); and bleached, degreased woollen serge (78 × 72; 8·4 oz.) were stored in the dark at average temperatures of 78 and 102° F. for 4 years and in diffused light at 78° F. At the start and at intervals of 6 months samples of the cellulosic materials were tested for breaking load, fluidity in cuprammonium and copper number, and the serge was tested for breaking load, elongation, cystine sulphur, moisture, and methylene blue absorption. Changes in light reflectance were also measured after 2 and 4 years for materials stored in the dark. Full particulars are recorded, with the analysis of variance of the data. Cotton and linen samples were stored in the dark both wrapped and unwrapped but wrapping did not affect the results significantly. The results show that deterioration was more severe at the higher temperature and in the light and that desized cotton kept better than filled cotton. For cotton and wool the extra damage consequent on exposure to diffused light was about the same as that due to raising the temperature, but for linen it was greater. C.

Cotton and Silk: Tendering. *Textile Weekly,* 1942, **30**, 50, 163, 457, 569-574; 1943, **31**, 279-281. A broad review of the "tendering problem in textiles" under the main headings: (1) Sizing, (2) Steeping, (3) Scouring and bleaching, (4) Silk, (5) Effects of Aniline black, and (6) Effects of light. C.

Damaged Fabrics; Detection of Acid and Basic Substances in —. C. Whitworth and D. W. Poxon. *Nature,* 1943, **151**, 198-199. When a solution of a nickel salt is incompletely precipitated with dimethyl glyoxime and filtered, there is obtained a solution which on application to a fabric damaged by alkali (e.g. caustic soda) causes the damaged fibres to take on a pink colour which is easily visible. This test has been tried with cotton and woollen fabrics. Similarly, a saturated solution of silver chromate (6N.), when applied to fabrics damaged by acids, shows a dark red-brown colour. This test did not work so well with damage by hydrochloric acid on cotton; wool damaged by this acid gives a white spot inside a dark ring. With coloured materials, the coloured precipitate is not so noticeable to the naked eye, but is easily visible under the microscope even when the fabric and precipitate are the same colour. C.

Dyed Utility Cloths: Fastness Tests. L. Pink. *Silk and Rayon,* 1943, **17**, 294, 316. The author reproduces the tests for fastness to washing, light and perspiration laid down in the appendices to Utility Cloth Specification B.S./B.O.T. 23, and shows how they are related to the findings of the Fastness Committee of the Society of Dyers and Colourists. C.

Fire-proofed Cloth: Testing. E. Schulte, L. Nusser and P. Kunz. *Official Digest, Federation Paint and Varnish Production Clubs,* 1942, No. 214, 123-134 (through *Textile Research,* 1943, **13**, No. 6, 37). Sixteen burning tests for textiles and wood are reviewed and the following new method is proposed for use

with camouflage fabrics of the painted Osnaburg type. The specimen, 4 in. × 15 in., is tautened horizontally under a load of 1 lb. over two fine copper wires. A heater containing a 450-watt coil (115 volt. a.c.) is placed at one end an inch above the surface. When the fabric bursts into flames the heater is removed and the ignition time, burning time and area of charring are recorded. The ignition time is said to be quite reproducible; it was 9-9½ secs. for untreated Osnaburg fabric. The burning time and area of charring are more variable. Results are given for plain Osnaburg and the same cloth treated with linseed oil and borax fire resistant paint, both before and after a fire-proofing treatment with (1) 5 or 10 per cent. magnesium sulphate followed by 3 or 6 per cent. solution of borax and boric acid (7 : 3 mixture); (2) 6 per cent. borax/boric acid; (3) 10 per cent. sulphamic acid. The longest ignition time, 17·5 secs., was that for unpainted cloth proofed by 10 per cent. magnesium sulphate + 6 per cent. borax/boric acid. All the painted samples ignited in 15-17 secs. The shortest burning times and smallest areas of charring were those for painted samples proofed by methods (2) and (3). C.

Terry Towels: Water Absorbency Tests. V. B. Holland. *Amer. Dyes. Rept.*, 1943, **32**, 167-170. Tests have been made on finished terry towels by (1) the drop-square test which consists in dropping a square of material on the surface of a beaker of water and noting the time required for the square to take up water and sink; (2) the Larose method in which samples are placed on wet porous plates under a definite pressure for measured periods of time and the take up of water determined, and (3) the wick method in which the rise of water in a strip is noted. The results show that where the terry towel has a uniform pile, consistent checks may be obtained by the three methods, but differences occur when terry towels having woven figured designs are tested. Both the wick and Larose methods may serve as standard procedures for measuring the water absorbent qualities of terry towels. The wick method is somewhat simpler and faster, due to less manipulation, but the Larose method has the advantage in that it applies pressure in simulating ordinary usage. The drop square method is not suitable for a standard procedure but serves for routine testing in the mill. C.

Textile Materials: Testing. Committee D-13, American Society for Testing Materials. *A.S.T.M. Proceedings*, 1942, **42**, 423-440. The annual report of the activities of Committee D-13 and its sub-committees, indicating the inquiries still in progress. Recommended changes in specifications and methods of testing have already been abstracted. C.

Fabrics: Bursting Resistance. H. Sommer. *Textilberichte*, 1941, **22**, 516-520, 564-570 (through *Chem. Zentr.*, 1942, i, 953 and *Chem. Abstr.*, 1943, **37**, 2586[3]). Curves and tables show the influence of surface area of the sample, relationship between tenacity and elongation, the stress-strain relationship in bursting tests, a comparison between bursting and tenacity values, and examples of the appropriate applications of the results of bursting tests. Tenacity tests on strips give results which are too low because the lateral contraction and uneven distribution of stresses are more pronounced than in the bursting test. The necessary calculations and the use of bursting tests in evaluating material for various performance purposes are described. C.

Full-fashioned Cotton Stockings: Serviceability. Margaret B. Hays, Ruth E. Rogers and Mary C. Boyer. *Amer. Dyes. Rept.*, 1943, **32**, 187-190, 209-211. Three American-Egyptian cottons (Pima, S × P, and P × (S × P)) of $1\frac{9}{16}$-in. staple and an Upland cotton (Coker Wilds) of $1\frac{3}{8}$-in. staple were spun under controlled conditions into 90's/2 and 120's/2 combed yarns, which were gassed and mercerised and then knitted into full-fashioned hosiery. The hose were worn by student nurses at a Washington hospital. Samples were removed at regular intervals of six periods of wear and laundering and were subjected to physical and chemical tests. The remaining hose were continued in service until worn out. The average length of service was 19·9 days. The three American-Egyptian cottons produced stronger yarns and hose with higher bursting strength than did the shorter staple Coker Wilds cotton. The fluidity values showed that all four cottons were of good quality chemically. Differences in the lengths of service between hose made from the different cottons were not statistically significant. However, the hose made from the Coker Wilds appeared to be the least satisfactory when the numerical values for the length of service, time of first break in the leg portion, and the percentage of

hose without breaks in the leg portion at the time of discard were considered. The S × P hose probably would be the most satisfactory. As evaluated by fluidity there was little difference in chemical deterioration among the four cottons. In the Frazier test for elastic properties, the differences between the four cottons were statistically significant, but were not of practical importance. Service produced a significant amount of deterioration as measured by bursting strength and fluidity. The variation attributable to individual wearers was significant when evaluated by the sensitive fluidity test. C.

(D)—OTHER MATERIALS

Cellulose Acetate: Mechanical Properties. W. N. Findley. *Proc. Amer. Soc. Testing Materials,* 1942, **42**, 914-922 (Discussion, 923-926). In extension of his work on the strength of cellulose acetate the author now describes measurements of creep on shaped specimens, 0·31 × 0·30 × 2·5 inches at their central portions, under loads of 30-150 lb., over periods up to 18 months, in a controlled atmosphere at 77 ± 1° F. and 50 ± 2 per cent. R.H. The data are analysed to show the effect of the stress on the rate of creep and on the creep for a given time, and also the effect of the age of the specimen on the rate of creep and the time for fracture. Under a suitable load, two stages of creep were observed, a first stage of relatively rapid change that could be represented by the equation $S = 1440r^{0.065}$ (S = stress, r = rate), and then, after a brief transition region, a second stage of slower creep. The experiments did not reveal any third stage of rapidly increasing creep as exhibited by metals. Ageing caused a marked decrease in the rate of creep during the first stage and also shortened the time for fracture under a constant load. C.

Starch Adhesives: Testing. A. Herman and F. M. Knowlton. *Proc. Amer. Soc. Testing Materials,* 1942, **42**, 956-961 (Discussion, 962-967). A series of simple tests are described for assessing the value of starch pastes as adhesives for bottle labelling and making paper packages. The paste is analysed for water, ash, acidity or alkalinity and its viscosity is measured in a falling ball instrument. Films are cast about 0·003 in. thick on glass or paper, dried, conditioned in atmospheres at 20 and 80 per cent. R.H. and tested for strength, brittleness, colour, and "hygroscopicity," which is really the sensation of dampness to the touch after conditioning at 80 per cent. R.H. C.

Olive Oil: Fluorescence and Colour. A. Paleni. *Ann. chim. applicata,* 1942, **32**, 189-196 (through *Chem. Abs.*, 1943, **37**, 1285). Olive oils from Italy and the Near East were investigated for their extinction coefficients, light-absorption curve in visible and ultra-violet light, fluorescence of the oil and its acetone extract and the luminescence developed by the oil. The fact that there was no relationship between colour, fluorescence, luminescence and light absorption suggests that they are due to different causes. It is concluded that the cause of fluorescence could only be revealed by chemical methods. W.

Determining the Concentration of Oil Solutions in Benzine: Electrical-capacity Method. V. M. Kopeĭkovskiĭ. *Trudy Krasnodar. Khim. Tekh. Inst. Zhirovoĭ Prom.*, 1940, No. 8, 61-102; *Khim. Referat. Zhur.*, 1940, No. 10-11, 124 (through *Chem. Abs.*, 1943, **37**, 1286). The method proposed is based on the fact that benzine and organic solvents in general used for the extraction of oils differ from vegetable oils in their dielectric constants. The dielectric constant is measured by a heterodyne method. Experiments on sunflower-seed oil, castor oil and cottonseed oil indicate that it is possible to determine the content of oil in benzine solutions within 0·1 per cent. in 2-3 min. (as compared with 3-4 hr. by the gravimetric method). The method can be used for production control in oil-extraction plants and for the control and investigation of processes of polymerisation, drying, water absorption, ageing of colloids, determination of the stability of emulsions and suspensions, etc. W.

PATENTS

Yarn Package Density Testing Apparatus. Manville Jenckes Corporation. U.S.P.2,313,336. Apparatus for testing the density of hollow yarn packages for dyeing and the like comprises a support on which the package is mounted, a presser foot having a number of contact members each of which spans several windings, a stem on which the presser foot is mounted, means for bringing the foot down on the package under an initial pressure, means for increasing the pressure by a pre-determined amount, and a device for indicating how much the package has been compressed under the load. C.

Porosity Recording Device. General Electric Company. U.S.P.2,310,111. The porosity of sheet material is graphically recorded by bringing one side of the sheet into intimate contact with a film that contains a sensitive compound of selenium and sulphur and exposing the other face to a source of mercury vapour. A blackened image is formed, in conformity with the size and distribution of pores in the sheet material. C.

Hosiery Sheerness Meter. R. K. Laros Silk Co. U.S.P.2,312,953. The apparatus consists of an electric lamp supplied from a constant voltage source, an adjustable diaphragm, and a light-sensitive device with pointer and scale graduated in " degrees of sheerness." Room is provided between the diaphragm and the recording device for a double thickness of the hosiery and a filter of approximately the same colour. C.

7—LAUNDERING AND DRY CLEANING

(A)—Cleaning

Aryl Sulphonates and Soap: Application in Hard Water. Virginia Ester, Ruth Donohue, Mildred Barr, Florence B. Castonguay, Lois Dale, D. Shepard and Rachel Edgar. *Amer. Dyes. Rept.*, 1943, **32**, 121-122, 135-141. The washing of undyed cotton, linen, spun cellulose acetate rayon, spun regenerated cellulose rayon, silk and wool fabrics with 0·2 per cent. of a sodium aryl sulphonate in hard water at 40° C. has been compared with the washing of these fabrics in hard water with or without 0·5 per cent. of a sodium soap by analysis of the residual fabrics after 1, 10, 20, 30, 40 and 50 washings. The fabrics were all analysed for absorption of light, ash, distribution of yarns by number and weight, elongation at break, strength and weight; the wool was also analysed for moisture, sulphate and total sulphur. Results are tabulated and discussed. The ash increased with washing and was generally greater with soap than with aryl sulphonate. The shrinkage of wool was slight when washed with soap and great when washed with the aryl sulphonate. Although the wet strengths of all the fabrics was lowered by washing, only the linen of high yarn counts lost so much as half its initial strength during 50 washings, a criterion for failure in use. The cellulose acetate rayon, cotton and regenerated cellulose rayon lost 8, 15 and 25 per cent., respectively, in wet strength during 50 washings whether washed with hard water alone or with aryl sulphonate or soap. Silk washed with aryl sulphonate showed a high wet strength, compared with silk washed in hard water, with or without soap. The wet strength of wool washed with hard water and soap was high compared with that of wool washed in hard water, with or without aryl sulphonate. Silk suffered a 33 per cent. decrease in elongation at breaking load during 50 washings by any of the methods studied. Linen lost approximately the same weight when washed in hard water alone or with aryl sulphonate or soap. Regenerated cellulose rayon, cotton, silk and wool increased in weight on washing with soap, and silk and wool increased in weight on washing with aryl sulphonate. Wool washed with aryl sulphonate increased in total sulphur, but not in sulphate, whilst wool washed in hard water with or without soap changed little in total sulphur or sulphate. Only in the felting of wool dried without stretching did the aryl sulphonate in hard water alter any of the six materials more than they were changed by washing in hard water alone. C.

Wool and Cotton Mixture Blankets: Effects of Laundering. H. F. Schiefer, L. R. Mizell and F. T. Mosedale. *J. Res. Natl. Bur. Stnds.*, 1943, **30**, 203-208. Tests were made on 33 part-wool blankets of 8 constructions, containing either 50 per cent. of wool and 50 per cent. of cotton or 25 per cent. of wool and 75 per cent. of cotton, and on a regular all-wool army blanket, before and after laundering. The results show that the unlaundered blankets containing 75 per cent. of cotton and 25 per cent. of wool were more compressible, thicker, more permeable to air and had a greater insulating value than the unlaundered blankets containing 50 per cent. of cotton and 50 per cent. of wool and the all-wool blanket. After 10 launderings the two series of blankets were essentially alike in these properties. The blankets increased in thickness, breaking strength, and weight per square yard with laundering and decreased in compressibility, air permeability and thermal transmission. These changes resulted from the shrinkage of the blankets during washing. All the blankets were considerably felted after the tenth washing. The compressional resilience of the unlaundered 25 per cent.-wool blankets was lower than that of the 50 per cent.-wool

blankets and very much lower than that of the all-wool blanket. It increased with laundering, primarily because of the felting produced. Significant differences in colour fastness and wear resistance were not observed. The shrinkages of the part-wool blankets were nearly twice the shrinkage of the all-wool blanket. It is suggested that the part-wool blankets should prove satisfactory for use in barracks, provided allowance is made for shrinkage. C.

Alkalis containing Water Glass: Use in Laundering. A. Foulon. *Leipzig. Monatschr. Text.-Ind.*, 1941, **56**, 225-226 (through *Chem. Zentr.*, 1942, i, 285 and *Chem. Abstr.*, 1943, **37**, 2587[5]). Alkalis containing water glass, e.g. Henko (a definite mixture of sodium carbonate and water glass), soften industrial waters more rapidly and more readily and produce softer waters than do alkalis which do not contain water glass. They remove temporary and permanent hardness and facilitate the whole washing operation by carrying away any iron or manganese salts. C.

Patent

Textiles: Marking for Laundering. I. Braithwaite & Son (Drysalters) Ltd. (Kendal) and A. L. Smith. B.P.553,740 of 1/10/1941: 3/6/1943. In a method of marking cloth, tabs, tapes, etc., by applying an ink containing an organic liquid the cloth is made receptive by impregnation or coating with a solution of cellulose acetate in acetone containing lithopone, titanium dioxide or other white pigment. Marks made with marking ink on the impregnated or coated cloth are less obscured by subsequent dyeing of the cloth when the impregnating or coating composition contains a pigment. C.

8—BUILDING AND ENGINEERING

(A)—Construction and Maintenance of Buildings and Plant

Aluminium: Cleaning. J. C. Harris and R. B. Mears. *A.S.T.M. Bulletin*, 1943, No. 120, 33-36; No. 121, 33-38. Abstracts are given of 127 publications, including patent specifications, on the subject of commercial methods for cleaning aluminium, inhibiting corrosion, and the evaluation of cleaning compounds. C.

Laminated Cloth Boards: Construction and Application. J. Delmonte. *Aero Digest*, 1942, **186**, 247 (through Mark and Proskauer's "*Resins, Rubbers and Plastics Abstracts*," 1943, A:816). Cloth "laminates" for the fairings, spinners, streamlining shields, etc., of aircraft, are made preferably with a burlap base, though canvas is satisfactory for simple curvatures. Thermoplastic resins are applied in solution, and thermo-setting plastics are polymerized *in situ*. Ethylcellulose laminates display good impact strength at low temperatures; so do the polystyrene products, though they are more brittle. A table compares the physical properties of 3-ply burlap and (*a*) ethylcellulose, (*b*) melamine. C.

Light Alloys: Application in Textile Machinery. J. Hodgkinson. *Textile Recorder*, 1943, **60**, April, 48. Suggestions are made for the application of light alloys in the form of extruded section for card flats, ring frame beams, ring rails, spindle rails and creels, as sand- or die-cast parts for roller stands, poker heads and feet, bearing housings, pulley brackets and traverse guides, and in sheet form for gear and traverse motion covers and "tin" rollers. C.

Electronic Tubes: Application in Works Control. A. P. Mansfield. *Textile World*, 1943, **93**, No. 3, 66-69. A simple description is given of thyratron and ignitron thermionic tubes and also photo-electric tubes, and some applications in textile mills are mentioned. Thyratrons are used to control the output of motors; ignitrons are employed in stroboscopes; photo-tubes secure the automatic opening of doors, pattern register in printing, width control in mercerising, and straight running on the stentering frame. C.

Gear Teeth: Designing. C. G. Pfeffer. *Machinist*, 1943, **86**, No. 38, 240-241E; No. 39, 246-249E. A broad review is given of the mechanical factors for consideration in the design of gear teeth. C.

Gear Wheels: Design and Cutting. A. H. Candee. *Machinist*, 1943, **86**, 1006-9, 1162-4, 1221-3. An illustrated account is given of various types of gear wheels and their design and cutting. C.

Laminated Wood: Production, Properties and Uses. A. E. L. Jervis. *Practical Engineering,* 1943, 7, 562-564. Advantages of laminated densified wood over metal for aircraft construction are outlined and charts showing the strength/weight ratios of laminated wood and metals, and the moisture absorptions of laminated and ordinary woods, and a table showing various characteristics of metals, woods and laminated woods are given. Laminated wood can now be produced with the same tensile strength as structural steel (60,000 lb. per sq. in.). Two types are distinguished: (1) paper glued film bonded boards, and (2) impregnated boards or bakelised wood. A brief description of the manufacturing processes is given. The use of laminated wood as an electrical insulator is discussed and the results of puncture tests are shown graphically. Products capable of resisting pressures of 100,000 volts can be produced. Laminated wood is being used for the construction of oil circuit breaker tension operating rods and handles for extracting live fuses. It is also used for the construction of various tools, e.g. drill jigs. C.

Rusting. E. Hardy. *Power & Works Engineer,* 1943, **38**, 162. Various methods of preventing the rusting of iron are briefly discussed. These include the tannic acid process, lanoline treatment, cellulose lacquers, etc., as well as more novel methods. La.

Scrapped Plant. C.H.S. *Power & Works Engineer,* 1943, **38**, 56. Scrap metal has increased in value so much that many firms are scrapping buildings and plant no longer in use. Notes are here given to enable the oxy-acetylene blowpipe to be used in this work to the best advantage, making the work easier and safer. La.

Canteen Services. J. Stephenson. *Power & Works Engineer,* 1943, **38**, 57-8. A practical survey of mains layout with particulars of some special equipment for canteen and kitchen services. La.

Maintenance Department. *Power & Works Engineer,* 1943, **38**, 59. A plea for an adequately organised and equipped department for dealing with maintenance. La.

British Elms. E. Hardy. *Power & Works Engineer,* 1943, **38**, 32-3. The various types of elm are considered with special reference to their use for engineering purposes. La.

Sifbronzing. W. Sutherland. *Mech. World,* 1943, **114**, 44. A further note on this process. La.

Aluminium Casting Alloys. *Mech. World,* 1943, **114**, 64. A brief abstract of a paper from the A.S.T.M. Bulletin on the effect of small amounts of impurities, i.e. minor alloying elements, on the properties of alloy castings. La.

(B)—Fire Prevention

Fire-resisting Paints: Testing. H. A. Gardner and L. P. Hart. *Natl. Paint, Varnish Lacquer Assoc., Sci. Sect., Circ.* No. 653, 1943, 19-27 (through *Chem. Abstr.,* 1943, 37, 2594[3]). An automatic testing apparatus is described for the evaluation of fire-resisting paints. A gas burner is moved by means of a cam operated with a spring motor toward and away from the test panel held in vertical position. The flame is adjusted to the required length. The nozzle at the closest point to the test is 1 cm. distant. The horizontal flame is in contact at the point of test for 5 sec. The number of contacts of the flame, the time in sec. required for ignition and the depth of the area into which the fire has burned is a measure of the fire resistance. The apparatus was tested using test panels made up with a number of fire-resisting paints. These paints were based on a flat white interior paint to which 12·5 per cent. of antimony trioxide, titanium dioxide, borax or zinc borate was added as the fire-resisting ingredient. Antimony trioxide has very little fire resistance as compared to the other substances tested. For the evaluation of fire-resisting paints on steel only one side of the panel is painted. A blast lamp is used on the uncoated side of the panel. The full blast of the flame is impinged on the central area of the panel for 10 to 45 sec. C.

(C)—Steam Raising and Power Supply

Boiler House: Improvement of Efficiency. D. R. H. Williams. *Textile Manufacturer,* 1943, **69**, 262-263. Further records are quoted to demonstrate the saving of fuel that is possible by increasing the efficiency of the boiler-house plant and especially by installing thermostatic control. In 1940/41 the coal

consumption in the writer's mills was 807·5 tons. A new economiser, automatic stoker and hopper feeder were installed, measures were taken to collect the condensate efficiently, all the lagging and other insulation was overhauled and a full instrument board was fitted, and the coal used in 1941/42 was reduced to 707·5 tons. Then five sections of the mills were fitted with thermostatic controls, and a steam-flow indicator and a portable steam-flow recorder were added, and the coal consumed in 1942/43 was 564·5 tons. C.

High Pressure Hot Water Heating System: Advantages. P. L. Geiringer. *Textile World,* 1943, **93,** No. 3, 90-91. The writer advocates the use of a high-pressure boiler (say, 600 lb.) for feeding hot-water heating systems at high temperatures (300-400° F.). Diagrams of the power plant are given and a chart is provided to show the total heat made available for power production when steam pressures are reduced from 600 to 85 lb. and from 200 to 15 lb. C.

Lubricating Oil Oxidation—Corrosion Tester. C. L. Pope and D. A. Hall. *A.S.T.M. Bulletin,* 1943, No. 121, 25-28. Equipment is described for testing the behaviour of hot lubricating oils in moist oxygen and their corrosive effects on metals and the like. The oil (250 c.c.) is contained in a covered beaker, kept at 100° C. and stirred by stainless steel paddles at 850 r.p.m. Any volatile products are condensed and allowed to drain back into the beaker. Moist oxygen is admitted through the condenser at a rate of 3 l. per hour. In tests on the useful life of oils metals are chosen that are appropriate to the purpose, e.g. steel wrapped in copper wire for turbine oils, and silver/cadmium or lead/copper for Diesel oils. The oil is inspected every 24 hours for colour change and then after 96 hours examined at regular intervals for interfacial tension against water (by the du Noüy ring dynamometer) and for acidity. The test can be used to predict the useful life of an oil, to study the blending of new and used oil, to determine the ability of an oil to prevent the rusting of ferrous metals, and so forth. Examples are described. C.

Heat Exchanger: Power Saving Calculation. W. F. Schaphorst. *Amer. Dyes. Rept.,* 1943, **32,** 211-212. A chart is given for the determination of the boiler horse power saved by the use of a heat exchanger under different conditions of water requirement and temperature. Examples illustrating its use are briefly discussed. C.

Engineering Fundamentals (8). *Power & Works Engineer,* 1943, **38,** 15-16. Some elementary notes on the principles underlying the development of steam plant, in particular, turbines. La.

Engineering Fundamentals (9). *Power & Works Engineer,* 1943, **38,** 43-44. Elementary notes on the quantities of heat required to produce steam under various conditions. La.

Engineering Fundamentals (10). *Power & Works Engineer,* 1943, **38,** 65. A brief account of combustion and of the materials required to produce it. La.

Engineering Fundamentals (11). *Power & Works Engineer,* 1943, **38,** 78-9, Elementary chemistry of combustion. La.

Engineering Fundamentals (13). *Power & Works Engineer,* 1943, **38,** 159-160. The use of different fuels in internal combustion engines is described, e.g. paraffin, petrol. La.

Flow Meters. A. Linford. *Power & Works Engineer,* 1943, **38,** 151-5. Differential-pressure flow meters have, owing to their extreme flexibility, the widest application, as the only essential requirement is that the fluid is contained in a closed conduit. The primary or differential creating element and the secondary or measuring element are considered separately in some detail, emphasis being laid on the reasons for several types of construction employed and the accuracy obtainable. La.

Positive Drives. P. W. Peel. *Power & Works Engineer,* 1943, **38,** 160-161. Brief notes on the silent chain, roller chain, herringbone gears and non-metallic gears. La.

Air in Steam. L. G. Northcroft. *Power & Works Engineer,* 1943, **38,** 77-8, The air venting of steam heated equipment is necessary if operating efficiency is to be maintained and the location of the venting points is of great importance. Diagrams show suitable venting points for a steam jacketed pan, a steam heater, and a steam roller. La.

Boiler Scale. *Power & Works Engineer,* 1943, **38**, 87-9. An examination of the effect of scale deposited from the water upon the heat transmission in boilers. La.

Electrical Equipment. *Power & Works Engineer,* 1943, **38**, 93-4. Notes on war economies in electrical equipment under the Directorate of Industrial Equipment. La.

Textile Plant. *Power & Works Engineer,* 1943, **38**, 60-63. An illustrated description of the engineering services and equipment in the large textile mills of Salts (Saltaire) Ltd., which undertake every phase of worsted manufacture. La.

Air Accumulations. *Power & Works Engineer,* 1943, **38**, 31-32. The conditions inside plant fed with steam containing a little air are considered in order that the most suitable vent points can be located. The subject is considered from the point of view of the plain vessel, long pipes and intermediate types of plant. La.

D.C. Machinery. "Electrohm." *Power & Works Engineer,* 1943, **38**, 39. Circulating currents frequently cause commutator and brush wear. The detection, cause and removal of such currents are considered in some detail. La.

Oil Filtration and Wear. T. W. Langley. *Mech. World,* 1943, **114**, 37-39, 48-52. An abstract of a paper before the Institute of Marine Engineers in which the author discusses the subject of engine oil filtration and its effects on wear in internal-combustión engines. The matter is first considered theoretically and the results are applied to practical cases, to show how and when wear occurs. Various types of oil filter are considered and their effectiveness in preventing wear is summarised. La.

Fuel Economy. W. Wadkin. *Mech. World,* 1943, **114**, 55. In answering a question the savings produced by returning condensate and lagging pipes in small plants, are estimated. La.

Heat Insulating Materials. E. Griffiths and M. J. Hickman. *Mech. World,* 1943, **114**, 16-22. A concise summary of results obtained from experiments on the thermal conductivity of a large number of insulating materials, e.g. cork, slag wool, etc. The heat flow in complex structures and the packing of fibrous materials under load are considered. Finally, a table gives the weight per cubic foot and conductivity of some 50 materials. La.

Safety Valves. J. H. Bottomley. *Power & Works Engineer,* 1943, **38**, 5-8. The operation and selection of safety valves for various situations on boiler plant are discussed. La.

Power Costs. G. W. Stubbings. *Power & Works Engineer,* 1943, **38**, 17-18. In works of any size it is usual to allocate to various departments their share of the power costs. The characteristics of suitable meters and other equipment for the purpose are described and the essential arrangements for maintenance of accuracy are indicated. La.

Remote Flow Indication. *Mech. World,* 1943, **114**, 68. An illustrated description of the Londex remote flow indication system. La.

Testing Electrical Contacts. *Mech. World,* 1943, **114**, 79. A brief description of an American machine which is self-contained and determines the performance characteristics of electrical contacts. Many variations in the test conditions are possible. La.

(G)—Heating, Ventilation and Humidification

Saturated Air: Water Vapour Content Determination. H. Pfriem. *Warme-u. Kälte-Tech.,* 1941, **43**, 137-141 (through *Chem. Zentr.,* 1942, i, 906 and *Chem. Abstr.,* 1943, **37**, 2303[7]). A linear relation holds between the natural log. of the pressure, the reciprocal of the absolute temperature and the moisture content of air. Expressed graphically, with the water content as one parameter, a convenient method for quickly determining the water content of saturated air at different pressures is given. C.

(I)—Waste Disposal

"Wool Alcohols" in B.P. Ointment Basis. *Chem. Tr. J.,* 1943, **112**, 590. In the Sixth Addendum to the British Pharmacopœia, to be effective from August 1, 1943, a new material for the preparation of ointment bases is

described. "Alcoholic Lanae" is prepared by saponifying wool fat and separating the fraction containing cholesterol and other alcohols. It is commonly known as wool wax. It resembles anhydrous lanolin in appearance, but is much harder, and when cold is quite brittle. The following are specified:— Minimum cholesterol content, 28 per cent., melting point ≮54° C., acid value, ≯3, saponification value ≯12, and acetyl value, 130-140. It is called Unguentum Alcoholium Lanae and contains wool alcohols, 60 gr., hard paraffin, 240 gr., white or yellow soft paraffin, 100 gr., and liquid paraffin, 600 gr. W.

PATENTS

Dry-saponified Wool Grease Soap: Extraction of Unsaponifiable Matters. H. W. Smith and S. G. Campbell. B.P.553,322 of 17/5/1943. To facilitate the efficient extraction of unsaponifiable matters from dry-saponified wool grease soap manufactured according to B.P.470,715, the soap is spread in its molten state at about 500° F. in a thin sheet formation, rapidly cooled to about 200° F., and then milled and formed into ribbons. Extraction is done with a solvent, e.g. a mixture of acetone and dichlorethane, or with a mixture of acetone and a solvent, e.g. trichlorethylene, carbon tetrachloride or benzine. The solvent may be recovered and the extracted matter deodorised. W.

Electrical Dust Precipitator. Lodge-Cottrell Ltd., Birmingham (International Precipitation Co. Inc., Los Angeles). B.P.553,420/1 of 9/2/1942:20/5/1943. (1) In an electrical precipitator for the removal of suspended particles from gases, the discharge electrode comprises an extended surface portion free from surface elements of radius of curvature small enough (e.g. less than 0·1 inch) to produce corona discharge under operating conditions and a discharge surface portion of very small radius of curvature (e.g. less than 0·0002 inch) supported by the extended surface portion, and projecting from it to a distance not exceeding its smallest radius of curvature. For use with a substantially plane collecting electrode surface, an advantageous form of this composite electrode has fine wire elements (about 0·01 in. diam.) extending perpendicularly. (2) In an electrical precipitator comprising complementary discharge electrode and collecting electrode systems, the collecting electrode system comprises a main collecting electrode, an auxiliary collecting electrode member projecting into the space between the discharge electrode and the main collecting electrode and means for maintaining the auxiliary collecting electrode substantially free from deposited material, the auxiliary collecting electrode and the cleaning means associated therewith forming a unitary assembly removable as a unit from the precipitator chamber. C.

De-humidifying Apparatus. J. Imber and Imber Research Ltd. (Greenford). B.P.553,758 of 24/12/1941:3/6/1943. A de-humidifying apparatus for use in confined spaces, e.g. in aircraft, comprises a casing, a burner disposed in the casing, a metallic heat dispersion element carried in a heat insulating support associated with the burner for the purpose of conducting a substantial amount of heat from the products of combustion to the exterior of the casing, and cooling chambers or passages disposed around the casing for condensing moisture through which means all of the combustion products pass before escaping to the atmosphere. C.

9—PURE SCIENCE

Starch Grains: Growth and Corrosion. N. P. Radenhuizen. *Protoplasma*, 1939, **33**, 440-468 (through *Chem. Abstr.*, 1943, **37**, 1622[1]). Starch grains are built up by means of apposition. Long polysaccharide chains are formed in the plastids and produce the optically denser interior of the rings. Towards the outside the optical density decreases, probably because of the deposition of shorter polysaccharide chains. After one ring has been completed an interval occurs until long chains have again been formed. Corrosion of the starch grain can be due to (1) regular liquefaction from the outside under the influence of diastase or (2) irregular solution, imparting to the grains a perforated appearance; (1) takes place particularly in seed starch, (2) in root starch. The two groups of starches are also distinguished by their adsorption of Congo red, their content of amylopectin, X-ray pattern, resistance to enzymes, etc. These differences may be due to a different water content. C.

Starches: Microscopical Identification. F. D. Armitage. *Industrial Chemist*, 1943, **19**, 267-273. Photo-micrographs of starches of buckwheat, manihot (cassava), sago, yam, ginger, sweet potato, horse chestnut and acorn, obtained

with transmitted light and with polarised light, are shown and their characteristic features are discussed. C.

Cellulose: Decomposition by Moulds and Bacteria. H. Hajo. *Textilberichte,* 1942, **23**, 245 (through *Bull. Inst. Paper Chem.*, 1943, **13**, 223 and *Chem. Abstr.*, 1943, **37**, 1597[4]). The development of moulds and bacteria on cellulose depends to a great extent upon the moisture content and the temperature of the surrounding air. At high relative humidities the growth of moulds increases, the maximum being about 95 per cent.; bacteria show no further development at relative humidities above 86 per cent. The active enzymes in the cleavage of the cellulose molecule are cellulase (which hydrolyses it to cellobiose) and cellobiase (which changes cellobiose to glucose). The resistance of cellulose to attack by bacteria and moulds depends upon its degree of polymerisation. Regenerated cellulose is more readily attacked than native fibres. C.

Commercial Enzyme Preparations: Invertase and Inulase Contents. W. W. Pigman. *J. Res. Natl. Bur. Stnds.*, 1943, **30**, 159-175. The relative enzyme content has been determined on 14 representative commercial preparations that hydrolyse sucrose and inulin. Preparations of fungal origin seemed invariably to contain invertases in about 0·5 to 1·0 per cent. of the quantities in commercial purified yeast invertase preparations. Enzyme preparations from plant sources (wheat, almond and malt), from animal tissues (pancreases), and from *Bacillus mesentericus* had negligible contents of invertase. Enzyme preparations from *Aspergillus niger* and yeast exhibited considerable ability to hydrolyse inulin, those from *A. oryzae* and *A. flavus* exhibited some slight activity, and preparations from other sources were essentially inactive. For several representative enzyme preparations, the rate of hydrolysis of inulin and sucrose was found to approximate to a first-order reaction. The activity of the inulase in several *A. niger* enzyme preparations was found to be greatest in the range *p*H 3 to 4. Invertase preparations from *A. niger* were most active at *p*H 3 to 4 and those from *A. oryzae* at *p*H 5·0 to 5·5. It is shown that these results are incompatible with Weidenhagen's theory of only one enzyme for each α- and one for each β-glycosidic type. The term "emulsin" is used as a synonym for a crude mixture of enzymes. The *A. niger* emulsins hydrolyse juices from the Jerusalem artichoke, which contain levulose polysaccharides. Consideration is given to the different methods available for expressing enzyme activity. It is shown, for the enzymes studied, that the pseudo first-order reaction constant is proportional to the enzyme concentration over a fairly wide range, and that this constant may be utilised for the expression of the enzyme content of various emulsins. C.

Chemical Glassware; Care of —. E. J. Lewis. *Chem. & Eng. News,* 1943, **21**, 552-554. The causes of failure of chemical glassware, such as mechanical and thermal shocks, developments of strain in use, scratches and abrasions, etc., are discussed and precautions which will ensure longer service are described. C.

"Hygrophone" Moisture Content Measuring Instrument. A. Tamm. *Mühle,* 1940, **77**, 715-716 (through *Chem. Zentr.*, 1942, i, 1370 and *Chem. Abstr.*, 1943, **37**, 1302[6]). The hygrophone is described. The product under test, e.g. grain, is placed in this instrument between the plates of a completely insulated condenser, which is then charged electrostatically. A discharge occurs after a longer or shorter period, depending upon the moisture content of the sample between the condenser plates. Immediately after the discharge the condenser is recharged automatically and simultaneously a sound is emitted from a loud speaker connected with the instrument through an amplifying tube. The number of such sounds or beats per minute is a direct measure of the moisture content of the sample under examination. C.

Hydrogen Peroxide: Production and Application. J. S. Reichert. *Chem. & Eng. News,* 1943, **21**, 480-483. Four processes account for the bulk of the hydrogen peroxide now manufactured; one is the decomposition of barium peroxide by sulphuric acid and the others depend on the steam distillation of electrolytically prepared H_2, $(NH_4)_2$, or K_2 persulphate. Solutions of 100-vol. concentration (30·5 gm. H_2O_2 per 100 c.c.) are now marketed in glass carboys, aluminium drums and even railway tank cars. Its properties and applications (especially in bleaching) are outlined. C.

Soluble Proteins: Iso-electric Point; Determination. W. G. Jaffé. *J. Biol. Chem.*, 1943, **148**, 185-186. A simple method for the approximate determination of the iso-electric point of soluble proteins depends on observation of the lowest *p*H level at which precipitates are formed with cationic detergents. C.

Rubber Molecule: Dimensions. G. Gee. *India Rubber J.*, 1943, **104**, 407-410, 439-443. A useful summary is given of modern work on the size and significance of the rubber molecule as revealed by osmotic pressures and viscosities of rubber solutions. C.

Vinylidene Chloride Polymers: Structure, Properties and Uses. R. C. Reinhardt. *Ind. Eng. Chem.*, 1943, **35**, 422-428. An account is given of the production, structure, properties and uses of vinylidene chloride polymers and copolymers. References to published papers and patent specifications number 59. C.

Recording Torque-type Viscometer. C. R. Wicker and J. A. Geddes. *A.S.T.M. Bulletin*, 1943, No. 120, 11-18. The authors have developed a recording viscometer that combines the principles of the modified Stormer and McMichael instruments. The material under test is placed in a can that is rotated at a constant speed on a table. A paddle is lowered into the material to a datum line and the moment tending to rotate the paddle is balanced by a spring. A lever arm on the spring carries an inking mechanism that makes a trace on a chart moving at a speed of 2 cm. per minute. By adjustments of the driving gear, the can may be driven at a series of speeds from 30 to 285 r.p.m. One spring may be used for measurements over the range 5 to 45 poises, but it can be replaced by other springs for work outside this range. The instrument may be calibrated to give readings in Stormer, Krebs or absolute units and has the additional advantages of providing different rates of shear and giving continuous records that reveal any fall of viscosity with time (thixotropy) or rise (rheopexy). It has been designed principally for use in measuring the consistency of paints and its utility is shown by reference to measurements on these materials. C.

Uranyl Oxalate Actinometer: Application. F. T. Bowditch, C. E. Greider and C. G. Ollinger. *Proc. Amer. Soc. Testing Materials*, 1942, **42**, 845-850. The uranyl oxalate actinometer depends on the measurement of the amount of oxalic acid decomposed when its solution is exposed to ultraviolet radiation in the presence of uranium salts. The authors demonstrate that the method cannot be used to determine the equivalence of light sources that differ in spectral characteristics; for example, sunlight, the open-flame sunshine carbon arc, and the enclosed plain carbon arc, at distances from the cell at which they caused the same decomposition, gave very different spectral energy distributions, the enclosed arc being almost three times as powerful as sunlight in the region of 3900 A. The actinometer could be used, however, to check the constancy of output of a source of given spectral composition. C.

Hydrogen Peroxide: Photochemical Decomposition. V. N. Kondrat'ev. *Problemy Kinetiki i Kataliza, Sbornik Trudov Konf. Posvyashchennoi Sorokaletiyu Perekisnoi Teorii Bakha-Englera*, 1940, **4**, 63-70 (through *Khim. Referat. Zhur.*, 1941, **4**, No. 1, 22 and *Chem. Abstr.*, 1943, **37**, 1656[9]). A critical review is given of the most recent data on and conceptions of the mechanism of the photo-decomposition of hydrogen peroxide according to the equations (1) $H_2O_2 + h\nu = 2HO - 48$ cal.; (2) $OH + H_2O_2 = H_2O + HO_2 + 12{\cdot}5$ cal.; (3) $HO_2 + H_2O_2 = H_2O + O_2 + OH + 25{\cdot}5$ cal. or $O_2 + H_2O_2 = O_2 + OH + OH^-$. The reactions that terminate the chain are (1) $OH + OH = H_2O_2$, (2) $HO_2 + HO_2 = H_2O_2 + O_2$, (3) $OH + HO_2 = H_2O + O_2$, or the reactions of OH^- or HO_2^- with the inhibitor or the wall. Experimental values of the energy of activation (5·8, 5·4 and 4·1 cal.) agreed with the calculated value of 5·5 cal. The quantum yield increased with increase in temperature. C.

Solids: Fluorescence in Compact and Dispersed States. A. Kuhn. *Kolloid Z.*, 1942, **100**, 126-135 (through *Brit. Chem. Physiol. Abstr.*, 1943, A I, 81). For substances that fluoresce with the same colour both in the compact state and in solution, and for those that fluoresce as solids but not in solution, the intensity of fluorescence decreases with increased dispersity (grinding in a machine-driven agate mortar with lactose as diluent). For substances that show different fluorescence colours in the two states and for those that fluoresce in solution but not in the compact state it is possible by continued grinding to

change the colour of the fluorescence, or to increase its intensity, to that characteristic of the solution. In this case the solid is considered to be spread in a unimolecular layer over the surface of the lactose. Experiments with acridine-orange, which stains living protoplasm green and dead protoplasm red, suggest that this behaviour is related to the particle size, since progressive grinding changes the fluorescence colour of the dye from orange-red to greenish-yellow. C.

Mobile Electron Microscopes. *Textile Research,* 1943, **13,** No. 5, 13-14. Brief, illustrated descriptions are given of new handy models of the electron microscope. The first, due to C. H. Bachman and S. Ramo, of the General Electric Co., can be run from an ordinary house circuit, is 52 inches high, and occupies a floor space of 3 feet × 2 feet. The other, due to the Radio Corporation of America, is a portable instrument that can be brought to a laboratory bench. C.

Insulating Materials: Thermal Conductivity. K. C. Niyogi and J. R. B. Mallik. *Indian J. Phys.,* 1942, **16,** 241-247 (through *Sci. Abstr.,* 1943, A **46,** 56). A report on the measurement of thermal conductivities of glass, mica, tintex, masonite, beaver, plywood, asbestos, sawdust, straw, husk, jute, cocoa-nut fibre, kapok, etc., with apparatus constructed on the wall principle. C.

Vinyl Elastomers: Stress-Strain Characteristics. M. C. Reed. *Ind. Eng. Chem.,* 1943, **35,** 429-431. The stress-strain curves of typical plasticized vinyl polymers have been determined at 10°, 25° and 40° C. on an autographic machine. The stress-strain diagram of these elastomers in extension is substantially a straight line up to 1,000 lb. per sq. in. during the first elongation cycle, but is markedly concave towards the load axis over the second cycle and shows a reduction in hysteresis on repeated flexure. Vinyl elastomers exhibit a greater increase in stiffness with decrease in temperature than vulcanized rubber and, for most commercial compounds, a higher modulus of elasticity at room temperature. With vinyl chloride-acetate copolymers, increasing the vinyl chloride content up to 95 per cent. reduces the temperature sensitivity. Increase in vinyl chloride content above 95 per cent. has no appreciable effect. Polyvinyl butyral elastomers show greater stiffening at reduced temperatures than polyvinyl chloride-acetate copolymers. C.

Atmospheric Sulphur Dioxide Determination Apparatus. M. D. Thomas, J. O. Ivie, J. N. Abersold and R. H. Hendricks. *Ind. Eng. Chem., Anal. Edn.,* 1943, **15,** 287-290. An automatic apparatus for the determination of small concentrations of sulphur dioxide and also the total volatile sulphur content of the atmosphere is described. A multiple port stopcock-type metal valve is used to control the flow of air and liquid. The air is passed to absorbers and the change in conductivity of the absorbing solution is measured. For the determination of the total volatile sulphur content a second air stream is passed through a silica tube containing an electrically heated platinum wire spiral where other sulphur compounds are oxidised to sulphur dioxide which is then absorbed in another set of absorbers. Carbon disulphide, hydrogen sulphide, ethyl mercaptan, thiophenol and thiophene have been determined in this way. Preliminary observations have shown that the apparatus can also be used for the determination of volatile chlorine compounds, such as chloroform, carbon tetrachloride, ethylene chloride, and chlorobenzene, which can be decomposed with the production of hydrochloric acid which affects the conductivity of the absorbing solution. Diagrams of the apparatus and a table showing results of typical analyses are given. Physiological limits of detection of sulphur dioxide, hydrogen sulphide and ethyl mercaptan are briefly discussed. C.

Alkyl Benzene Sulphonates: Colorimetric Determination. J. C. Harris. *Ind. Eng. Chem., Anal. Edn.,* 1943, **15,** 254-256. A simple quantitative method is discussed for the determination of alkyl benzene sodium sulphonates, based upon the formation of a blue colouration when a solution is added to a solution of *o*-tolidine and sodium hypochlorite. Details are given of procedures involving (1) visual observation and (2) photometric measurements. C.

Fats and Oils: Iodine Number Determination. F. A. Norris and R. J. Buswell. *Ind. Eng. Chem., Anal. Edn.,* 1943, **15,** 258-259. Methods of determining the iodine numbers of fats and oils are critically discussed and it is pointed out that a rapid method involving the use of a combination of mercuric acetate and Wijs solution is suitable for use on conjugated fats. A rapid method involving the use of mercuric acetate with Hanus solution is described and typical results

are given. This method gives values identical with those obtained by the standard Hanus method on non-conjugated fats, except with castor oil where the ricinoleic acid content is responsible for the higher values obtained by the rapid method. The method is unsatisfactory for conjugated fats. C.

Glycerol: Determination. W. J. Govan, Jr. *Ind. Eng. Chem., Anal. Edn.*, 1943, **15**, 260-261. Details are given of a method of determining the glycerol content of crude glycerin and soap lyes which depends on determination of the difference in the weights of the residues obtained from aliquot portions after removal of (1) water and (2) both water and glycerol by evaporation. Water is removed by drying in a natural convection drying oven maintained at 100° ± 2° C. after addition of methyl alcohol and then of ethyl ether to the sample. Water and glycerol are removed by heating in an infra-red drying oven at 160° C. Some typical results are given and are shown to agree well with results obtained by the acetin method. C.

Cellulose: Copper Number. H. Staudinger and K. W. Eder. *Cellulosechemie*, 1941, **19**, 125-128 (through *Holz Roh-u. Werkstoff*, 1942, **5**, 214 and *Chem. Abstr.*, 1943, **37**, 2172[2]). The copper number, as applied to the end-group determination, cannot be used for determining the degree of polymerisation of cellulose. The copper number gives considerably smaller values than those found by either the end-group method, the viscosity or the osmotic methods. The conclusion is drawn that Fehling solution oxidises not only the aldehyde end group but also the hydroxyl groups. C.

Cellulose: Molecular Weight. T. Svedberg. *Svensk Papperstidn.*, 1942, **45**, 444-458 (through *Chem. Abstr.*, 1943, **37**, 2570[3]). The author reviews various methods for determining the molecular weight of cellulose—namely, X-ray analysis for cellulose in the solid state and ultracentrifugal, diffusion and streaming double-refraction methods for the liquid state. The results are identical within the limits of experimental errors. The values of the molecular weight of cellulose decrease in the order: cotton, wood meal, technical wood cellulose. The polydispersity can be estimated by measurements of the spreading of the sedimentation maximum and by observation of anomalous conditions of diffusion and streaming double refraction. Cotton cellulose is less polydisperse than technical wood cellulose. C.

Cellulose: Reactions. *Silk and Rayon*, 1942, **16**, 52-4, 182-3, 232-4, 350, 368, 424, 443, 544, 554, and 740-2. A broad review of the structural chemical and colloidal aspects of cellulose chemistry, particularly as involved in finishing processes and rayon manufacture. C.

Cellulose: Reaction with Formaldehyde. K. Götze and A. Reiff. *Zellwolle, Kunstseide, Seide*, 1941, **46**, 331-335 (through *Chem. Zentr.*, 1942, i, 292 and *Chem. Abstr.*, 1943, **37**, 2570[6]). In cellulose fibre treated with formaldehyde, the formaldehyde becomes partly chemically combined and partly polymerized. Both types can be separated nearly completely by extraction for 5 hours with 10 per cent. caustic soda. With the amounts of catalyst held constant, and with increasing concentrations of formaldehyde, the fibre takes up larger amounts of formaldehyde, particularly larger amounts of the combined formaldehyde. If the formaldehyde concentration is held constant, the amount absorbed can be increased also by increasing the amount of the catalyst; this promotes greatly the extent of the polymerization. For practical purposes it is more advantageous to raise the formaldehyde concentration, as the catalyst may cause other reactions. The swelling power of the treated fibre is lessened in an increasing degree with increasing amounts of formaldehyde absorbed, but not in direct proportion. Above a formaldehyde concentration in the fibre of approximately 1 per cent., the lessening of the swelling power becomes insignificant. The various types of cellulose absorb varying amounts of formaldehyde and, consequently, the effect on the swelling power differs. Amounts of only 0·2-0·5 per cent. formaldehyde lower the swelling power of hydrated cellulose sufficiently for practical purposes. Formaldehyde reacts with pure α-cellulose as well as with contaminations of the carbohydrate type present in the fibre. During normal washing operations, very little formaldehyde is dissolved from the fibre; however, much of the polymerized formaldehyde is dissolved. It is concluded that the decrease in swelling is caused by the formation of oxymethylene bridges between neighbouring cellulose chains. Data are given on the determination of formaldehyde in the treated fibre. C.

Cellulose: Supermolecular Constitution and Reactivity. (1) T. Lieser and F. Fichtner. (2) T. Lieser and R. Jaks. (3) T. Lieser, R. Jaks and E. A. Glitscher. *Liebig's Ann. Chem.*, 1941, **548**, 195-203, 204-211, 212-215 (through *Chem. Zentr.*, 1942, i, 1000-1004 and *Chem. Abstr.*, 1943, **37**, 2567-2570). (1) Consideration is given to the question whether the cellulose macromolecule is always the reacting entity of cellulose or whether the submicroscopic or the supermolecular entity can enter into reaction. This entity, the cellulose micelle, consists of long principal valence chains united into crystallites which are firmly united through association or molecular cohesion. The micellar power can be overcome by exceeding a definite concentration of an active agent. Reactions of cellulose in the solid fibrous state with various acids are studied. It is assumed that the strong acids, like strong bases, first add to the OH groups in the micellar surface so that, depending upon the concentration of the acid, more or less optimal addition compounds result. If a limiting concentration is exceeded, solution of the fibre and permutoid reactions occur. (2) Alkali-cellulose was treated with alkylating agents and the resulting methylcellulose submitted to acetolytic degradation. Three constitutional formulae can be written for hemimethylcellulose (one MeO group to 2 cellulose units) characterised, respectively, by (*a*) the arrangement of the MeO groups on the micellar surface; (*b*) the nearly symmetrical (alternate) distribution over the principal valence chain; (*c*) the irregular arrangement over the individual macromolecules. Evidence for and against these formulae is discussed. A large number of methylcelluloses with increasing content of MeO groups were submitted to acetolysis and the yield of cellobiose was determined. The experiments showed that the methylation does not proceed as a permutoidal, but as a micellar reaction, progressing from the micellar surface to the interior of the micelles. (3) Micellar cellulose is insoluble in nearly all media, including water. This insolubility is caused by the reciprocal demands of the OH of the different glucose anhydride chains. The molecular cohesive forces, the crystallite forces and the micellar forces are stronger than the solvation forces exerted by the solvent. As a poly-OH compound, cellulose should be water-soluble in spite of its macromolecular nature. The basis for the insolubility thus rests in the supermolecular structure of cellulose. In substitution products solubility is possible if an expansion or subdivision of the micelle occurs so that OH groups of the inner micelles are exposed to the solvent. The cellulose macromolecules would become soluble in water if they were separated by such a distance that the association power of the OH groups of the principal valence chains is small and the water molecules could penetrate between the glucose anhydride chains of the inner micelles. To produce this solubility, cellulose is dissolved in organic bases with large molecules, such as tetraethylammonium hydroxide, and transformed by carbon disulphide into the trixanthate. This is easily soluble in water and methyl alcohol and is dialysed against pure water until all the sulphothiocarbonate groups are split off by hydrolysis and the degradation products are removed. If cotton wadding is used as starting material and the dialysis is carried out at room temperature, a clear solution of cellulose in water is obtained which, however is unstable. This solution is a macromolecular solution with isolated glucose anhydride chains, whereas the solution in cuprammonium hydroxide or as viscose is micellar. When 10 per cent. of ammonia and an excess of cupric hydroxide is added, a completely copperized cellulose results; this consists of the isolated macromolecules, whereas ordinary water-insoluble cellulose is composed only of micelles and is only micellarly copperized. It is pointed out that the supermolecular micellar structure of cellulose is of as great importance in the reactivity as its macromolecular high-polymeric nature. C.

Nitrocellulose: Stabilization. A. Soler and A. Vian. *Ion*, 1942, **2**, 745-752 (through *Chem. Abstr.*, 1943, **37**, 2572[9]). Substances employed as stabilizers of nitrocellulose may also be used as gelatinizers; three substances, diphenylurethan, urethan and diethyldiphenylurea (Centralite) are studied from the latter viewpoint. The coefficient of gelling (*G*) is defined as the maximum number of grams of nitrocellulose (11·80 per cent. N) that are completely gelled in 2 hours by 1 g. of the substance. The factor *G* increases with the temperature and at lower temperatures is different with each substance; at 150° its values for diphenylurethan, urethan and diethyldiphenylurea are 1·132, 0·841 and 0·862, respectively. When recalculated to molecular weights the

gelling values at this temperature are 217·12, 204·85 and 254·0. The experimental work indicates that at temperatures from 30° to 150°, the diamide function is superior in activity to the monoamide function. Equations are derived by which it is calculated that, if the temperature is raised to 174°, *G* will become equal for all and 1 mole of any of the three substances will gell 330·5 g. of nitrocellulose (11·80 per cent. N). Mixtures of the three also tend to reach the same saturation point; at the lower temperatures these mixtures are more active than the single substances and hence are preferred for work at these temperatures. Mixtures containing diphenylurea (akarite) show an activity that exceeds the sum of the activities of the separate substances and may well be added to masses that are to be moulded in small thicknesses. C.

Oxystarch and Oxycellulose Carbonyl Groups: Determination. E. K. Gladding and C. B. Purves. *Paper Trade J.*, 1943, **116**, *TAPPI*, 150-155. Aqueous hydroxylamine hydrochloride forms oximes with reducing sugars and the course of the reaction can be followed by titrating the liberated hydrochloric acid with standard alkali. Procedures designed, respectively, for (1) estimating the large amounts of carbonyl present in reducing sugars and in polysaccharides oxidised with periodate, (2) following the course of the reaction, and (3) determining the smaller amounts of carbonyl present in various oxycelluloses are described and results obtained are discussed. Simple sugars that condensed in first-order reactions which were complete within 1·5 or 18 hours at 20° C., and the corresponding carbonyl groups, are classified as "fast" or "slow." All the aldehyde groups in periodate oxycellulose and oxystarch are of the "fast" type, although the reactions are not first-order. In the oxidation of unswollen linters with increasing amounts of chromic anhydride in acetic acid-acetic anhydride at 20° C., up to 28 per cent. of the oxidant was accounted for as carboxyl and "fast" carbonyl in the insoluble oxycellulose, and water-soluble products were formed even with relatively small amounts of oxidant. Unswollen, powdered starch was not appreciably affected in the same conditions. When highly swollen linters were used, duplicate oxidations proceeded much more rapidly and did not lead to perceptible production of water-soluble material until an oxidation level of 0·3 atom of oxygen per glucose unit was reached. About 75 per cent. of the oxidant consumed below this level was represented by the insoluble oxycellulose, but the recovery fell sharply thereafter. The fate of the remaining 25 per cent. was not determined, although it may have produced "slow" carbonyl groups in the oxycellulose. These results show that the chemical course of oxidations that are unaccompanied by substantial swelling may be dominated by the extent of colloidal surface present in the original cellulose or starch. The colloidal condition of the latter, however, was not nearly so critical when the chromic anhydride was dissolved in 0·2N aqueous sulphuric acid, probably because aqueous solutions exert a powerful swelling action. C.

Starch Hydrolysates: Dry Substance, Refraction and Density. W. Kröner, W. Reischel and W. Höppner. *Z. anal. Chem.*, 1941, **122**, 321-331 (through *Chem. Zentr.*, 1942, i, 277 and *Chem. Abstr.*, 1943, **37**, 2606[9]). For measuring the refractive index the Abbé refractometer is most suitable. The density is best determined by the method of Schulz and Steinhoff with a pycnometer at 20°, referred to water at this temperature. The results of the determinations are summarised by curves useful for future determinations of dry substance in starch-sugar juices and starch syrups. The usual methods for determining dry substance are not considered satisfactory for rapid laboratory control. C.

Penetrometer: Use for Determination of Flow Properties. W. W. Pendleton. *J. Appl. Physics*, 1943, **14**, 170-180. The use of the penetrometer for the determination of viscosities both for viscous flow (viscosity independent of rate of shear) and generally viscous flow (viscosity dependent on rate of shear) is discussed and formulae are developed for viscosity, shearing stress and rate of shear in terms of penetration data. The penetrometer method has been checked with (1) the capillary viscometer for viscous flow, using coal tar pitch, and (2) the revised axially moving cylinder method for generally viscous flow, using a high-melting blown asphalt. For any one temperature, the flow properties of a generally viscous material are defined by the straight line relationship between log. shearing stress and log. rate of shear. From this relationship viscosity may be calculated at any desired rate of shear. The slope n of this line is required in the calculation of rate of shear both for the penetrometer method

and for any other type of standard viscometer method. An independent means for observing n has been developed for the penetrometer and for the moving cylinder method. It is shown that earlier formulae for standard instruments based on viscous flow are invalid when applied to fluids showing generally viscous flow properties. The power function law relating shearing stress and rate of shear has been found to hold for the asphalt studied over the range of rate of shear from 10^{-5} to 10 reciprocal seconds. In addition to speed of operation and precision, the penetrometer has the advantages of minimizing the elastic effects and reproducibility without extensive heat treatment and pre-working. Entire shearing stress-rate of shear curves can be determined with one load and one penetration using a succession of time intervals. C.

Sodium Laurate Solutions: Interfacial-tension Studies. J. K. Davis and F. E. Bartell. *J. Phys. Chem.*, 1943, 47, 40-50. Measurements have been made of the interfacial tensions existing at the dineric boundary between aqueous sodium laurate solutions and *n*-heptane. Significant alterations in the interfacial tensions were observed as the interfaces were allowed to age. The changes were much more pronounced with solutions in which partial soap hydrolysis had occurred (*p*H about 8) than in more basic solutions (*p*H 11) where hydrolysis of the sodium laurate was completely suppressed. With unhydrolysed sodium laurate solutions at concentrations above 0·005N., the adsorption of sodium laurate at the water/heptane interface is comparable to its adsorption at the surface of its aqueous solution. The extended decrease with time of the interfacial tensions of partially hydrolysed laurate solutions against *n*-heptane is due to migration of fatty acid across the interface. Addition of lauric acid to *n*-heptane causes interfacial-tension lowerings at the aqueous soap solution/*n*-heptane interfaces which are similar to the interfacial-tension lowerings at the analogous water/*n*-heptane interfaces. For aqueous sodium laurate solutions to attain very low interfacial tensions against a non-polar organic liquid and hence be capable of emulsifying it, considerable concentrations both of sodium laurate in the aqueous phase and of lauric acid in the organic liquid phase must exist, and these concentrations must be in equilibrium. C.

Polyvinyl Chloride Solutions: Osmotic Pressure. R. M. Fuoss and D. J. Mead. *J. Phys. Chem.*, 1943, 47, 59-70. A dynamic osmometer suitable for solutions in organic solvents is described and also the preparation of osmometer membranes, consisting of partially denitrated nitrocellulose. The results of measurements of the osmotic pressures at a series of concentrations from 2 to 10 g. of polymer per kg. of solution of fractionated vinyl chloride polymers in methyl amyl ketone at 27° C. are presented and discussed. The molecular weight of a carefully fractionated sample determined osmometrically agrees with the value obtained for the same polymer by means of the ultracentrifuge. The osmometric values for other fractions of the same original polydisperse polymer also agree with viscometric values, when the first polymer is used as a calibrating substance for the viscometer method. C.

Pigments: Specific Gravity Determination. I. Baker and G. Martin. *Ind. Eng. Chem., Anal. Edn.*, 1943, **15**, 279. A rapid, accurate method for the determination of the specific gravity of dry paint pigments is described which depends on determination of the weight of a sample in air and in kerosene. Air and occluded gases are removed by heat treatment and centrifuging. A specific gravity tube is first weighed submerged in kerosene. A sample of the pigment is weighed into the tube and is covered with kerosene and heated to 65-70° with frequent stirring and then centrifuged. The tube is then filled up with kerosene and weighed again submerged in kerosene. Typical results for titanium dioxide and titanium-calcium pigments are given. The accuracy is 5 parts per 1000 or better. C.

Cenco Spectrophotometer: Modification for Reflection and Fluorescence Measurements. H. J. Dutton and G. F. Bailey. *Ind. Eng. Chem., Anal. Edn.*, 1943, **15**, 275-277. Details are given of a simple modification of the Cenco spectrophotometer by means of which it is possible to measure reflection and fluorescence spectra with moderate resolution. Fluorescence is observed from the same direction as the exciting light and it is shown that this arrangement is superior to other possible arrangements in that the shape of the curve representing the spectral distribution of energy and the position of the maximum are independent of the concentration of the fluorescing substance. Reflectance spectra of coloured papers measured with the modified instrument are compared

with the reflectance curves recorded by a Hardy spectrophotometer, and the fluorescence spectrum of thiochrome is shown. C.

Cellulose: Action of Ultra-violet Light on —. M. de Buccar. *Papeterie*, 1941, **63**, 49-58 (through *Chem. Zentr.*, 1942, i, **132**, and *Chem. Abstr.*, 1943, **37**, 2170[9]). Ultra-violet light acts upon cellulose to produce a molecular polymerisation and then an oxidation reaction, giving water and carbon dioxide. Catalysts have an accelerating action. The source of the light produces a considerable amount of ozone; therefore, the action of ozone was studied; the increase in the copper number was greatest with a moisture content of 45-55 per cent. and a temperature of 40°. The action of the various wave lengths making up the ultra-violet light was also studied. Ultra-violet light can be used to destroy moulds and putrefaction bacteria in old manuscripts. Bleaching can be accelerated by the use of light of wave lengths of 3500-3850A. Ultra-violet light causes an increase in the viscosity of cellulose nitrate and a decrease in the solubility in alcohol/ether; a denitration is produced and in the presence of a softening agent (especially tritolyl phosphate) a marked yellowing occurs. A malachite green filter from cellulose nitrate cannot be used because of the formation of nitrogen oxides and decomposition of the dye. Acetate films behave like cellulose nitrate films, but ethylcellulose is more stable. Cellophane is very transparent to ultra-violet light, followed by acetate films, cellulose nitrate, ethylcellulose and, as the least transparent, benzylcellulose. By long illumination, the transparency decreases. C.

Hydrogen Peroxide: Behaviour in Chemiluminescent Oxidation Reactions. B. Y. Sveshnikov. *Compt. rend. acad. sci. U.R.S.S.*, 1942, **35**, 278-283 (through *Chem. Abstr.*, 1943, **37**, 1931[9]). The luminescence effects of the oxidation of 3-aminophthalic hydrazide, 3-acetamidophthalic hydrazide, 3-hydroxyphthalic hydrazide, lucigenin (dimethyl-bi-acridinium dinitrate), and pyrogallol plus formaldehyde by hydrogen peroxide were studied. All the compounds were dissolved in water except the pyrogallol-formaldehyde mixture, which was studied in solutions of 60 per cent. glycerol and 40 per cent. water. The initial intensity of the luminescence was measured photo-electrically as a function of the concentrations of the oxidised substances and of the concentrations of hydrogen peroxide, and the decrease of the light emission of the reacting systems was registered as a function of time of reaction. The intensity of the initial chemiluminescence increases less than proportionally with the concentrations of the oxidisable compounds. Hence the luminescence is not caused by a bimolecular reaction of the organic substances, and it is unlikely that it is a unimolecular process. The fact that the decrease of luminescence with the reaction time is faster for the smaller concentrations of the organic compounds, and that the quantum yield is the higher (per molecule of hydrogen peroxide) the lower the hydrogen peroxide concentration, leads to the conclusion that the mechanism of the luminescence is controlled by a process between the organic compounds and an unstable intermediate product formed in the primary splitting of the hydrogen peroxide molecule. C.

Water Vapour and Carbon Dioxide: Absorption of Infra-red Radiation. M. McCraig. *Phil. Mag.*, 1943, [vii], **34**, 321-342. The absorption of black-body radiation by water vapour, carbon dioxide, and mixtures of these gases with each other and with nitrogen has been measured. The total pressure was varied from 0·1 to 2·0 atm., and the path length from 25 to 100 cm. According to Beer's law the absorption is a function of the product of the partial pressure of the absorbing gas and the path-length. It was found that for mixtures of carbon dioxide and nitrogen Beer's law holds provided the total pressure is constant, but that if the total pressure is increased, whether by compressing a fixed quantity of carbon dioxide or by adding nitrogen, the law breaks down and the absorption increases. A similar increase was found with mixtures of water vapour and nitrogen. For water-vapour, even when the total pressure was kept constant, Beer's law failed when the partial pressure was increased, there being a slight increase in the absorption. The effect upon the absorption of changing the temperatures of the gas and the source of radiation, and the theoretical reasons for the departures from Beer's law are discussed. C.

Colour Vision: Evolution. G. L. Walls. *J. Appl. Physics*, 1943, **14**, 161-165. A brief review is given of our knowledge of colour vision in fishes, reptiles and animals and its association with diurnality and with retinae containing cones. It is pointed out that colour vision is associated not only with an abundance

of cones as such, but also with the development of exceptionally high visual acuity through the construction of a pure-cone retinal patch of maximum resolving power and that animals having colour vision have good mechanisms of accommodation. It is suggested that colour vision has been evolved for the enhancement of the over-all resolution afforded by the visual system and has been evolved only by groups of animals which already had laid a basis for excellent visual acuity. C.

Colour Vision: Physiological Theory. (1) E. N. Willmer. (2) K. J. W. Craik. *Nature,* 1943, **151,** (1) 632-635; (2) 727-728. (1) In a previous article attention was directed to the possibility that the physiological basis for colour vision might lie in the relative responses of the rods and the cones. In attempting to decide which was the significant relationship, the percentage of maximal rod response was plotted against the percentage of maximal cone response, i.e. rod sensitivity against cone sensitivity, for each wave-length. The figures were plotted directly from the scotopic and foveal photopic visibility curves given by Abney for the arc-light spectrum. The curve obtained is strikingly similar to the C.I.E. colour chart except for wave lengths longer than 600 mμ and shorter than 470 mμ. The interpretation and significance of the new diagram are briefly considered and explanations are given of points raised by Hartridge concerning the results of mixing extreme reds and extreme blues in different proportions and the appearance of colours examined after previous adaptation of the eye to violet light. (2) Various objections to Willmer's theory are discussed and a demonstration of the possibility of obtaining intensities equal to those of a "good" yellow or green from a mixture of red and blue is described. The unreliable nature of subjective judgments of colours, seen in isolation, and the value of colour matches are pointed out. C.

Colour Vision: Theory. J. H. Shaxby. *Phil. Mag.,* 1943, [vii], **34,** 289-314. Transformations of the energy of a primary sensory stimulus to that of molecules of the material of a sense organ lead to the concept of receptor energy, in the form of damped vibrations causing the ejection of electrons. It is shown that this energy, the proximal stimulus of sensory action currents, is the quantity S in the Weber-Fechner law $S = K \log I/I_0$. The limitations of the law are discussed in connection with the unequal sharing of stimulus energy among the receptor molecules. The cases of steady stimuli (in the skin senses, smell, etc.) are contrasted with those of periodic stimuli (in hearing and sight). The values of the visibility function for different wave lengths are calculated and shown to agree with the observed values. A theory of colour vision based on the electronic content of the discharges of action current, and not requiring the retinal triplication of the trichromatic theory, is shown to lead to an equation for a match in colour which is in accord with observed data. C.

Plastics: Mechanical Properties. T. P. Oberg, R. T. Schwartz and D. A. Shinn. *Modern Plastics,* 1943, **20,** No. 8, 87-100, 122-128. An account is given of investigations of the static tensile, compressive, stiffness and bending properties, and the fatigue characteristics of a number of thermoplastic and thermosetting plastic materials at temperatures of $-38°$, $0°$ and $78°$ F. Test procedures are described and results are shown in tables and graphs. The specific gravity of the materials ranged from 0·54 for plastic-bonded plywood to 1·38 for compressed, resin-bonded laminated wood. The laminated phenolic thermosetting plastics, paper and fabric bases, the resin-bonded plywood and the resin-bonded laminated wood, both compressed and natural or non-compressed, developed the higher specific strengths, with low elongation. In general, with decreasing temperature the static strength properties, modulus of elasticity, proportional limit, yield strength and ultimate strength increase, and the elongations and impact strengths decrease. This effect is very marked for thermoplastic materials and there is much less effect on thermosetting plastics, the ultimate strength increasing only slightly. Plastic-bonded wood is also very little affected by low temperatures. The data on fatigue properties indicate that plastics in general are not adversely affected by low temperatures. The thermoplastic materials showed a greater increase in fatigue strength at low temperature than the thermosetting plastics. The latter are affected by notches at normal temperatures, but the former are not. C.

Proteins: Theory of Periodic Structure. A. G. Ogston. *Trans. Faraday Soc.,* 1943, **39,** 151-158. The numerical conditions are shown which must be fulfilled

by a regular periodic structure, and a simple diagrammatic method of testing given which may be applied even to complex structures, provided that complete analytical data are available. Fulfilment of the conditions shows only that the data are consistent with regularity, which further evidence is needed to prove. There is no suggestion that 2 and 3 hold any unique position as prime factors in the structure of a regular array of the type considered; if the hypotheses of Bergmann and Niemann should be proved to be correct, whether for proteins or their sub-units, deeper insight into the structure and mode of formation of proteins will be needed to explain them. W.

Protein Molecule: Structure. D. G. Dervichian. *J. Chem. Phys.*, 1943, **11**, 236-246. A two-dimensional double layer of amino acids is postulated as the constitution of proteins in solution. From the known size of a single amino acid residue, the shape and size of a protein molecule of molecular weight class 3500 may be estimated. The denatured molecules are postulated to have a filamentous or fibrous form, characterised by the polypeptide chain. The evidence for such a postulate is reviewed. W.

Nature of the Reaction of Wool with Alkali. L. R. Mizell and M. Harris. *Amer. Dyes. Rep.*, 1943, **32**, 145-148. When wool is treated with alkali, one atom of sulphur is split off from each disulphide linkage, and no significant amount of thiol groups is formed. More than 25 per cent. of the non-cystine sulphur in the treated wool has been shown to be lanthionine by isolation of the amino acid. It is suggested that lanthionine is formed by fission between carbon and sulphur atoms of cystine, giving dehydroalanine ($=C=CH_2$) and $-CH_2-S-SH$ residues. An atom of sulphur is eliminated from the latter and the thiol group so produced reacts with the dehydroalanine residue to form lanthionine. W.

Fats, Oils and Soaps: Review of Literature for 1942. M. M. Piskur. *Oil & Soap*, 1943, **20**, 36-46, 58-71. W.

Human Body: Reactions to Physical Environment. D. Brunt. *Quarterly J. Roy. Meteorological Soc.*, 1943, **69**, 77-114. A lecture reviewing the heat exchanges of the human body with the atmosphere. Nude and clothed bodies are discussed for full ranges of indoor and outdoor conditions and the limits of body regulation are quantitatively investigated. W.

10—ECONOMICS

British Cotton Industry: Organisation. Cotton Industry Conference. *Manchester Chamber of Commerce Monthly Record*, 1943, **54**, 75-82. The full text is given of the "Report to the President of the Board of Trade on the Present and Future Organisation and Direction of the Cotton Industry" (24th March, 1943), which is the first report of the Cotton Industry Conference formed on 24th September, 1942. The report favours the continuance for at least a year or two after the war of a Cotton Board with statutory powers. C.

Cotton Goods: Production and Consumption in India. "Vidyarthi" and S. Gokhale. *Indian Text. J.*, 1943, **53**, 149-150. The authors present graphs of (1) the net available mill production in India, (2) the net amount available for consumption, (3) net imports, (4) estimated handloom production and (5) population for the period 1906-1939, and use them to criticise the "greed and the technical incapacity of the Indian money-owning class." C.

Textile Wholesale Prices, May, 1943. *Board Trade J.*, 1943, **149**, 221. Monthly index numbers are given for the period May, 1942, to May, 1943. The numbers for May, 1943, are Cotton 136·2, Wool 174·4, Other Textiles 135·3, All Articles 163·3 (1930 = 100). C.

Weaver's Wage: Calculation. H. M. Broadley. *Textile Weekly*, 1943, **31**, 773-774. The writer points out that there are at present two systems for calculating weaving prices in the cotton industry, (1) the Uniform List of Prices to be paid to weavers, under which the number of picks put in by the loom is calculated from the diameters of the train of wheels in the take-up motion and (2) the Prescribed Cloth Prices under the Cotton Control orders, in which the picks in the cloth are counted "on the table." The calculation from the train of wheels does not give the picks per inch exactly so that the two systems lead to different results. Thus, for a particular cloth the writer arrives at a weaver's piece rate of 170·98d. per 100 yards (after making all the allowances now in

force) and a weaving price of 175·40d. He recommends the adoption of the Cotton Control system (2) for both purposes. C.

Textile Wholesale Trade Index Numbers. *Bd. Trade J.*, 1943, **149**, 245. Index numbers of trading by wholesale textile houses in May are given, together with comparative figures for earlier periods. The figures for May are (1) sales for home trade, 98, and (2) value of stocks at the end of the month, 105, based on average monthly sales or stocks in 1937 = 100. The figures confirm the conclusion that the reduced clothes ration is producing a much stronger stock position. Home trade sales in May were 2 per cent. below those of a year earlier, whilst stocks were 15 per cent. higher. The May index is 3 per cent. below the average for the preceding 12 months, whereas normally May sales are about 6 per cent. above the average for the year. C.

11—INDUSTRIAL WELFARE, INDUSTRIAL PSYCHOLOGY AND EDUCATION

Medical Supervision. G. Lowe. *Mech. World*, 1943, **113**, 668-9. The institution of adequate medical supervision in the factory is of especial importance under war-time conditions and the factors affecting the health of workers are briefly discussed. The problem is urgent and suitable schemes to improve the situation are outlined. La.

Glycols: Toxicology. R. Walther. *Arch. f. Gewerbehyg. u. Gewerbepath.*, 1942, **11**, 326-344 (through *Bull. Hygiene*, 1943, **18**, 224-225). Experiments have been undertaken to determine the toxic effects on animals of propylene glycol, methyl glycol, methyl glycol acetate, ethylene glycol, diethylene-glycol-monoethyl ether, ethyl glycol and ethyl glycol acetate from the standpoints of (1) local irritation of skin and mucous membranes, (2) local tissue injury, and (3) absorptive effects. Details of the results are given. They indicate that whilst the dangers from inhalation or skin absorption of the glycols and their derivatives is negligible, ingestion may cause severe kidney damage without premonitory symptoms, whilst subcutaneous injection of medicaments containing glycols may produce tissue necrosis and toxic absorption. Propylene glycol appears to be the least toxic of the glycol group. C.

Low Grade, Stained Cotton: Illness Caused by —. P. A. Neal, R. Schneiter and B. H. Caminita. *J. Amer. Med. Assoc.*, 1942, **119**, 1074-1082 (through *Bull. Hygiene*, 1943, **18**, 227-228). Also Reprint from *Amer. J. Public Health*, 1942, **32**, 1345-1359. People engaged in making mattresses and some others in a cotton mill and cotton processing plants handling a low grade, dusty, yellow- or brown-stained cotton suffered from an illness coming on a few hours after inhaling cotton dust, characterised by fever, anorexia, nausea and vomiting, generalised aching and fatigue. Chemical and mycological examination revealed nothing to account for the effects, but bacteriological examination showed the fibres to contain large numbers of rod-shaped organisms, and cultures gave profuse and almost pure growths of a capsulated motile Gram-negative bacillus, classed as a species of *Aerobacter*. The same organism was recovered from the dust of this cotton and from dust in a cotton mill in which "mill fever" had occurred three years earlier; normal cotton did not contain it, yielding mixed and much less profuse growths of indifferent bacteria. Extracts of the cotton and filtrates of cultures of this organism contained a heat-stable toxic substance producing vomiting and diarrhœa in cats and eliciting a Schwartzman reaction in rabbits. Intradermal injection of cotton extract or culture filtrate produced severe inflammatory reactions in human skin. The inhalation of infected cotton dust had no distinct effect on six species of animal, but in human volunteers inhalation of either natural infected cotton dust, dust from normal cotton artificially infected, or filtrates of cultures of the cotton bacterium, produced illness corresponding to that observed in mattress makers. When the material inhaled contained the living cotton bacterium, this could sometimes, but not always, be cultivated afterwards from nose and throat swabs; blood cultures were always negative. It does not appear that the cotton bacterium produced an infection; its effects are considered to be due to an endo-toxin. It is pointed out that the illness shown by these investigations to be produced by inhaling the cotton bacterium resembles "mill fever," "Monday fever" and "gin fever" in cotton mill workers, and other febrile conditions seen in workers in flax, jute and grain. C.

Textile Research: Organization for War. F. S. Blanchard. *Mechanical Engineering,* 1943, **65**, 205-207. Effects of the war on textile research in America are briefly discussed. Organizations contributing to textile research are divided into the following categories: (1) Organizations representing textile associations, foundations, or membership groups. (2) Non-military governmental organizations. (3) Research organizations representing the various branches of the Armed Services. (4) Educational organizations. (5) Research foundations, or institutes not primary textile, or for some other industry. The work of these various organizations is reviewed, particular attention being paid to the rôle of the Textile Research Institute and Textile Foundation, and the Textile Research War Council. Reference is made to work on the conservation of wool, the substitution of cotton rope for manila and sisal, the utilization of high-strength cotton yarns in military equipment, aviation clothing, accelerated ageing of military fabrics, resistance of fabrics to ultra-violet light, rayon problems, military finishing requirements, and the warp-sizing of spun rayons. C.

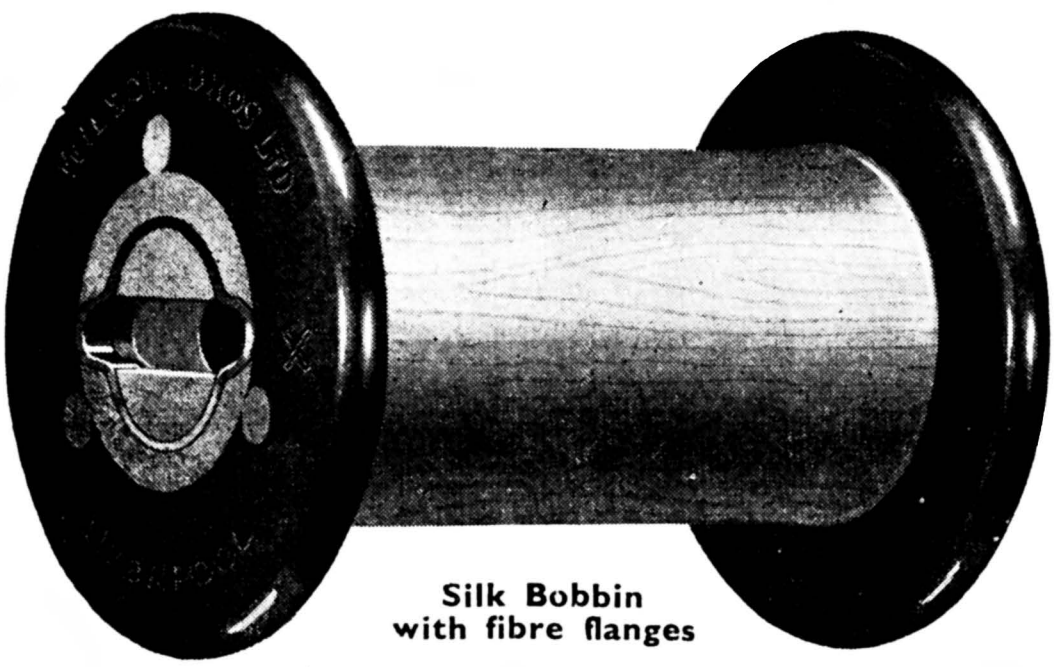
American Scientists: Organisation for the War. K. T. Compton. *Nature,* 1943, **151**, 601-606. The Pilgrim Trust Lecture to the Royal Society, giving details of the various organisations of men of science in the United States in peace time and the new bodies (councils, committees, etc.) now engaged in war-time research and investigation. C.

Industrial Research: Organisation in India. Sir Ardeshir Dalal. *Indian Text. J.,* 1943, **53**, 130-131. A report of an address on the organisation of research into the natural products and manufactures of India, with special reference to the establishment in 1940 of the Board of Scientific and Industrial Research under the direction of Sir S. S. Bhatnagar, D.Sc. Under this Board a National Chemical Laboratory is to be founded at Poona, a National Physical Laboratory, a National Metallurgical Laboratory at Jamshedpur, a Fuel Research Station at Dhanbad, and an All-India Glass Institute. The results of research will be exploited by a Research Utilization Committee. Some research problems are mentioned, including the production of "a cotton cloth which has the warmth of wool." C.

Woollen Mill: Dermatitis. L. Schwartz and J. E. Dunn. *Ind. Medicine,* 1942, **11**, 432-435 (through *Biol. Abs.,* 1943, B, No. 8958). An incidence of 21 per cent. dermatitis broke out among 333 workers in the card room, dyehouse, wash room and waste room of a woollen factory making blankets for the armed forces. Sodium dichromate gave the highest per cent. of positive reactions among 8 materials used for patch testing. The only change in the manufacturing process was the increase in strength of sodium dichromate in the dyebath from 0·5 to 3 per cent. The exposure to 3 per cent. dichromate solution produced chrome ulcers in some workers and chrome sensitivity in others not previously affected when exposed to 0·5 per cent. dichromate solution. W.

High Speed Photography. *Power & Works Engineer,* 1943, **38**, 115-6. A brief explanation of how high-speed photographic technique may be useful in industry and a description of special equipment which will give extraordinary results. La.

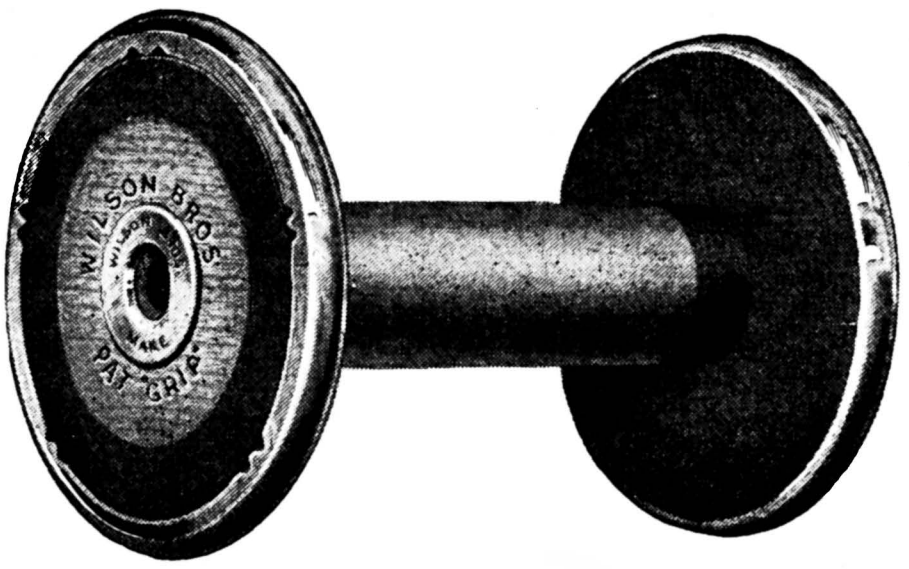
MAKERS *of all kinds of* BOBBINS
for COTTON, WOOL, SILK, ARTIFICIAL SILK etc.

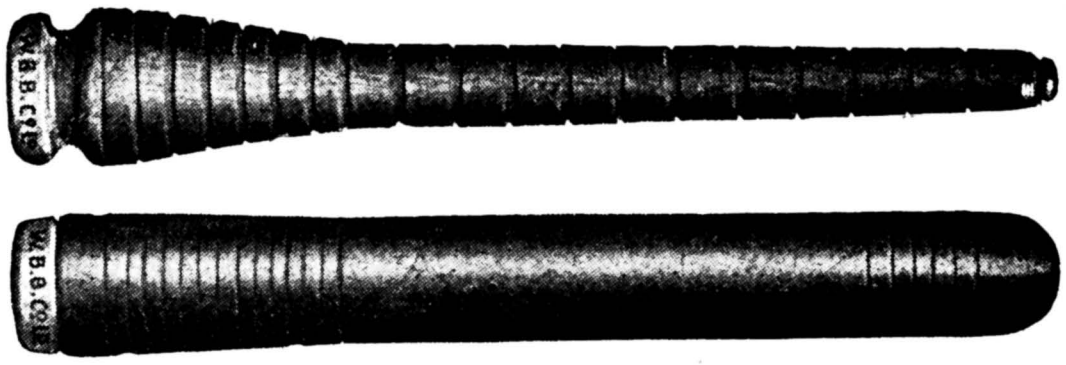


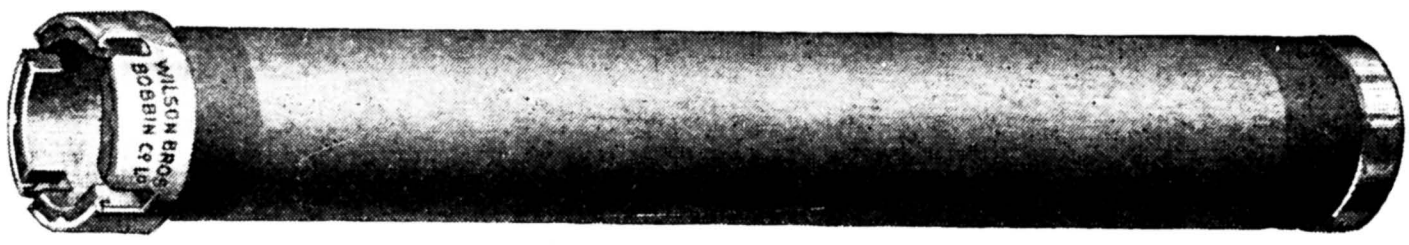
Silk Bobbin
with fibre flanges

TRADE MARK

CARDROOM TUBES
RING BOBBINS
WINDING BOBBINS
PIRNS etc



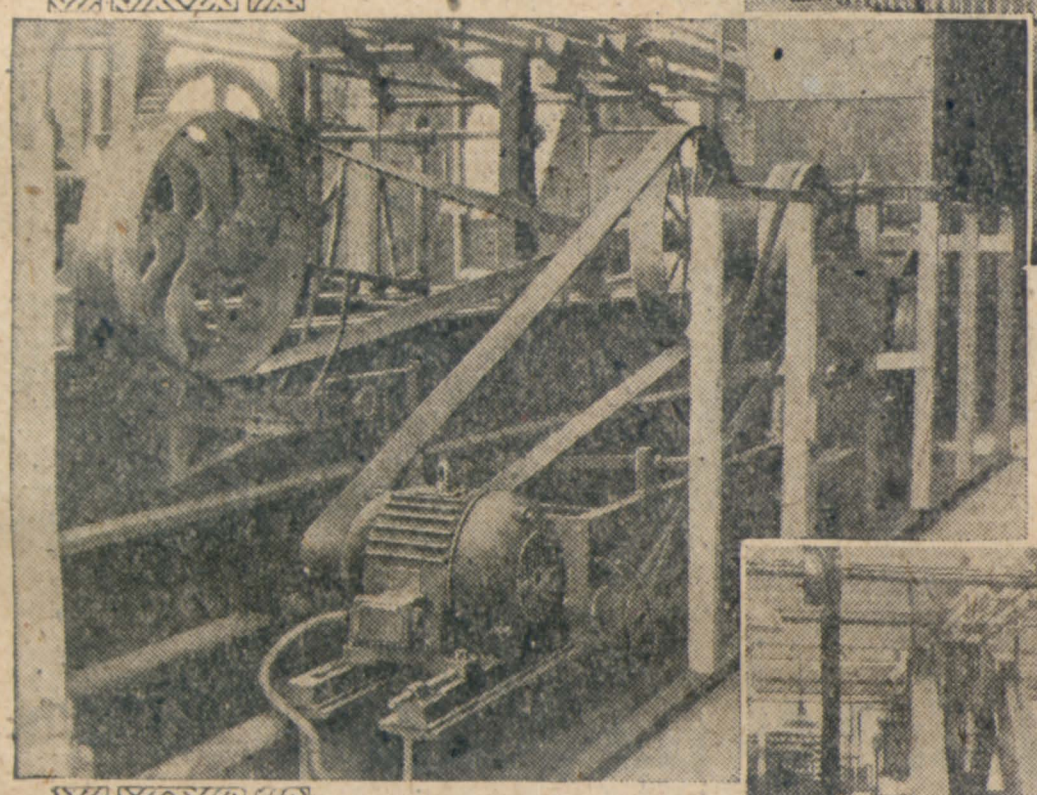


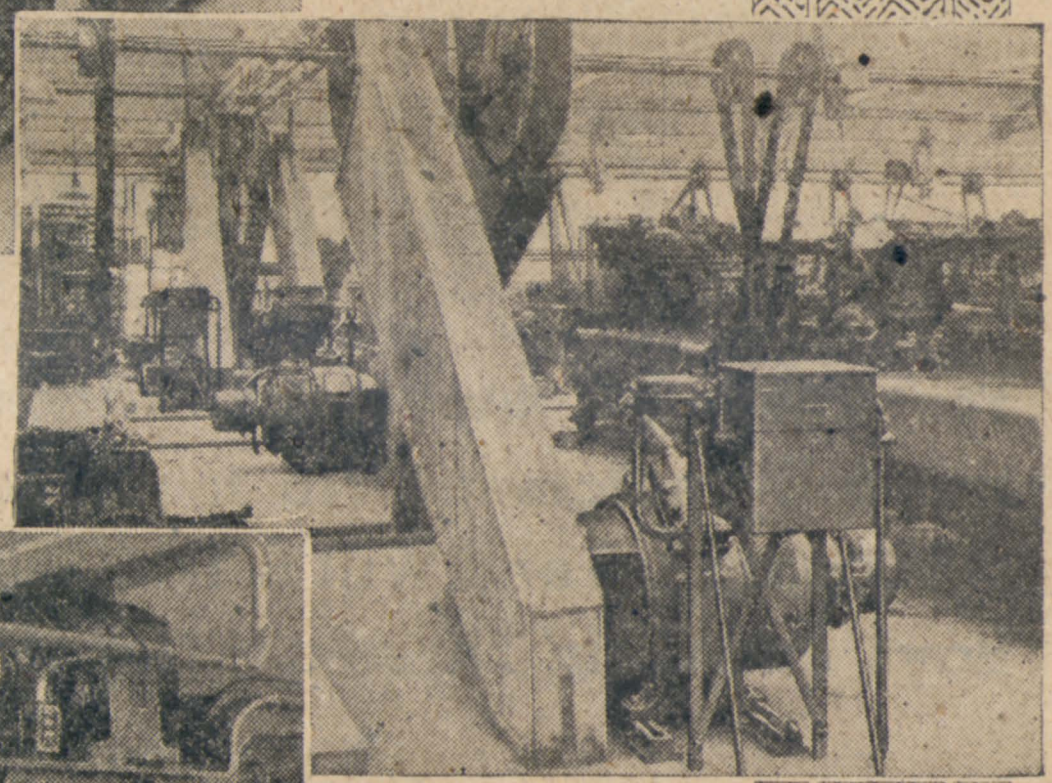


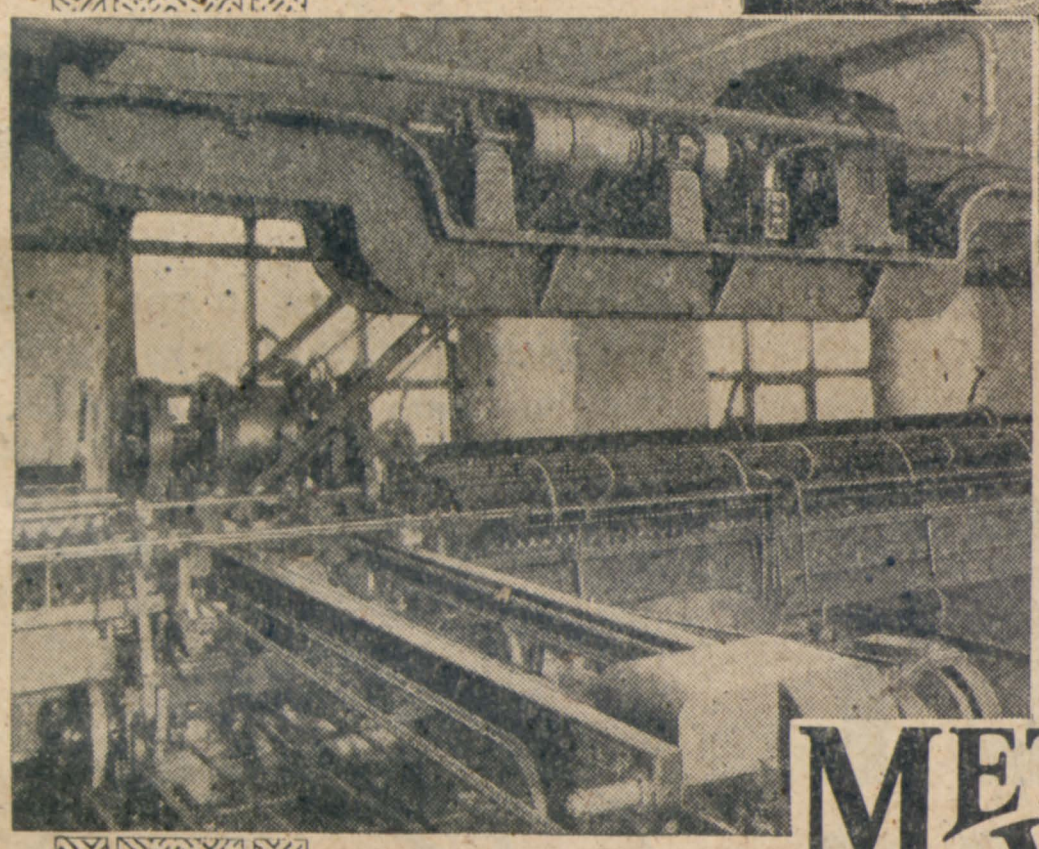
WILSON BROTHERS BOBBIN CO LTD
GARSTON LIVERPOOL

Telephone **Garston 900** ***Telegrams*** **NUGGET LIVERPOOL**

TYPICAL TEXTILE DRIVES







For electric motors and control applied to the driving of Textile Machinery specify—

METROPOLITAN Vickers

ELECTRICAL CO., LTD.

TRAFFORD PARK ··· MANCHESTER 17.

J/N902

Printed and Published for the Textile Institute (Offices—16, St. Mary's Parsonage, Manchester) by C. Tinling & Co. Ltd., Liverpool, London and Prescot.