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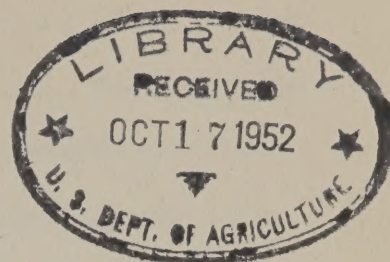
THE LITERATURE OF THE NATURAL FIBERS. //

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From antiquity until around 1900, the natural fibers were the only important raw materials of the textile industry. In 1900, they represented at least 99.9 percent of the world production of textile fibers. In 1950, they accounted for approximately 85 percent, although their production had almost doubled.

The first use of the natural fibers antedates written records by many centuries. Patterns of weaves on clay vessels attributed to the Old Stone Age and spindle whorls found among the relics of the New Stone Age are evidence that both weaving and spinning were practiced during those times. Because of the perishable nature of fibers, actual specimens of fabrics were not found until archaeological investigations uncovered them in early Egyptian tombs and in the remains of the Swiss Lake Dwellers. Such findings along with the very earliest written records show that our most prominent modern fibers — flax, wool, cotton, silk, and hemp — were among the first fibers used, illustrating, perhaps, the "survival of the fittest".

The technical literature of the natural fibers covers a very wide scope and is peculiarly complex. The natural fibers are exceedingly numerous. Our understanding and evaluation of their behavior are based on knowledge gained

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from diverse fields, including botany, biology, geography, and economics; as well as the many different branches of chemistry and physics. The literature reflects also many historical aspects, for a number of the crafts practiced through the centuries are the basis for modern textile technology and science. Therefore, if we are to know our fibers and to use them wisely, it is necessary to consider and attempt to correlate the influences of the various ^{of science} fields on their constitution, properties, and performance.

It is obviously impossible to present a comprehensive, impartial, and balanced survey of all the useful sources in so short a time. It is hoped that the presentation will serve as a key to the literature of the scientific and technological aspects of the natural fibers. Most of the sources cited contain bibliographies which will refer to sources having other bibliographies, and so on -- like an endless chain. The payoff is best if the chain is not broken before the original sources are reached. Few journal references are included, since these are available from the abstracting and indexing services, and from the treatises, monographs, and reviews.

The references given are, for the most part, those readily available and used in the United States and other English-speaking countries; but an effort has been made -- largely through the appended bibliography -- to include outstanding sources regardless of language or country of origin. If favorites are missing, please bring them to our attention so that they may be added in the event this paper should be published.

We shall now discuss briefly in the following order: classification and varieties of the natural fibers; problems of nomenclature; and sources we have found most useful for obtaining background information, for locating original records, and for keeping abreast of current developments.

Classification and Varieties

Although natural fibers are usually classified according to their origin as animal or vegetable, chemists generally think of them from the viewpoint of their chemical nature as protein or cellulosic. The mineral kingdom also produces an important fiber — asbestos — which has had limited use in the textile field because of processing difficulties.

The cellulosic fibers can be subdivided further into seed, bast, leaf, and fruit; and the protein fibers into wool and hair, and secretion, as shown in Table 1.

Table 1. Partial List of Natural Fibers

Cellulosic Fibers			Protein Fibers		
Seed	Bast	Leaf	Fruit	Wool and Hair	Secretion
Cotton	Jute	Abacá	Coir	Sheep's wool	Silk
Kapok	Flax	Sisal		Hair of the:	
	Hemp	Henequen		Camel	
	Ramie	Cantala		Alpaca	
	Sunn	Caroa		Llama	
	Kenaf	Istle		Vicuña	
	Urena Lobata	Phormium Tenax		Goat	
		Palm		Rabbit	
				Horse	
				Cattle	

Adapted from FAO "World Fiber Survey," 1947.

The World Fiber Survey, prepared by the Food and Agriculture Organization of the United Nations in 1947, considers nine of these fibers as of major economic importance — namely, cotton, jute, flax, hemp, abacá, sisal, henequen, wool, and silk. Ramie and kenaf might be added to these nine in the light of present investigations to find substitutes for strategic fibers that may be in short supply.

A more comprehensive list of commercially available natural fibers arranged in tabular form is included in the latest edition of ASTM Standards on Textile Materials. This list gives the commercial as well as the botanical or biological names.

The exact number of natural fibers that have served textile purposes cannot be determined since a great many of them have been tried on a small scale but have never attained economic importance. Vegetable fibers, in particular, are extremely numerous and diversified in character. In 1897, Dodge listed 1018 species in his Descriptive Catalogue of Useful Fiber Plants of the World. He described these species fully, treating them from botanical, agricultural, and industrial standpoints. The economic data are of course antiquated, but the scientific, commercial, common, and native names which have been included insofar as possible are still invaluable. Also given are the kind of fiber produced, the part of the plant from which it is taken, and the position of the species in the vegetable kingdom. Unfortunately this classic reference book has long been out of print, but it can still be consulted in many libraries.

A similar catalogue of fiber-producing plants was published in Germany in 1924 by Schilling. This work lists 1926 plants, which is almost twice as many as given by Dodge. This book is strictly a catalogue without the complete descriptions included by Dodge. Instead, there is a bibliography of 460 references to literature in all parts of the world.

Nomenclature

A discussion of where to find textile information inevitably presents the problem of nomenclature or terminology. This subject is particularly difficult for newcomers and occasional workers in the textile industry. As in most specialty fields, common words are sometimes used with special meanings; also British and Americans may use the same word but with different interpretations or they may have entirely different words to express the same idea.

Textile definitions most generally accepted for reference in the United States are those standardized by the American Society for Testing Materials and published in ASTM Standards on Textiles. ^{Materials} The Federal Trade Commission has also established definitions for use in enforcing its Trade Practice Rulings. These may differ from the ASTM definitions; for example, the ASTM restricts its definition of wool to "The fiber from the fleece of the sheep", whereas the Federal Trade Commission defines it as "The fiber from the fleece of the sheep or lamb or hair of the Angora or Cashmere goat (and may include the so-called specialty fibers from the hair of the camel, alpaca, llama, and vicuña)".

Other organizations also set up "standard" definitions for special purposes; for examples, the Trade Standards Division of the U. S. Department of Commerce in connection with Commercial Standards; the Federal Specifications Board for government purchase specifications; and the American Association of Textile Chemists and Colorists as part of textile test methods.

On the international basis, a serious effort to standardize textile nomenclature is being made by the Textiles Subcommittee of the International Standardization Organization (ISO/TC38). Committee D-13 of the American

Society for Testing Materials and the British Textile Institute, both working through their national Standards associations, are especially active in this effort. It is interesting to note that the other member nations have recommended that the American and British reach an agreement in their use of words before translating definitions into other languages.

Textile dictionaries generally give more descriptive definitions than those of the organizations just mentioned. Among recent dictionaries that are fairly comprehensive in scope are Callaway Textile Dictionary and Higgins and LaVault's A Comprehensive Dictionary of Textile Terms. For British usage, there is The "Mercury" Dictionary of Textile Terms.

Background References -- General

TREATISES, MONOGRAPHS. -- In our opinion, Matthews' Textile Fibers is the outstanding reference for an all-inclusive treatment of the various aspects of the different fibers and classes of fibers. It covers history, chemical and physical properties, microscopy, testing, utilization, and economics; and it provides an extensive bibliography with each chapter. It is interesting to remember that the first edition in 1904 represents "the author's endeavor ... to bring together as far as possible, all of the material available for the study of textile fibers." Much of this same ambition is sensed in the fifth edition, published in 1947, which is a complete revision of the earlier pioneer editions. A board of 45 experts cooperated in its preparation with Herbert R. Mauersberger as Editor.

The Marberg lecture of the late Harold DeWitt Smith can be highly recommended for its philosophical presentation on the physical and mechanical properties of the different fibers. This lecture entitled: Textile ^{Fibers} Physics; an Engineering Approach to their Properties and Utilization was delivered before the American Society for Testing Materials in 1944.

The more fundamental aspects of fiber constitution and behavior are dealt with in Astbury's Fundamentals of Fibre Structure and Textile Fibres under the X-Rays; Hermans' Contributions to the Physics of Cellulose Fibres and Physics and Chemistry of Cellulose Fibres; Marsh's Textile Science; Preston's Fibre Science; and the HIGH POLYMERS series of monographs, three of which are concerned with natural fibers — volume IV, Natural and Synthetic High Polymers, by Kurt H. Meyer; volume V, Cellulose and Cellulose Derivatives, edited by Emil Ott; and volume VI, Mechanical Behavior of High Polymers, by Turner Alfrey, Jr.

The more strictly chemical aspects of the vegetable fibers are treated in Doree's Methods of Cellulose Chemistry, Heuser's The Chemistry of Cellulose, and Marsh and Wood's Introduction to the Chemistry of Cellulose. Chemistry of the animal fibers was reviewed in the Fibrous Proteins Symposium, published by the Society of Dyers and Colourists in 1946. Fibers in general are dealt with in two textbooks, Hartsuch's Introduction to Textile Chemistry, and Fierz-David ^{and Merian's} Abriss der chemischen Technologie der Textilfasern; also in Heermann ^{and} Agster's Färberei- und textilchemische Untersuchungen; Frenzel's Einführung in die Textilchemie; and Valkó's Kolloidchemische Grundlagen der Textilveredlung.

Microbial Decomposition of Cellulose by R. G. H. Siu, published in 1951, is a comprehensive review of the various aspects of this field. Emphasizing cotton, Dr. Siu includes chapters on "Morphological, physical, and chemical features of cotton" (304 references), and sections on mechanism of degradation and on methods of prevention. Each chapter is followed by an extensive bibliography, with a grand total of over 2000 references. Indexes of authors, microorganisms, and subjects are given.

The most generally accepted methods for evaluating the chemical, physical, and microbiological properties of fibers and their products are given in the latest editions of ASTM Standards on Textile Materials (with Related Information); Federal Specification CCC-T-191b, Textile Test Methods; the Technical Manual and Year Book of the American Association of Textile Chemists and Colorists; and British Standards Institution Handbook, Methods of Test for Textiles. Helpful references on testing methods include the AATCC 1949 Monograph on Analytical Methods for a Textile Laboratory; Textile Testing, Physical, Chemical, and Microscopical by J. H. Skinkle; Textile Analysis by S. R. and E. R. Trotman; and Textile Untersuchungen by M. Nopitsch.

For microscopy, Hanausek's The Microscopy of Technical Products is helpful when examining cordage and hair products; Shillaber's Photomicrography in Theory and Practice, for these techniques; Von Bergen and Krauss' Textile Fiber Atlas and Wildman's Animal Fibres of Industrial Importance: Their Origin and Identification, as general references. Also valuable to the microscopist are two recent books in German, Herzog's Handbuch der mikroskopischen Technik für Fasertechnologen and Luniak's Die Unterscheidung der Textilfasern. For identification and analyses of fiber mixtures, the methods of the American Association of Textile Chemists and Colorists, the American Society for Testing Materials, and the British Textile Institute are all well-known and widely used working tools.

Textile Microscopy in Germany, Report No. 13 in the Quartermaster Textile Series, provides a valuable set of reference photomicrographs from Germany plus some electron micrographs of fibers, illustrative of techniques employed in the United States and Holland.

REVIEWS. — Since 1917, a review chapter on fibers, textiles, and cellulose has been included by the Society of Chemical Industry in its annual Reports on the Progress of Applied Chemistry.

In 1932, the United States Institute for Textile Research published Textile Research; A Survey of Progress which reviewed the literature for 1931 and was intended as the first of a series of such compilations. Unfortunately only one volume was published.

In 1949, Review of Textile Progress, a new annual devoted exclusively to the textile industry was started by a group from the Textile Institute and the Society of Dyers and Colourists who felt the need for more complete information on textiles. The prominently featured subjects include physics and chemistry of fibrous materials, fiber production, and conversion of fibers into finished yarns. Two volumes have so far been issued, covering 1949 and 1950 developments respectively.

In 1950, the staffs of the Textile Research Institute and the Textile Foundation began publication in the Textile Research Journal of annual Reviews of Research and Development in the Field of Textiles. The review of 1949 literature includes 826 references, that of 1950 literature, 1622 references.

The 1951 Conference of the Textile Institute had as its theme: "Textiles — the Past, Present and Future". Progress during the past 100 years received particular attention in the papers which are presented in full in the August 1951 issue of the Proceedings.

In 1949, a series of ten authoritative papers on Structure of Textile Fibers was published in the Proceedings of the Journal of the Textile Institute. Three of the papers are general and five deal with specific natural fibers.

Specific Fibers

COTTON. — The scope of the American Cotton Handbook by Merrill, Macormac, and Mauersberger is well described in its sub-title as "A Practical Reference Book for the Entire Industry". This handy and widely-used book treats historical, statistical, and economic background of the American cotton industry, and all phases of cotton manufacture from the growing of the plant through the testing and laundering of the finished products. An extensive bibliography is included.

In 1896, the U. S. Department of Agriculture published a 433-page Office of Experiment Stations Bulletin entitled: "The Cotton Plant: Its History, Potany, Chemistry, Culture, Enemies, and Uses", which is packed with interesting summaries of historical information, including a 62-page chapter on "Chemistry of cotton". The material presented is well documented with references up to that time. The historical review by R. B. Handy is especially worthy of notice.

Of historical interest also is The Structure of the Cotton Fibre by F. H. Bowman, published in 1908.

In 1923, in the early days of the British Cotton Industry Research Association, seven reviews of literature pertaining to cotton were published in the Transactions of the Journal of the Textile Institute.

Botanical and agronomical aspects of cotton are treated in The Wild and Cultivated Cotton Plants of the World by Sir George Watt; The Development and Properties of Raw Cotton and Studies in the Quality of Cotton by W. Lawrence Balls, one of the deans of the cotton industry; in Cotton: History, Species, Variety, Morphology, Breeding, Culture, Diseases, Marketing and Uses by H. P. Brown; and in The Evolution of Gossypium by Hutchinson, Silow, and Stephens.

Cotton Research Proposals, a compilation of needed technical research on cotton fiber utilization based on a report to the Secretary of Agriculture from the Cotton Advisory Committee is the lengthy title of a pamphlet prepared and published by the National Cotton Council of America in 1947. This report will be of special interest to those who plan and direct research programs.

WOOL. -- American Wool Handbook. A Practical Text and Reference book for the Entire Wool Industry well describes this useful volume by Warner Von Bergen and Herbert R. Mauersberger. The second edition, published in 1948, includes chapters on historical and economic background, sheep breeds and raising, specialty fibers, physical and chemical nature and properties of wool, chemical and mechanical processing, testing and bibliography.

Dr. William McMurtrie's Report upon an Examination of Wools and other Animal Fibers published in 1886 by the Government Printing Office is still often quoted. This comprehensive report is based on a scientific examination of the fineness, strength, elasticity, and felting properties of the various breeds of sheep exhibited in 1880 at the International Exhibition of Sheep, Wool, and Wool Products in Philadelphia.

Bowman's Structure of the Wool Fibre published in 1902 is also of historical interest.

Wool Quality by S. G. Barker presents a resumé of world-wide chemical, physical, and biological research on the wool fiber through 1931. The same author, in 1929, summarized the existing state of scientific knowledge of wool in an Empire Marketing Board publication: Wool: A Study of the Fibre.

Beginning in 1950, the Wool Bureau, Inc. (U.S.A.) has issued an annual bulletin in which current wool research activities are reviewed and suggestions are given for research and development studies in the areas of mill

processing, laboratory tests and standards, fundamental research, product development, and production and marketing. The 1952 edition adds a list of domestic and foreign research laboratories that are actively engaged in wool research.

A list of "Basic Information Sources" on Wool and Wool Manufactures was issued in 1949 by the Inquiry Reference Service of the U. S. Department of Commerce. Especially helpful in locating publications of the different federal agencies it also includes lists of nongovernment books, directories, trade and professional associations, trade papers and research associations concerned with wool.

SILK. -- Bibliography of the Technical Literature on Silk by F. O. Howitt is a comprehensive survey of the technological and scientific aspects of the literature to 1944. An explanatory introduction to silk technology and glossary of silk terms are included.

Handbook No. 2 in the Textile Institute's technology series, also by Howitt, covers the origin, properties, and economics of silk.

The latest book is Silk, Biology, Chemistry, Technology, by Carboni of the Silk Experiment Station in Milan. This work is an up-to-date revision in English of a standard Italian reference which covers the field from the cocoon through dyeing, with chapters on analysis and properties of the fiber.

The U. S. Department of Commerce issued a list of "Basic Information Sources" on Silk and Synthetic Fibers, Yarns, and Fabrics in 1943. Government and nongovernment publications, directories, trade associations and papers, and research organizations are among the sources listed.

Long Vegetable Fibers

The long vegetable fibers include the bast or soft fibers, such as jute, flax, and hemp; and the leaf or hard fibers, as sisal and abacá. Flax and hemp are the oldest; jute gained commercial prominence since 1832, now ranking second only to cotton in production; sisal and abacá are relatively newcomers.

The U. S. Department of Agriculture has been publishing bulletins and reports on cultivation and processing of vegetable fibers since 1880.

Significant contributions were the Office of Fiber Investigations series (1890-1898) and Dewey's Fiber Production in the Western Hemisphere (1943).

Long Vegetable Fibers by Weindling, published in 1947, describes cultivation and commercial practices with emphasis on the American cordage fibers. The World Study of Hard Fibers and Hard Fiber Products of the Department of Commerce appeared in two parts in 1949 and 1951.

Fabric Research Laboratories, under a Navy contract, investigated the mechanical properties of hard fibers with reference to their use in cordage structures and reported results in their Technical Reports 3 and 4.

With soft fibers classed among strategic materials, the production and processing of vegetable fiber plants have been accented since World War II. Progress of sansevieria, ramie, and kenaf are reviewed in the Yearbook of Agriculture, 1950-51.

Economic aspects are covered in the Bureau of Agricultural Economics' annual The Jute and Hard Fibers Situation, begun July 1951.

JUTE. -- The 1950-51 Annual Report of the Indian Central Jute Committee mentions the compilation of a 900-item bibliography covering jute science and technology since 1920. This Committee published A Review of the Position Reached in Technological Research in Jute by C. R. Nodder in 1949.

Chaudhury's Jute and Substitutes, published in 1933, is a useful treatise. The Textile Institute's Handbook on Jute (1949), by H. L. Parsons, is already out of print.

FLAX AND LINEN. — An extensive bibliography is to be found in Tobler's Der Flachs als Faser- und Ölpflanze.

Two reports were issued in 1946 by the Georgia School of Technology on The Processing of Domestic Flax for Textile Use. I. Decortication and II. Retting and Degumming.

HEMP. — U. S. Department of Agriculture Farmers' Bulletin No. 1935 dealing with the growth and harvesting of Hemp was revised slightly and reissued early this year.

RAMIE. — The most recent general reference is Luniak's book in German on Ramie ^{published in 1949} History, nomenclature, botany, production, processing, and manufacture are treated in the first part and the properties and uses in the second part. The latter includes chemical, physical, and mechanical properties of the fiber including optical and electrical — also information on identification.

In the same year, the Office of Technical Services issued a report on Ramie Production in Florida and the Fabric Research Laboratories one on Degumming of Ramie. The latter investigation was conducted under contract with the Office of Naval Research.

A critical survey of Ramie by G. L. Carter and Paul M. Horton appeared in 1934.

KENAF. — In March of this year, a bibliographical survey of Kenaf (Hibiscus cannabinus L.) by Lewis P. McCann was published by the U. S. Department of Agriculture. ^{as its Bibli} A review of the literature is followed by a bibliography of 115 references.

An earlier review by Julian C. Crane with 53 references appeared in Economic Botany in 1947.

A joint contribution from the Ministry of Agriculture of Cuba and the Office of Foreign Agricultural Relations of the U. S. Department of Agriculture, published in 1951, concerns Kenaf -- Producing it for Fiber and for Seed. The work reported was carried out as part of the Point IV program of technical cooperation administered by the Technical Cooperation Administration, U. S. Department of State. OFAR has issued several other "Fact Sheets" on kenaf.

Abstract and Index Services

The textile field is served by several outstanding abstracting journals and indexing services.

Chemical Abstracts is the first choice. World-wide coverage of chemical aspects of natural fibers, annual and decennial subject and author indexes are among its valuable features. It is interesting to note the first issue in 1907 contained a section entitled "Dyes, Bleaching and Textile Fabrics" in charge of the late Professor L. A. Olney, a post he held until his untimely death in 1949.

The Abstract Section of the Journal of the Textile Institute, begun in 1918, has undoubtedly the most complete coverage in the general field of textiles. The abstracts are classified, and author and subject indexes are published annually. The subject index, largely title entries arranged alphabetically under broad subjects, does not compare favorably with the excellent, specific indexing in Chemical Abstracts.

Abstract sections are included in several other textile journals, among them Bulletin de l'Institut Textile de France, Canadian Textile Journal, Journal of the Society of Dyers and Colourists, Melliand Textilberichte, Textil Praxis, Textil Rundschau, and TIBA. Textile Research Journal had its own abstracts through 1949. The American Dyestuff Reporter occasionally carries "Foreign Notes", which are reviews of articles appearing in foreign publications.

In 1944, both Natural and Synthetic Fibers and Textile Technology Digest were started. The former, edited by Harris and Mark, is a loose-leaf literature and patent service with full abstracts of selected articles. The latter, compiled by the Institute of Textile Technology has relatively short abstracts and covers leading textile journals.

Other useful abstract sources include Biological Abstracts, British Abstracts, Chemisches Zentralblatt, Coton et fibres tropicales, Bulletin Analytique, Empire Cotton Growing Review, and Engineering Index.

Bibliography of Technical Reports is an important guide with brief abstracts to the many technical reports of investigations made by or for the United States military forces and which have been released since the end of World War II.

The outstanding indexing journal is USDA Library's Bibliography of Agriculture. With its monthly author and annual/indexes and its coverage of world literature in agriculture and related sciences, it is especially helpful in locating some of the less publicized reports. Superseding Cotton Literature, which served the cotton interests so well from July 1930 through June 1942, it extends the service to other fiber interests.

Available from the Superintendent of Documents, the Monthly Catalog, with both monthly and annual indexes, is the most complete list of current U. S. government publications.

The Technical Manual and Year Book of the American Association of Textile Chemists and Colorists includes a very comprehensive annual index on "Chemical, physical, technological, and biological aspects of textiles". This index has developed from a modest beginning into one of the most convenient listings since it now contains the year's crop of articles arranged by authors and followed by an extensive subject index based on the pattern set by Chemical Abstracts. The 1951 list included 937 references, for which much credit is due Mr. W. H. Cady, who is also on this program.

Agricultural Index and Industrial Arts Index include references on the natural fibers and list the periodicals covered.

Bibliographies, Reading Lists and Library Catalogues

Bibliographies, reading lists and library catalogues often yield obscure references that might otherwise be missed.

Textile World's Textile Bibliography, compiled by Richard C. Scott, is the latest comprehensive list of English-language books. A similar compilation, restricted to books published between 1930 and 1951 on scientific and technological aspects, is found in the 1951 Technical Manual and Year Book of the American Association of Textile Chemists and Colorists. In 1938, the Bureau of Foreign and Domestic Commerce published its third edition of Textile Reading List, a Partial Bibliography on Textile Information.

The 1951-52 Year Book of the Textile Institute includes both a listing of its Library Catalogue and a classified list of books suggested for general reading on textile subjects. Fifty-five pages of fine print were required for the Library Catalogue.

The North Carolina School of Textiles Library maintains an up-to-date Mimeographed Accession List of its excellent collection of books and periodicals relating to textiles.

Periodicals

Journals to be scanned regularly will be determined by individual interests and requirements. In making selections, the wide scope of the natural fibers should be remembered plus the fact that journal titles are often misleading. Lists of textile periodicals are available.

Many important domestic and foreign technical journals are the official organs of associations. Representative titles with their sponsors are in the "List of Sources".

Miscellany

In addition to the general references, abstracting and indexing services, bibliographies, and periodicals, there are many miscellaneous sources of original data and information. These include government agencies, national and international trade and research organizations, research and consulting laboratories, and textile schools. No doubt many other possibilities will be suggested by particular circumstances. Knowledge of where research is being conducted and by whom can usually be acquired through reading scientific and trade periodicals and by attending scientific meetings.

The many opportunities which might be developed along these lines are too numerous for discussion, but some are suggested in the appendix.

Conclusion

In this presentation, we have shown how limitless are the boundaries of the field of the natural fibers. No other commodity, except possibly food, has served man in so many different ways. Now that scientific methods have been introduced for elucidating the properties and behavior of the fibers, we can look to a future with much greater diversity of products as well as the possibility of tailor-making products for particular end-uses.

THE LITERATURE OF THE NATURAL FIBERS

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List of Sources

The references cited here are, for the most part, those readily available and used in the United States and other English-speaking countries. A special effort has been made, however, to cover also the more important contributions in other languages since they may not be so well-known or appreciated domestically.

In order to avoid repetition, the books listed in the "Textile Bibliography" of Textile World (see Section V) are not given unless they are mentioned in the text.

The list of sources is arranged in the following order:

- I. Classification and Varieties
- II. Nomenclature, Dictionaries
- III. Background References
 - A. General
 - B. Specific Fibers
- IV. Abstract and Index Services
- V. Bibliographies, Reading Lists and Library Catalogues
- VI. Periodicals
- VII. Miscellany

^{1/} One of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

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III. BACKGROUND REFERENCES

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<u>Country</u>	<u>Journal Title</u>	<u>Sponsor</u>
Australia	The Textile Journal of Australia	Associated Cotton Textiles Mfrs. of Australia Textile Soc. of Australia Woollen & Worsted Mfrs. of Australia, etc.
Belgium	Textielwezen	Unie van Textielingenieurs en -bedrijfsleiders, L'Union des Ingenieurs et Directeurs Textiles
Canada	Canadian Textile Journal	Can. Assoc. Textile Chem. & Colourists Textile Soc. of Canada

<u>Country</u>	<u>Journal Title</u>	<u>Sponsor</u>
France	Bulletin de l'Institut Textile de France	L'Institut Textile de France
	Fleur bleu	Confédération Générale des Fabricants de Toile de France
Germany	Melliand Textilberichte	Vereins der Textil-Chemiker und -Coloristen (VTCC)
Great Britain	Empire Cotton Growing Review	Empire Cotton Growing Corp.
	Faraday Society, Transactions of; Discussions of	Faraday Society
	Journal of the Textile Institute	Textile Institute and British Cotton, Linen, Silk, and Wool Research Associations.
	Journal of the Society of Dyers and Colourists	Society of Dyers & Colourists
India	Jute Bulletin	Indian Central Jute Committee
Norway	Norsk-Tekstil Tidende	Norsk Tekstil Tikkish Forbund
Sweden	Meddelanden Från Svenska Textilforsknings- institutet	Svenska Textilforsknings- institutet
Switzer- land	Textil Rundschau	Schweizerischen Vereins der Chemiker-Coloristen und der Kommission (Textilindustrie) des Schweizerischen Verbandes für die Materialprüfungen der Technik

<u>Country</u>	<u>Journal Title</u>	<u>Sponsor</u>
U.S.A.	American Dyestuff Reporter	American Association of Textile Chemists and Colorists
	ASTM Bulletin	American Society for Testing Materials
	Papers of the AATT	American Association of Textile Technologists
	Textile Research Journal	Textile Research Institute
	Textile Technology Digest	Institute of Textile Technology

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