SECOND ANNUAL REPORT

OF THE

UNITED STATES
TARIFF COMMISSION

FOR THE

FISCAL YEAR ENDED JUNE 30, 1918

WASHINGTON
GOVERNMENT PRINTING OFFICE
1919

UNITED STATES TARIFF COMMISSION

Office: 1322 New York Avenue,
Washington, D. C.

COMMISSIONERS.

F. W. TAUSSIG, *Chairman.*
THOMAS WALKER PAGE, *Vice Chairman.*
DAVID J. LEWIS.
WILLIAM KENT.
WILLIAM S. CULBERTSON.
EDWARD P. COSTIGAN.

WILLIAM M. STEUART, *Secretary.*

TABLE OF CONTENTS.

SECOND ANNUAL REPORT OF THE UNITED STATES TARIFF COMMISSION.

WASHINGTON, D. C., *November 26, 1918.*

TO THE CONGRESS:

The United States Tariff Commission begs herewith to submit its second annual report for the year 1917–18.

As noted in our first annual report, Vice Chairman Roper resigned from the Commission September 26, 1917, having been appointed Commissioner of Internal Revenue by the President. On February 21, 1918, Thomas Walker Page, of Virginia, was appointed a member of the Commission, and subsequently was designated to serve as vice chairman of the Commission. With this exception the personnel of the Commission has remained unchanged. Mr. William M. Steuart, who had been appointed acting secretary during the year 1917, was made secretary of the Commission on January 1, 1918.

The Commission has remained in the quarters which were secured during the previous year, at 1322 New York Avenue. These quarters, while sufficient and convenient for the staff of the Commission as it stands at present, will not prove adequate in case of a considerable enlargement of the staff, the need of which is indicated elsewhere.

TARIFF INFORMATION CATALOG.

As was stated in the first annual report of the Commission, its most important function is that of having at the command of Congress, on all phases of the tariff question, information that will facilitate well-advised legislation. To this end the Commission has proceeded systematically with the preparation of its Tariff Information Catalog.

The plan of organization for this part of the Commission's work has been carefully considered and has now been standardized. Each paragraph of the revenue act of 1913 is being analyzed, and tariff information units segregated. In some cases a unit will cover a whole paragraph in the tariff act; in other cases, where a paragraph enumerates several articles, there will be separate units for each of them.

The information recorded covers for each article, a general description, the uses to which it is put, the methods and processes of its manufacture, notable divergencies between American and for-

eign methods, the nature and source of supply of materials, domestic production and exports, imports from principal contributing countries, revenue from imports, the extent to which imports compete with domestic production, cost of manufacture so far as obtainable in foreign countries and in the United States, suggestions for changes in the act of 1913, and other pertinent data.

Extended correspondence has been carried on with manufacturers, exporters, and dealers. Conferences have been held with the representatives of a number of industries, both with associations and with individuals. The information obtained in this way has been incorporated in the Tariff Information Catalog so far as it can be stated in summary form. The auxiliary files contain all correspondence and memoranda as originally received, without abbreviation or change, and are available for reference where more detailed information is desired. All pertinent information is being codified and arranged in convenient form for consultation. The Tariff Information Catalog has been completed for 158 commodities and at the close of the year work was in progress on 506 more. The names of these commodities are listed in the appendix. The Commission is compelled to state, however, that lack of funds, and the call upon the Commission itself and upon members of its staff, for war services, have made it impossible to expand this work as quickly and as fully as is necessary if its object is to be fully attained. Some important schedules of the tariff have hardly been touched at all. No part of the Commission's work is more important, and none is more directly dependent upon the organization and maintenance of a skilled staff.

To illustrate the character of the work, there are appended samples of the catalog for certain commodities. These examples are transcripts, without change, of what appears in the catalog for the several articles. The units were selected somewhat at random, but in such manner as to indicate the different kinds of information obtainable for different articles. Steel rails, one of the articles, have had a long history and have played an important part in tariff discussions, but now present very different problems from those of the past. Cotton gloves, upon the other hand, are commodities the manufacture of certain classes of which has been newly established in the United States, more particularly under war conditions, and illustrate problems of readjustment which press for immediate consideration. Bleaching powder is a chemical product in which conditions have changed in recent years. Quicksilver is an example of a mineral of minor quantitative importance, of peculiar geographical distribution, and of inter-relation with other industries. These examples are presented by the Commission as the clearest indications of the work that has been done, and of what needs to be done for a very much greater

range of commodities than the Commission has yet been able to touch.

PUBLICATIONS.

In connection with the Tariff Information Catalog separate reports have been published from time to time, which are an outgrowth of the work upon that catalog, and serve as handbooks upon various industries. The reports of this character so far published are:

Silk and Manufactures of Silk.
The Button Industry.
The Glass Industry as Affected by the War.
The Surgical Instrument Industry.
The Brush Industry.

In addition to these handbooks, the Commission has published reports upon the chemical industry, which are in part an outgrowth of the Tariff Information Catalog, and in part are issued for independent reasons. A preliminary report upon the dyestuff situation in the textile industries has been issued; and more important, a census of the production of dyes and coal-tar chemicals was issued in September, 1918. A report upon the revision of the customs administrative laws has also been published.

PUBLICATIONS IN PREPARATION.

The following is a list of publications and reports which are completed or nearly completed, although not published:

Sugar Production, Imports, and Competitive Conditions.
Minor Acids.
Heavy Chemicals.
Cotton Goods.
Cotton Yarns.
Agricultural Products.
Free Zones.
Reciprocity and Commercial Treaties.
Preferential Tariffs within the British Empire.
French Colonial Tariffs.
German Colonial Tariffs.
Japan:
- Trade During the War.
- The Tariff System of..
- Industrial Development of, prior to and during the War.

China:
- Tariff.
- Trade Report.

Dyes and Coal-Tar Chemicals.

Dyes and other coal-tar chemicals have been given special attention, both on account of the rapid development of the industry in the United States and on account of the exceedingly complex and technical tariff problems involved.

In order to secure information in regard to how the textile industry had been affected by the curtailment of imports of dyes from Germany, a detailed questionnaire was sent to a large number of representative textile mills. The information secured in regard to their experience was compiled and published in a pamphlet entitled "The Dyestuff Situation in the Textile Industries." It appears that although there was little closing of textile mills owing to lack of dyes, widespread shutdowns were narrowly averted. The textile mills were forced to economize greatly in the use of dyes by changes in design and by dyeing in lighter shades. Natural dyes were used in greatly increased amounts. Considerable quantities of dyes originally made in Germany were imported from other nations, chiefly China. In many cases textile mills were forced to use dyes in a manner and for purposes for which they were not suited. The cost of dyes increased manyfold. By the close of 1916, however, American dyes were being made in sufficient quantity to prevent a widespread disaster to the textile industry. The needs of woolen mills were met earlier and more satisfactorily than the needs of cotton mills.

In September, 1918, the Commission published a "Census of Dyes and Coal Tar Chemicals, 1917," which shows in great detail the production of dyes and other coal-tar chemicals during 1917. This census was undertaken by the direction of the President for the purpose of preparing for the administration of certain provisions of the revenue act of 1916. The revenue act of September 8, 1916 (Title V, sec. 501), provides for a reduction of duties upon intermediates and dyestuffs, if at the expiration of five years after 1916 it is found that less than 60 per cent of the domestic consumption is being produced in the United States. In order to secure systematic and accurate information, which may be helpful to Congress in framing amendatory legislation, the Commission proposes to take annually a census of coal-tar chemicals.

The census for 1917 shows that there were 190 firms which manufactured coal-tar chemicals during that year, including 81 firms which made dyes. The total production of American dyes during 1917 was approximately equal to the annual imports before the war, but the distribution over the different classes of dyes was an abnormal one. Indigo, the most important of all dyes, was being made at the rate of only a few per cent of the normal consumption, and whole

groups of dyes of the highest quality, including alizarin and its derivatives and the fast vat dyes derived from anthracene and carbazol, were not made on a commercial scale. This defect is, however, being remedied in 1918.

The few and relatively small dye factories which existed in the United States before the war were dependent upon Germany for scores of essential chemicals. The American industry has now freed itself from dependence on any imported raw material, except sodium nitrate from Chile. Much, however, remains to be done before the industry can be regarded as firmly established. Many important missing dyes must be made, costs must be lowered by systematic study of the details of manufacture, and operatives and investigators must gain in knowledge and in skill by experience. It is probably inevitable that a large proportion of the firms which have entered this field will have to retire when competitive conditions return, but the industry will probably survive.

The act of September 8, 1916, has doubtless contributed to this development by encouraging the investment of capital in the industry. It has, however, become clear that the act is not so worded as to carry into effect, completely and perfectly, the presumable intent of Congress. There are many loopholes which permit the evasion of the intent of the law, and there are also serious difficulties in the interpretation and administration of the law as it stands. The Commission has sent a report to Congress, pointing out these difficulties in considerable detail, and has prepared a draft of a bill, which, without changing the principle or fundamental policy of the present law, attempts to remedy these defects.

In preparing the draft of this bill, conferences have been held with representatives of manufacturers, of importers, of the customs staff, and with technical experts. The attention of the Congress is respectfully called to this draft, and to the report which explains in detail the suggested amendments.

Other Chemicals.

MINOR ACIDS.

Another inquiry which is well advanced, and on which a handbook will shortly be published, deals with the acids covered by paragraph 1, of schedule A, together with several closely related products provided for in other paragraphs. Although these are minor products, the problems which they raise are typical, and the results will, it is believed, be instructive. The commercial development of several of them since the outbreak of the European war is likely to have a permanent influence on the conditions of international competition.

Citric acid is a by-product of the lemon-growing industry, as it is made from cull lemons. Before the war cull lemons were almost entirely wasted by American growers; they are now being largely utilized in the manufacture of products formerly obtained almost entirely by importation. Although impure lactic acid, suitable for technical uses, has long been made in the United States, it is only recently that an edible grade has been produced here. The only manufacturer of formic acid in the United States in 1914 was dependent on a semi-finished material imported from Germany; after the outbreak of the war he was compelled to stop making formic acid. This acid is now being made in this country exclusively from American raw materials. The report will discuss the changes in these industries in considerable detail.

HEAVY CHEMICALS.

A report of wider scope, dealing with the heavy chemical industry, is in progress, but is not so well advanced. The abnormal demand for many of the heavy chemicals, created by the war, has resulted in a great increase in productive capacity, both in the United States and in Europe, which may be expected to intensify international competition. This is especially true of the chemicals needed for the manufacture of explosives and poisonous gases, but competition will be felt in many other lines. In many cases the United States Government has erected and operated the plants for the production of these chemicals.

TEXTILES.

SCHEDULE L.—SILK AND SILK GOODS.

A pamphlet on Silk and Manufactures of Silk was prepared early in 1918. This pamphlet is a preliminary report designed to furnish basic data for the use of Congress in a study of schedule L. Definitions of articles mentioned in the tariff are given, together with descriptions of processes of manufacture, and information as to imports, exports, and domestic production. There is appended to the report a digest of Treasury Decisions concerning the interpretation of the tariff law affecting silk and silk manufactures.

SCHEDULE I.—COTTON GOODS.

Cotton yarn.—The imports of cotton yarn are being carefully analyzed to determine the sections of industry that would be affected by any changes in the tariff law. A study of the invoices of all yarns received in the fiscal years 1914 and 1918 is being made, and particulars have been tabulated of about 92 per cent of all yarns imported in those years. From these original data tables have been

prepared, classifying the totals by several criteria, namely, count and ply; whether combed or carded; whether in the grey, bleached, or dyed state; and whether mercerized, gassed, prepared, or subjected to other special finishing processes. Importers were questioned as to the uses of imported yarns and tables were compiled to show the amounts used by each industry and the nature of their requirements. It appears that the imported cotton yarns are mainly made from Egyptian cotton, mule spun and doubled in the United Kingdom. For many years the main competition has been in the range from 58s. to 78s., but it is shown that the domestic industry has been extending its competition into medium fine counts; where the main number imported was formerly 58s., it is now 78s.

The lace and lace curtain industries are the largest importers of foreign yarns, and they are absolutely dependent for their "prepared bobbin yarn" on a few mills in England which produce this specialty. The knit goods industry is the second largest consumer of foreign yarns. The hosiery mills are now relying almost exclusively on domestic yarns but the chamoisette glove industry, a war development, has had to import most of its special requirements from England. The import of cotton yarn for weaving cotton cloth is a minor item, smaller than the amount required by the silk industry in weaving cotton-back velvets, cotton-back satins, and umbrella cloths. The different kinds of imports have been classified by countries, special attention being given to the yarns formerly supplied by Germany, such as Turkey red yarn for towel stripes, hand-knitting yarns, and polished yarns for shoe laces.

Cotton cloths.—Our import trade in cotton cloth, a matter of much tariff discussion in the past, was made the subject of a field study during the summer of 1918. The inquiry was confined to New York City, the chief port of entry of foreign goods as well as the seat of the large dry goods commission houses. Its purpose was to ascertain the principal lines of cotton goods imported from various countries, why they were imported, and the nature of the competition they met from similar goods made in the United States. A particular effort was made to measure the influence of the tariff on this competition, as well as the disturbances or changes in the trade brought on by the war.

The investigation disclosed that the import trade was in a large measure supplementary to, rather than in direct competition with, the lines of cotton cloth produced in this country. Most of the imported cotton fabrics were made of medium to fine yarns, and were of a character which for various reasons prevented their manufacture generally in the United States. War conditions have dislocated the general import trade in cotton goods only in small measure, owing to

the fact that the trade with Great Britain, which furnishes 80 per cent of our imports, was well maintained. The yardage of cotton cloth imports during the year ending June, 1917, particularly from England, was the largest in several decades, exceeded only by the years 1906–1908.

The principal lines imported from Great Britain have been linings, particularly venetians; fine plain white goods, such as muslins, cambrics, and lawns; voiles; fancy shirtings; ginghams; piqués; and fancy dress goods. Swiss imports, principally fine white goods, such as lawns, organdies, and dotted swisses, fluctuated in volume. French imports, principally plain and novelty dress goods, fell off markedly during the war. Imports from Germany and Austria, mainly fancy dress goods and coarse yarn colored goods, practically ceased with the fiscal year 1915. A striking increase in the imports from Japan was one of the notable developments during the war. This was almost entirely in cotton crêpe for men's shirts, a novelty of a few years' duration and already on the wane. Japanese crêpe is distinctive and is not a direct competitor of American-made crêpe, which is different in character and used mainly for kimonos.

Venetians.—The largest single import of cotton cloth into the United States during the past few years has been that of venetians. The estimated total consumption of the American market increased from 8,000,000 yards in 1913 to 14,000,000 yards in 1915 and in 1917 exceeded 35,000,000 yards. The typical fabric is a close woven, piece-dyed mercerized sateen or twill, woven of medium to fine yarns, usually dyed black, and given a characteristic "Marquise" finish to resemble heavy silk. On account of their close weave and fine lustrous finish, venetians have been found particularly adapted to the lining of clothing, the making of bathing suits and skirtings, and for other purposes where a solid yet soft and sightly fabric is desired. It has, in fact, supplanted silk satin for several purposes, being more durable and less expensive. It has also been used as a substitute for fine woolen linings.

The venetian trade presents a typical after-war tariff problem. This fabric was originally finished in the Bradford district of England, and up to 1915 was almost entirely imported. The expanding uses for venetians in this country during the past few years, however, combined with the inability of the English mills, restricted in output and hampered by wartime difficulties, to supply all needs, stimulated American manufacturers to renewed experimentation and opened a market for their increased production, with the result that during the past year (1917–18) domestic manufacturers were supplying probably half of the American market for venetians. In June, 1918, a large part of the supply, both imported and domestic, was taken

over by the War Department, as an emergency measure, for the lining of service coats.

The continued maintenance of the American venetian industry after the war is dependent partly upon the measure of tariff protection accorded this class of goods, and partly upon factors of trade conditions and comparative costs here and abroad which can not be fairly gauged until industry returns to normal.

Chamoisette gloves.—These gloves are manufactured of sueded cotton, are washable, and are made in imitation of chamois, or sueded leather. They have been extensively used since 1906, and their popularity has greatly increased of late because of the high prices of leather gloves. Prior to 1914 no gloves of this variety were manufactured in the United States. Ninety per cent of the cotton gloves imported came from Germany and almost all were made in Chemnitz, Saxony. The domestic industry has developed rapidly since 1914, and during 1917 the annual production was estimated at about one million dozen pairs.

The Commission made an extended investigation of the industry. While technical difficulties have been encountered by the American manufacturers, they are emerging from the experimental stage and are now turning out a product of excellent quality. One of the most difficult things to achieve has been the velvety suede finish which gives the gloves the appearance of leather. The "duplexing" or "combining" of two thicknesses of the cloth, for use in making heavier gloves, has also given trouble, but gloves of this variety were placed on the market in the fall of 1918. The Tariff Information Catalog on Cotton Gloves is reproduced in the appendix.

As in the case of venetians, this industry presents an after-war problem. The duty under the act of 1913 is 35 per cent.

Import records and other sources of information.—The Tariff Commission has on file samples of the principal lines of cotton cloth imported into the United States from each country, together with such details as to construction, prices, shippers, and importers, as could be secured. When possible, the more important lines were studied in detail; leading importers, manufacturers, and gray-goods houses were interviewed in the endeavor to ascertain the more exact conditions and limits of competition between the foreign and domestic fabrics.

Slight aid could be secured from the official records as at present constituted concerning the exact character and comparative volume of the different classes of imported cotton cloths. It was possible, therefore, to study in detail only a few of the prominent lines of imports. It is planned to extend this inquiry, and to publish the results in the form of a pamphlet in the Tariff Information Series.

Ad valorem and specific duties on cotton manufactures.—An effort is being made to ascertain comparative costs here and abroad on typical cotton fabrics of varying description, in their relation to the adjustment of the tariff schedule. The investigation consists first, of bringing the report of the Tariff Board, made in 1912, up to date in respect to the costs of manufacture of certain American fabrics, and second, making a comparison of the equivalent specific and ad valorem duties under the acts of 1909 and 1913, upon certain cloth constructions. The central problem is that of the relation between the duty and the cost of conversion. This is found to vary widely.

A given yarn or fabric made of American cotton has, normally, almost exactly the same cost for raw material, whether made in England or the United States; the significant element for tariff purposes is the cost of conversion in the respective countries. The present ad valorem duties are levied upon the foreign market value of the imported product. The question of paramount importance is not the relation of this duty to the total cost of the similar American fabric, but to the conversion cost of such fabric. On coarse fabrics, the duty as levied on the basis of foreign values may be several hundred per cent of the conversion cost of a similar American product, while on fine imported fabrics the duty may be a small percentage of the conversion cost of a similar domestic product. This situation the graduated ad valorem rates attempt to meet; but the aim may or may not be accomplished. For with the fluctuating prices of raw cotton, and the changing proportion which the raw material constitutes of the total value of a fabric, an ad valorem duty, which is assessed as a percentage of the total market value of the commodity, may fluctuate widely—and variously for different cloths—quite out of proportion to any changes in the costs of conversion or the comparative advantage of the foreign or domestic producers. This problem of an equitable arrangement of the tariff schedule will be particularly important in the readjustments under new levels of wages and prices.

GLASS.

A pamphlet entitled "The Glass Industry as Affected by the War" shows that, while all branches of the industry have been seriously affected by the abnormal conditions that have prevailed since the war began, commercial production has increased, and export trade in specific lines has extended to countries not hitherto reached by American glass manufacturers. Among glass manufacturers the consensus of opinion is that although the war has injuriously affected the domestic production of a number of staple articles, through lack

of important ingredients, it has stimulated the industry to a remarkable degree, and has been the principal factor in the creation and development in this country of a number of new branches. Among these are optical glass, laboratory or chemical ware, special grades of glass gauge tubing, watch crystals, oven glass, glass brick, siphon bottles, glass for spectacles, photographic glass, and high-grade picture glass.

Optical glass, although not required in large quantities, is of the greatest importance in war operations, as by its use in range finders and gun sights, firing, especially by artillery, is directed and controlled.

Before the war the United States was mainly dependent upon Germany for its supply. Through the aid of scientists of the Carnegie Institution, at Washington, and of the Bureau of Standards the essential details of manufacture were developed in seven months, and optical glass production was begun by the end of 1917. At the present time there is a large output of optical glass of the kinds needed for military fire-control instruments, the quality of which compares favorably with the best European glass.

Many industries requiring research work—the testing of processes and the analyses of materials—are dependent upon chemical and scientific glassware for their successful continuance. Before the war practically all of such ware was imported from Germany. With the supply cut off, successful research and experimental work enabled American factories to combine and melt the essential ingredients. Their success in a short period of time has been remarkable. Comparative tests made by the Bureau of Standards show that many of the American-made wares are the equal of the German, and that others are superior for general chemical laboratory use.

Before the war European manufacturers also supplied the United States with practically all of the thinner glass used in frames of expensive pictures. They also furnished photographic glass, and thin glass for lantern slides and slides for microscopic work. The American company now making these kinds of glass by a machine process states that it does not fear foreign competition in picture or photographic glass after the war. All of the glass siphon bottles used in the United States were formerly imported from Austria and Germany. The American owners of an automatic bottle-making machine now manufacture all the siphon bottles used in this country—about 1,000,000 a year. The machine making this and all other kinds of bottles is entirely automatic, requiring no operator in the process. Oven glass for baking and cooking, a heat-resisting glass, is a development of chemical ware. It is a distinctive American product. Other branches of glass production, entered upon by American manu-

facturers since the outbreak of the war, are the making of spectacle glass; tubing, made of special chemical glass and used for water gauges on high-pressure boilers; parabolic mirrors for battleship searchlights; glazing glasses for polishing leather; and glass brick for building purposes.

The older branches were well established and technically far advanced before the war. That of machine-made cylinder window glass and automatic bottle production was introduced commercially in 1903 with imperfect results; the work of perfecting the machines, devices, and methods has continued up to the present time and a high degree of mechanical efficiency has now been reached.

At a conference held in Pittsburgh, the attention of the Commission was directed to the need of a revision of the glass tariff classification. Although the rates of duty have been changed under all tariff acts, there has been but little change in the classification for upwards of 40 years. Great branches of the industry, such as that of illuminating glassware, have been created and developed during that period, and of these the tariff acts and classification have taken no cognizance. It was pointed out that the glass tariff classifications of some foreign countries are much more detailed than those in the tariff law of the United States. A suggested classification approved by the American Association of Flint and Lime Glass Manufacturers contains 55 paragraphs, whereas the tariff act of 1913 has but 29 paragraphs.

White Earthenware Pottery.

The changes brought about by the war have been some substitution of domestic for imported materials and the abolition of competition in certain kinds of imported ware.

Sixty per cent of the potteries of the country used imported English ball clay exclusively before the war, and the other 40 per cent used both English and American ball clays. The war changed this condition and the average in 1918 has been 50 per cent of American ball clay admixture for all potteries. The result of using a greater quantity of domestic clay has been the production of ware inferior in quality.

Practically a new industry has been established in the United States by the use of American-made decalcomania since the war began. Decalcomania is the art or process of transferring designs and pictures for decorative purposes to white-ware pottery. The word is also used to designate the products so made. Before the war nearly all of the decalcomania used was imported, about 60 per cent from Germany and about 40 per cent from England. At the present time 90 per cent is made in the United States.

When trade relations are resumed with Austria and Germany it is thought that strong competitive conditions will reappear in the American market. American potters believe that they will be in a much stronger position to meet the after-war competition than they were in 1913, on account of the installation and successful operation of new devices and systems for the more rapid and more economical production of the ware.

The production of chemical pottery for use in laboratory work has been greatly developed since the war began. A large proportion of the chemical porcelain was formerly imported from Germany. Its domestic production was so small, relatively, that the figures were not reported separately prior to 1916. Porcelain "guides" used in looms in the weaving of silk, wool, and cotton were also imported before the war, the American market depending upon Germany for the supply. The intricate technical processes involved in their manufacture have been mastered, and they are now being successfully made in the United States.

Brushes.

Paragraph 336 of the act of 1913 covers the imports of brushes of all kinds and imposes a duty of 35 per cent ad valorem.

In the latter part of 1917 associations and individual manufacturers of the industry called the attention of the Commission to the fact that, on account of higher cost of raw materials and labor, they were no longer able to compete with foreign products, especially those of Japan, which were then being offered on the American market at prices lower than the domestic product. They stated that for these reasons the ad valorem duty no longer afforded sufficient protection to the home industry, and requested the Tariff Commission to make a study of existing conditions and to submit the findings to Congress at the proper time. Conferences were accordingly held with manufacturers, and information was collected by questionnaires and through investigation in the field. The results are given in a report on the brush industry, Tariff Information Series No. 8.

The industry has profited by the partial elimination, during the war, of European competition and by the large orders for brushes by the Government, the Red Cross, and foreign countries whose trade before the war was supplied by the brush-producing countries of Europe. Foreign competition in the past has been almost entirely on toilet brushes, particularly toothbrushes. It has been estimated that from 50 to 60 per cent of the toilet brushes used in the United States are imported from Europe and Japan.

Buttons.

An investigation of the button industry in the United States was made in response to appeals to the Tariff Commission by important button manufacturers for changes in the present tariff law. The principal provisions in the tariff law of 1913 bearing on buttons are in paragraphs 151, 339, and 356, which levy ad valorem duties ranging from 15 per cent to 60 per cent. In addition to interviews with importers and exporters and conferences between members of the Commission, manufacturers, and representatives of associations, an investigation was conducted in the field. Much valuable information was also secured through questionnaires, more than 500 of which were sent to button factories throughout the country. The results are given in a report on the button industry, Tariff Information Series No. 4.

Before the war Germany and Austria-Hungary were the largest exporters of buttons, sending their wares into every foreign market. From 1910 to 1915 the United States imported from these countries an annual average of about $1,000,000, or over 70 per cent of the total imports. Since the cessation of imports from Germany and Austria, Japan has become the source of a considerable part of our imports of shell buttons (fresh water and ocean pearl). The expansion of this trade is shown by the fact that Japan sent the United States in 1916 pearl buttons to the value of $770,849 as against $28,057 in 1912. As a large proportion of these buttons were of small sizes and came in at very low prices, the quantity was great and the competition with similar domestic products was severe.

There was serious competition with domestic producers from European countries prior to the war, and the competition from Japan has increased during the war. The domestic fresh water and ocean pearl button industries are particularly affected.

Metals and Manufactures of Metal.

The innumerable items included in the metals schedule of the tariff, the differing stages of development of the industries concerned, the varied nature and source of the materials used, render the problems to be studied more numerous and sometimes more difficult than in any other schedule. The progress of the Commission's work in this field has been peculiarly hampered by lack of money and the difficulty of securing an adequate number of qualified investigators. It has, however, been pushed with such dispatch as was possible, and specimens of its Tariff Information Catalog, in the form of reports on steel rails and quicksilver, are given in the appendix. The cata-

log includes a considerable list of other metal items already covered with similar completeness.

Many metals with established methods and lines of production and trade have been seriously disturbed by the war. This has been notably true of tungsten, quicksilver, magnesite, chromite, and manganese, the domestic production of which has been greatly expanded. The difficulty of readjustment to peace conditions led the Commission to hold conferences at Denver and San Francisco with those interested in tungsten and quicksilver, and the opportunity was taken to confer also with the interests concerned in the importation and use of antimony. The information thus secured was supplemented from all other available sources for incorporation in the Tariff Information Catalog. The Commission intends at an early date to publish a handbook on these and other minor metals.

SURGICAL INSTRUMENTS.

In May, 1918, the Tariff Commission held a conference with representatives of the surgical instrument industry. More than 50 manufacturers, dealers, and importers attended.

As the result of this conference, of questionnaires sent to manufacturers, importers, and dealers, and of field inquiry, the Commission prepared and published a pamphlet "The Surgical Instrument Industry in the United States." The report is restricted in scope to metal instruments used by surgeons in diagnosis and in operations upon the human body. Two general classes of instruments are considered: (1) Steel instruments, such as knives, scissors, and forceps; (2) soft metal instruments which include hypodermic and other syringes, catheters, probes, canulas, and trocas.

Until the beginning of the European war in 1914, American surgeons were almost entirely dependent upon Germany for steel instruments. The few American surgical-instrument factories of any importance were engaged chiefly in the prduction of soft-metal goods, i. e., instruments and appliances of brass and copper. In the fall of 1914 the shutting off of foreign supplies resulted in a shortage of steel instruments. The stimulus thereby given to the American industry caused rapid expansion. The output of soft-metal goods doubled in the years 1914–1917, and the production of steel instruments increased from 200 to 300 per cent.

After the entrance of the United States into the war in April, 1917, Government orders for instruments for the use of the Army and Navy further stimulated the industry. American manufacturers were called upon to supply, within a few months, a quantity equal to several times their normal output. The total purchase by the War Department from April, 1917, to September, 1918, amounted to

$8,500,000, which was enormous in proportion to the size of the industry.

Before the war, the great variety of types and patterns and the limited demand necessitated skilled hand labor for a large proportion of the output. War conditions revolutionized the industry. The types of instruments required by Army surgeons for effective work were reduced to about 800 in a standard list drawn up by a committee of the Council of National Defense. Mass production in specialized establishments and on standard patterns was made effective by the use of machines designed to perform operations formerly requiring skilled hand labor. The scarcity of skilled labor made the designing and use of machines almost imperative.

While concentrating their attention upon the production of instruments for military use, manufacturers were forced to increase their output to meet the requirements of the civil population. A shortage of improved types of steel instruments developed, and prices increased from 50 to 200 per cent over the 1914 level. To supplement the production of American manufacturers a new source of foreign instruments was drawn upon. In the fall of 1915 a few thousand dollars worth were brought into the United States from Japan. In 1917 Japanese imports probably amounted to between one-third and one-half of the prewar annual import of surgical instruments from Germany.

Surgical instruments, as such, have never been provided for in tariff legislation. As manufactures of steel not otherwise provided for, they had been dutiable at 45 per cent ad valorem for more than half a century prior to 1913, except from 1894 to 1897, when there was a reduction to 35 per cent. In the act of 1913 the rate was reduced to 20 per cent.

The suggestions which the Tariff Commission has received from manufacturers recommend two changes in the tariff act: (1) That surgical instruments be taken out of the general or "basket" clause and be given a separate classification; and (2) that a higher rate of duty be imposed.

Several large importers oppose an increase in the rate of duty on Japanese instruments until more normal trade relations shall indicate the permanent conditions of competition between Japanese and American producers. Representatives of American hospitals urge the continued free entry of instruments for their use on the ground that they are charitable and educational institutions.

KNITTING NEEDLES.

The manufacture of needles in the United States has been confined almost entirely to sewing machine and knitting machine needles. Large sewing machine companies make their own needles as a sub-

sidiary product, and there has been little foreign competition in this line. But German knitting machine needles were strong competitors prior to 1914 in the American market. The cessation of imports and the extraordinary war-time demand for knit goods has caused a shortage of needles in the United States and in other countries formerly supplied by Germany. England, France, Switzerland, and Japan now manufacture knitting needles. Conditions existing in the industry were such as to prompt the manufacturers to request a conference with the Tariff Commission. A conference was held in Boston during April, 1918, with representatives of the industry.

Since German competition has been cut off, there has been an increased demand for the American machine needle in foreign markets, which, because of domestic need, the manufacturers have been unable to supply. Exports have increased somewhat, but most manufacturers are doubtful about retaining this trade. Some manufacturers of sewing machine needles report a loss in export trade since 1914 as a result of the decrease in exports of machines.

Agricultural Products.

The Commission has in preparation a handbook on the commerce of the United States and Canada in agricultural products. The section of it that deals with wheat, oats, barley, and flaxseed is nearly complete. It aims to show the effects of the grain duties during the past decade. A careful study was made of production and prices in both countries and the general course and fluctuations of the grain trade with a view to ascertaining the causes of importations and the influence of imports and the tariff on the market and on producers' prices. The report discusses competitive conditions as they existed previous to the outbreak of the war and the effect that the renewal of peace may have, in each country, upon the production and trade in grain.

In response to requests from the citrus fruit, olive, olive oil, and raisin producers of the Pacific coast, conferences were conducted with their representatives and with importers at New York, San Francisco, Los Angeles, and Fresno. At San Francisco a hearing was also given to those affected by the import of eggs and egg products from China. The information thus secured, together with that assembled from other sources, has been incorporated in the Tariff Information Catalog. The catalog also contains material pertinent to the tariff relating to hay, potatoes, beans, tea, coffee, crude cocoa, the cocoa and chocolate industry, and other products.

Sugar Production, Imports, and Competitive Conditions.

The Commission has made detailed studies of costs of production in the beet sugar industry of the continental United States and in

the raw cane sugar industry of Cuba, Hawaii, Louisiana, and Porto Rico. Schedules were sent to the manufacturers in the several localities covering costs for 1916–17 and 1917–18 and estimated costs for 1918–19. The data secured by these schedules have been tabulated and made the basis of a report, which brings to date some of the information contained in publications issued by the Department of Commerce,[1] and by the Federal Trade Commission.[2] The new data relating to the effect of the war upon costs and prices furnish the basis for a discussion of the probable effect upon the industry of changes in the tariff, and an estimate of the proportion of the domestic output that is dependent upon the tariff under normal conditions.

The report is accompanied by charts, showing, in graphic form, the costs of production, factory by factory, of cane and beet sugar in the several centers of the industry. So far as the Commission knows, no accurate exposition of this kind has ever before been undertaken in any country for any industry.

By means of the data collected and the charts based on them, the Commission, working in cooperation with the United States Food Administration, was able to establish an accurate basis for the regulation of prices of sugar. Upon the basis so established the prices for the crop of 1918–19 were in fact largely fixed.

The Commission has also undertaken, again in cooperation with the United States Food Administration, a study of the cost of refining cane sugar. Costs of refining for all cane refiners were obtained for (*a*) the first nine months in 1917, (*b*) the last three months in 1917, and (*c*) the first five months in 1918.

This investigation was carried on by field work, and a report was written to meet the needs of the Food Administration. Later the refiners were requested to furnish the Commission with monthly reports, both of cost of production and of financial results, and also to supply the same information for the calendar years 1914, 1915, and 1916. Returns are now being received and tabulated. A full report on costs of refining sugar will be prepared as soon as the data for the calendar year 1918 are available.

Customs Administrative Laws.

In August, 1918, the Commission submitted to the Committee on Ways and Means a report on the operation of the customs administrative laws, with recommendations for amendment. As stated in the first annual report of the Commission, this subject has been the occasion of repeated conferences with representatives of the Treasury Department, of the Board of General Appraisers, of the

[1] The Cane Sugar Industry, 1914.
[2] The Beet Sugar Industry in the United States, 1914.

Court of Customs Appeals, customs officials at important ports, and members of the New York customs bar. While complete agreement has not been reached upon every single item in the proposed revision of the laws, the Commission is able to state that the revision has been indorsed almost in its entirety by all consulted.

The need of a revision of these laws has long been felt. No revision covering the whole subject has been made for more than a century. In the meantime statute has been added to statute, sometimes without repeal of those in conflict; and many provisions are redundant and ambiguous. In mere bulk the present laws are almost unmanageable. The proposed revision, while sacrificing no essential point, occupies about one-fourth of the existing statutes.

In the report presented to Congress the statutes as they stand have been printed in one column, and in a parallel column the proposed revision. The main lines of the proposed changes have been summarily explained in a brief introduction. At the same time an index has been provided at the close, enabling easy reference to those sections in which the significant changes are to be found.

While the work has been in the main one of codification and simplification, some important changes in substance are recommended. Most important is that by which the appointment of the chief customs officers is to be made by the Secretary of the Treasury instead of by the President. This would involve the automatic application to these appointments of the rules and regulations of the civil-service law; since under existing statute, appointments thus made come at once within the scope of that law. In other words, the Secretary of the Treasury would make the appointments not within his uncontrolled discretion, but subject to the provisions of the civil-service law. On the other hand, the removal of these officials from the list of presidential appointees would bring it about that confirmation by the Senate would no longer be required. It is further recommended that these customs officials should be appointed not for terms of four years, as now, but for terms of six years.

Other important changes, of a more technical sort, relate to the bond and warehouse system, which is not only simplified, but made more elastic; to the application of penalties, and more particularly to the removal of certain unduly drastic provisions for preventing the undervaluation of goods subject to ad valorem duties; to the enlargement of administrative discretion in many cases where at present there is unnecessarily detailed statutory provision; and to procedure before the Board of General Appraisers.

This matter involves no changes in rates of duty, and no matters of economic policy. It is one merely of business-like and systematic

procedure. There is complete agreement among all concerned that a reform in these bulky, confused, inconsistent, and largely obsolete statutes is desirable.

Free Zones.

Soon after its organization, the Tariff Commission took up the study of free zones in ports, as alternative to the existing system of bonded warehouses, bonded manufacturing warehouses, and repayment of drawbacks on exported dutiable goods of foreign origin.

The Committee on Ways and Means, through its chairman, made request for a report on this subject. The inquiry involved consideration of foreign free zone practice and results, and of the laws governing free-port concessions in foreign countries. The investigation of foreign procedure was followed up by queries concerning the probable usefulness of such a device in expediting American commerce. Many business men possessed of foreign and American experience were consulted, hearings were held in New York, Philadelphia, and San Francisco, and questionnaires were sent out to those especially interested.

As a result of the investigation, a bill, drafted in conjunction with Members of the House and Senate, was introduced in both Houses. This bill has been referred to the Ways and Means Committee of the House and to the Committee on Commerce of the Senate. The latter committee has called for a report on the bill and the propriety of its passage. The Commission has submitted its findings on the general question, and has considered the bill and suggested certain amendments thereto. The Commission recommends the adoption of permissive legislation, in the belief that it is in the interest of American commerce. Its report has been ordered to print by the Senate committee.

Acknowledgment is due the State Department for many valuable reports and documents secured through the Consular Service, and also the Department of Commerce for data concerning foreign and domestic ports, their facilities, and tonnage.

Unfair Foreign Competition in American Markets.

The Commission has in preparation a report on the prevalence of unfair competition by foreign producers in the markets of the United States, particularly that form of it commonly known as "dumping." Numerous interviews were held by an experienced member of the Commission's staff with manufacturers, importers, retail merchants, and customs officials who were in a position to speak with authority on the subject, and informal conferences relating to unfair trade methods and practices were held by the vice

chairman and other members of the Commission. Through correspondence with officials of chambers of commerce, boards of trade, manufacturers' associations, and other business organizations in all parts of the country, a list was compiled of individuals who were thought to be possessed of authentic information regarding the abuses under investigation. To these individuals a questionnaire was addressed by the Commission. In addition, a number of trade papers and journals published the questionnaire, accompanying it with the request of business officials that the Commission be furnished with full information covering the past 10 years.

Several hundred replies were received; by far the greater part were to the effect that the writer knew of no instance of specifically unfair competition, although many complained that foreign goods, being cheaply produced, were sold at lower prices than domestic goods in the United States. Some actual cases of dumping, however, were cited, and these the Commission proposes to examine more closely. It is also planning to extend the scope of its inquiry and, if possible, to secure more positive evidence before making specific recommendations.

In connection with this investigation the Commission made a careful study of the nature, operation, and effectiveness of the Canadian antidumping law. While engaged in this work its representative received cordial and helpful cooperation from Canadian officials as well as from the United States consular service in Canada. The Canadian law, passed in 1904, on the whole seems to have effectively accomplished the purpose for which it was passed. Canadian merchants, however, complain that it has prevented them from taking advantage of foreign-price fluctuations and has hindered their securing favorable terms under special conditions. The results of the Commission's study of this law will be published as a part of the projected report on dumping.

Investigations of Foreign Tariffs and Commercial Treaties.

The defeat of the central powers by the Allies and the United States and the cessation of hostilities has reawakened an interest in the international aspects of the tariff. Section 704 of the act creating the Tariff Commission specifically empowers it to investigate tariff relations between the United States and foreign countries, commercial treaties, preferential provisions, economic alliances, and other subjects connected with foreign tariff relations of this country. Anticipating a demand for information upon these subjects when the problems of readjustment following the war should arise, the Commission undertook a number of investigations in this field. Some of

the data gathered by the Commission have been published and some are in preparation for print; other material will be placed at the disposal of those both in the legislative and executive branches of the Government who will be charged directly with the responsibility of the peace readjustment.

In particular the Tariff Commission has placed both its published and unpublished information at the disposal of the Commission conducted under the supervision of Col. E. M. House, who, as is well known, is in charge of gathering data which will be useful to the American commissioners at the peace conference, and the Tariff Commission has cooperated in every way to assist the inquiry in gathering such data as relate to tariff and commercial treaty matters.

The subjects covered by the investigations of the Commission under this head are reciprocity, tariff treaties, and the most-favored-nation clause; the preferential tariff systems of the self-governing dominions of the British Empire; the colonial tariff systems of France, Germany, Italy, and certain other European countries; the tariff and treaty systems and trade of the East, especially Japan and China, and a digest of all commercial treaties in force between the nations of the world in 1914.

RECIPROCITY AND COMMERCIAL TREATIES.

This report contains surveys, which are believed to be exhaustive, of the reciprocity experiences of the United States; the form and the operation of bargaining features in United States tariff laws; the policies and practices of this country in respect to commercial treaties, and, in particular, the use of the most-favored-nation clause therein; and the tariff systems and bargaining methods followed by the principal European countries.

The survey of American reciprocity experiences covers the following topics: The reciprocity treaties of 1854 with Canada and of 1875 with Hawaii; the reciprocity agreements, concluded under the tariff acts of 1890 and of 1897, with a number of Latin American and European countries; the reciprocity treaty of 1902 with Cuba; the arrangement of 1904 whereby Brazil grants preferential tariff treatment on certain American products; and the unsuccessful attempt in 1910–11 to establish reciprocity relations with Canada. On each of these a thorough and well-documented legislative and diplomatic record is given, and a careful and comprehensive statistical study is made of the effects of the several arrangements on the commerce of the United States.

The study of American policy and practice in regard to commercial treaties, and especially to the use of the most-favored-nation clause therein, includes a historical record of American diplomatic and judicial practice in regard to the use and the interpretation of

the clause, an analysis of the various forms in which this clause appears, a comparison of the European and the American theory and practice in regard to the use and interpretation of the clause, and an analysis of the relation of most-favored-nation treaties to the practice of making special reciprocity arrangements.

The report concludes with a historical and critical account of the commercial policies and tariff systems of the countries of continental Europe. Here are analyzed and explained the various types of tariff systems, such as the single schedule, the general and conventional, the maximum and minimum, and the preferential tariff systems. The relation between European tariff practice and commercial treaty practice is indicated and the actual working of the different types of policy is considered. Special chapters are devoted to the commercial policies and tariff systems of Germany, France, and Russia.

The Commission introduces the report with a statement of its recommendations with regard to the policy now desirable for the United States. The arguments for and against the practice of making special reciprocity arrangements are summarized, and the recommendation is made that the United States follow the policy of equality of treatment of all countries so far as concerns general industrial policy and general tariff legislation.

CONCLUDING RECOMMENDATIONS ON RECIPROCITY.

The conclusions, to which the Commission was finally led by its extended inquiries, are comparatively simple. They are simple at all events as regards the immediate questions before Congress and as regards the policy to be immediately adopted.

The Commission recommends that the guiding principle of our commercial policy, so far as it affects international tariff problems, be equality of treatment. Equality of treatment should mean that the United States treat all countries on the same terms and, in turn, require equal treatment from every other country. In order that the United States shall be in a position to make this general policy effective, the Commission recommends the enactment of additional duties, in the nature of penalty or retaliatory duties, and that these duties be applied to the products of those countries which discriminate against the United States by failing to accord to our products and to our citizens treatment as favorable as that which is given to others. The object of such additional duties should be simply and solely to secure for the United States equality of treatment and a fair field in world commerce. They should never be used for the purpose of obtaining special privileges.

In order that a plan of this sort may be effective, it should have elasticity. It can not be mechanically applied to all countries, or to all products, or according to an unvarying rule. Accordingly, the

Commission recommends that discretionary power be given the President to impose under certain circumstances these additional duties on commodities coming from non-reciprocating countries, the commodities to be selected according to the character of our trade with those countries and the rates to be determined within statutory limits according to the exigencies of the situation. The Commission believes that the United States should be prepared for all contingencies and that the proposed mode of meeting discrimination is a weapon that should be in our hands.

THE TARIFF SYSTEM OF JAPAN.

This report consists of an account of the evolution of Japanese tariff policy, followed by a descriptive account of the tariff system of Japan and Japanese dominions as it is in force to-day. For 40 years preceding 1899 Japan's tariff was fixed by the terms of her treaties. Since 1899 the Japanese Government has steadily increased the rates of the customs duties and adopted others of the devices which, in commercial policy, are intended to increase the revenues from foreign trade and to encourage the development of home industry.

Beginning with an account of the treaty tariffs and treaty revision, the narrative proceeds to the tariff laws of 1897, 1906, and 1910. It then gives special attention to Japan's new commercial treaties of 1911 and after, particularly to the four which contained conventional schedules. The historical section is followed by an account of tariff changes since 1911, various laws which affect imports, the drawback system, bounties, and special encouragement of production and export.

JAPAN'S TRADE DURING THE WAR.

The report on the Japanese tariff contains a section showing the effect up to 1914 of the conventional rates upon the foreign trade of Japan with those countries entitled to the conventional rates under treaties. War conditions, however, have changed the current of trade to such an extent that no satisfactory inquiry on the working of the conventional rates could be carried beyond 1913. The Commission therefore had a report prepared dealing with the effect of war conditions upon the foreign trade of Japan, particular reference being made to the changes in the trade between Japan and the United States. This report, which is now in press, is divided into three principal sections, as follows: (1) Development of Japan's foreign trade prior to the war, dealing with the growth of Japan's trade from 1856 to 1913 and the status of her commerce in 1913, the last normal year before the war; (2) expansion of Japan's foreign trade during the war,

dealing with the trade of Japan during the years 1913–1917 by groups of merchandise, comprising raw, semi-manufactured, and manufactured articles more or less related to each other; (3) trade between Japan and the United States, showing the character of this trade and the changes that have taken place therein, especially since 1913. Special attention is called to the fact that, although the Japanese exports to the United States still largely exceed the imports from the United States, the excess has diminished during the war, owing in the main to Japan's increased imports of American cotton, iron, and steel. The appendix contains a number of major tables and charts giving a restrospective view of Japan's foreign trade for a series of years, by continents and countries, groups, and character of merchandise, all of which can be used advantageously in connection with the other sections of this report. The War Trade, War Industries, and Shipping Boards have had access to and made use of the materials included in this report.

THE INDUSTRIAL DEVELOPMENT OF JAPAN.

This report is a summary of such information as has been published in Japanese official statistics, Japanese periodicals and newspapers, and Japanese and American trade papers, or has been gathered by the Tariff Commission through special investigations from importers of Japanese goods and American manufacturers engaged in the production of articles with which Japanese merchandise comes into competition.

It reviews the agrarian and industrial development in Japan from the restoration of the Emperor in the year 1868 to the year 1918, with special reference to the changes which have been wrought through the war, and outlines the policy pursued by the Japanese Government in regard to Government assistance to industry through subventions, regulations, and subsidies.

THE TARIFF OF CHINA.

China has a treaty tariff, simple in appearance, with low rates of duty; yet the system is complicated by the fact that the provisions upon which it is based are scattered among the clauses of many treaties, and by the existence of a considerable number of exceptional or special arrangements. Reductions in the rate of duty have been made in favor of trade from or to limitrophe regions. Particular arrangements have also been made with regard to the tariff and customs administration in leased territories.

Three subjects are covered in the report: (1) history of the tariff of China: (2) the actual tariff system; (3) the problems of revision

which have been occupying the attention of the international commission sitting at Shanghai during the current year.

The historical section of the report contains an account of the treaty provisions, the revision of the schedules in 1902, and the new provisions made in treaties of 1901 and since. The second section gives a working account of the system as it is, including import, export, and transit duties, likin, preferential arrangements, the situation in the leased territories, provisions with regard to administration, and miscellaneous items. The third explains the reasons for revision and the progress made by the international commission which has been working on the revision.

CHINA'S FOREIGN TRADE.

This report reviews the foreign trade of China from the opening of the treaty ports in 1842 to the end of 1917. It recounts the obstacles to the development of China's foreign trade, such as geographical barriers, the lack of transportation facilities, war, and internal disturbances. The difficulties caused to foreign trade by a fluctuating currency are emphasized, and the effect of the tariff duties and surtaxes on foreign trade is shown.

The shifting of China's foreign trade since 1914 from European countries to America, Asia, and Oceania is shown to be clearly traceable to the war, either as a direct result of the stoppage of commerce with Germany, Austria-Hungary, and Belgium, or as an indirect result of the shipping restrictions by reason of the war. A chapter is given to the trade of China with the United States and with Japan in order to bring out the reasons for the failure of the United States to increase her trade with China and the success of Japan in securing a leading position. The trade is then analyzed by great groups of commodities to show the relative importance of raw to manufactured articles. A section follows on the trade of China during the years 1913–1917. Both the import and export trade of the chief articles is given, as well as the increase in the trade and the standing of the countries of origin and destination.

THE TARIFF SYSTEM OF SIAM.

This report consists, first, of a digest of the treaty provisions upon which the tariff system of Siam is based, and, second, of an account of the tariff as it is. Siam's tariff, like that of China, made many years ago by agreements with other powers, remains a "treaty tariff." It is conspicuous for its low rates of duty. The account of the actual tariff system includes treatment of the schedule of duties, the excise list, prohibitions and restrictions, transit duties, drawbacks and miscellaneous, and discussion of possible revision. A brief account is

also given of the general conditions affecting the country's trade and the trade with the United States.

PREFERENTIAL TARIFFS WITHIN THE BRITISH EMPIRE.

A report is in preparation, and far advanced to completion, on the tariffs in the self-governing parts of the British Empire, which establish differential tariff treatment in favor of British commodities. After a brief historical survey, tracing the development of sentiment in the self-governing dominions and in Great Britain in favor of preferential arrangements within the British Empire, separate sections are given on the preferential tariffs of Australia, New Zealand, Canada, and South Africa.

These sections treat of the changes in the character and the amounts of the preferences from their inception to the present time. In each case the special form of the preferential arrangement is described. Each section is accompanied by a study of the trade of each of the dominions, including a statistical examination of the commercial statistics available, in order to ascertain the effects of the preferential tariffs on the commerce of British and of non-British countries with the dominions. The statistical study, although not yet complete, offers every indication that no very striking results ensued from the establishment of preferences, and that the share of non-British countries in the trade of the self-governing dominions continues to increase in spite of the tariff preferences to British goods.

FRENCH COLONIAL TARIFFS.

The study of the French colonial tariff system is part of a general study of the trade policies of the various colonial powers. The report sketches briefly the extent and variety of the French colonial empire, with sufficient description of the governmental system to explain in what way the different tariffs are made and how the French Government controls all preferential features. The subject is complicated, because there are a score of colonies, and each has two or three kinds of import duty, besides export duties. A collective description is given for the eight colonies whose tariffs are most alike, the chief differences being set forth in tables; the others are classified in groups, each colony, however, being considered individually. The relative commercial importance of the colonies is set forth and the steps are noted by which in the course of the last 30 years the French have been closing the markets of their colonies to the goods of other countries and extending to colonial goods preferences in the French market. Certain colonies, nevertheless, remain without tariff preferences of any sort, chiefly (though not wholly) because of treaties stipulating equality of commercial treatment. The relevant treaty

provisions are given, as well as others bearing on tariff policy, such as those fixing minimum duties on alcohol through the greater part of Africa.

GERMAN COLONIAL TARIFFS.

The development of the German colonial empire, its commercial importance, and the system of colonial administration and finance under which it is governed from Berlin are summarily described. A description is also given of the German colonial system and policy and an analysis made of the tariffs of the individual colonies in order to ascertain whether preferential treatment is given to German products. There is no open discrimination in any of the German colonial tariffs between German and foreign commodities, and an analysis of the available statistical data gives no definite indication of concealed preference, by indirect means, to German products.

DIGEST OF COMMERCIAL TREATIES.

Digests or abstracts are being prepared of all the commercial treaties, conventions, etc. (approximately 1,000 in number), that were in force between treaty-making powers in July, 1914, together with the few that have come into effect since that date. Each abstract gives the date, title, and provision for termination of the individual treaty, with a reference to the collections where its text may be found, and states, in brief but accurate language, the substance of all the clauses of the treaty, rearranged in a convenient and logical order. It is proposed to supplement these abstracts by analyses, summaries, and topical indexes, thus furnishing a complete conspectus of the treaty relations of individual countries and of the varying treatments of particular subjects.

So far as the Commission has been able to ascertain, no work of this nature has ever been attempted. Its usefulness is apparent. Comparatively few treaties, save those of the United States and Great Britain, exist in an English version. Their texts are scattered through hundreds of volumes which are to be found only in very large or specialized libraries. The language of the average treaty is verbose, complex, and technical; the arrangement of the clauses lacking in logical method. These impediments to the study of treaty material will now, to a large extent, be removed.

This collection, it may be observed, will be a valuable working tool for the student not merely of commercial relations but of international relations in general. We must look, for example, to treaties of this type for definition of the rights of resident aliens. In fact, by far the greater part of what we may call the written or statutory international law of general and frequent application is embodied in the commercial treaties and conventions.

The labor of supplementing this collection with current additions from year to year will, it is thought, be slight in comparison with the magnitude of the initial undertaking which is now approaching completion.

Cost Investigations.

The Commission has made no extended investigations of cost of production. It has refrained from doing so for several reasons. In the first place it is obvious that business conditions during the last two years have been immensely disturbed and that costs have been abnormal. Any figures obtained by contemporary investigation would be of little or no significance on the return to normal conditions. Further, no comparative investigation of costs could be undertaken, because of the impossibility of securing information about competitive conditions. Information about business conditions in Europe and elsewhere is always difficult to obtain; under the conditions of the last two years it has been quite impossible to secure. Furthermore, cost figures for foreign countries, even if obtainable, would be more abnormal than those in the United States and less significant of the competitive conditions which are to be expected in the future. Finally, the funds at the disposal of the Commission are inadequate for any extended cost inquiries. This is the most expensive of all kinds of investigation. A large trained staff is necessary; much time must be given to the elaborate following up of details whose results, nevertheless, can be summed up in a few words or a few figures.

The Commission, however, has recognized the importance of the investigation of costs of production in this country and abroad. An accountant has been added to its permanent staff, and preparation has been made, by arranging schedules and studying cost methods, for eventual thorough studies in the great industries. Limited cost investigations have been made in the silk, cork, and chemical industries and a complete investigation in the case of sugar. In the silk industry an endeavor was made to utilize existing comparative figures of the cost of certain standard fabrics in the United States and abroad in cases where the same interests had mills in the different countries. Schedules have been forwarded to foreign mills and it is hoped that upon the return of more settled conditions significant figures will be secured. In the chemical industry also preliminary work has been done. Plants manufacturing widely different products have been visited and the best methods of obtaining standardized costs have been discussed with the managers. The complexity of this industry is particularly great, and satisfactory methods of cost accounting have been developed by American concerns in only a few

cases. In this industry trustworthy information on costs would be of special interest.

The most complete and detailed studies of costs have been in the sugar industry. As indicated elsewhere in this report, the investigation of the beet-sugar and cane-sugar industries has included the ascertainment of costs of production for the great majority of the establishments in the United States and its possessions and a sufficient number of establishments in Cuba to make possible all desired comparisons. The problem in this case was simplified by the earlier investigations undertaken by other departmental organizations and by the circumstance that our friendly relations with the Republic of Cuba have made possible inquiries on cost conditions there which could not have been carried out in any other foreign country. At the same time the Commission has undertaken the investigation of the costs of refining cane sugar in the United States, to which reference has already been made.

Still another subject upon which cost inquiries have been made is that of the conversion costs of cotton yarn and cotton cloth. This inquiry has been connected with the investigation of ad valorem and specific duties, also noted elsewhere in this report.

The Commission further has had the benefit of important cost investigations undertaken by the Federal Trade Commission in connection with the work of the price-fixing committee of the War Industries Board. The policy of regulating prices has led the Federal Trade Commission to make extended investigations of the costs of production of iron and steel, lumber, copper, cotton fabrics, and other articles. Some of the material so secured has been put at the disposal of the Tariff Commission, which is glad to acknowledge its indebtedness in this regard to the Federal Trade Commission. Disturbed as recent conditions have been, the material is valuable, especially in relation to the inquiries upon ad valorem and specific duties and the conversion costs of cotton manufactures.

Inconsistencies and Inequalities in the Act of 1913.

The investigations of the Commission in various directions have brought to its attention inconsistencies and inequalities of various kinds in the texts of the tariff laws as they now stand. The classification of commodities is sometimes illogical. Duties upon finished products are not properly proportioned to the duties upon raw materials. The same, or similar articles, are mentioned in different paragraphs, causing uncertainty to arise as to the rate of duty to be imposed. With the accumulation of information on items of this sort, the Commission has undertaken to systematize the material and to be prepared for an eventual simplification and smoothing of the language of the statute. This task is closely connected with that of

the revision of the customs administrative laws, and of taking cognizance of the interpretation of those laws by the Board of General Appraisers, the Treasury Department, and the Court of Customs Appeals. The work is still in its early stages, and its prosecution necessarily depends upon the ability of the Commission to enlarge its staff and to give the needed attention to the great number of commodities enumerated in the statute.

WAR SERVICES.

The war has necessarily affected the Commission's work. Members of the Commission itself and of its staff have been called from their regular duties in order to aid in various war activities. The chairman of the Commission has been designated by the President to serve upon the price-fixing committee of the War Industries Board and also to serve upon committees connected with the work of the Food Administration. He has been asked to serve as director on the sugar equalization board. The vice chairman served in the spring months on the President's committee on a national meat policy and more recently as chairman of the committee to consider the conditions of the cotton-growing industry. Commissioner Lewis has been designated by the President, under the terms of the act of May 20, 1918 (the so-called Overman Act), to serve with the Post Office Department in connection with the administration of the telephone and telegraphs. Since this detail he has given his time entirely to his new work. Commissioner Culbertson was requested by the Y. M. C. A. to undertake a journey to Europe for the purpose of report and service in connection with its work; Commissioner Costigan was requested by the Committee on Public Information to undertake a journey abroad on a similar task. In both the last named cases the services were rendered with the approval of the President.

The inevitable consequence of this drain upon the Commission's personnel has been that its own proper work has been to that extent put aside and has failed to be prosecuted to the extent and with the success which would otherwise have been possible. Needless to say, the desired services were rendered without hesitation and to the best ability of the individuals called upon. Necessarily, however, in the meantime the work of the Commission itself has not progressed so fast as might be desired. The exigencies of the war have made no other outcome possible.

COOPERATION WITH OTHER DEPARTMENTS.

The act establishing the Tariff Commission provides that it "shall in appropriate matters act in conjunction and cooperation with the Treasury Department, the Department of Commerce, the Federal Trade Commission, or any other departments, or independent estab-

lishments of the Government, and such departments and independent establishments of the Government shall cooperate fully with the Commission for the purposes of aiding and assisting in its work." The Commission takes pleasure in reporting that in all cases the cooperation of other departments has been cordially extended and that in turn it has availed itself of every opportunity to be of service to others. Reference has already been made to the joint action of the Food Administration and of the Tariff Commission in regard to the ascertainment of costs for raw sugar and refined sugar. The Federal Trade Commission has put at the disposal of the Tariff Commission its cost figures, and in turn has availed itself of the services of the Tariff Commission's specialist on textiles in order to secure information on the costs of certain fabrics purchased in large quantities by the War Department. The War Trade Board requested that the Tariff Commission's specialist upon chemical industries be detailed to it for the organization of its work in connection with the regulation of imports and exports of chemicals. There has been constant interchange of information between the Tariff Commission and the Department of Commerce, more particularly with the Bureau of Foreign and Domestic Commerce; important conferences have been had on the improvement and standardization of import and export statistics collected by the Bureau of Foreign and Domestic Commerce. The Division of Customs of the Treasury Department has cordially and effectively cooperated with the Tariff Commission in its investigation of the customs administrative laws. The Geological Survey has put at the disposal of the Tariff Commission its extensive material on mineral industries. The State Department has conferred with the Tariff Commission concerning commercial arrangements, more particularly with regard to the commercial arrangement with Brazil, which is fully described in the Commission's report on reciprocity. Finally, as already stated, the Commission has been in repeated communication with the organization directed by Col. E. M. House for the preparation and presentation of material desired in connection with peace readjustments.

FINANCES AND APPROPRIATION.

The act establishing the Commission contained an appropriation of $300,000 for the work of the Commission for the year 1916–17. The same sum was appropriated for the year 1917–18. The act of 1916 contained in section 709 the provision:

> That there is hereby appropriated, for the purpose of defraying the expense of the establishment and maintenance of the Commission, including the payment of salaries herein authorized, out of any money in the Treasury of the United States not otherwise appropriated, the sum of $300,000 for the fiscal year ending June thirtieth, nineteen hundred and seventeen, and for each fiscal year thereafter a like sum is authorized to be appropriated.

In establishing the Commission, in other words, Congress contemplated the permanent availability for the Commission of $300,000 a year. On the outbreak of the war, in the spring of 1917, the President requested the Commission to advise him what savings it could make. Accordingly the Commission undertook to keep its expenses for the fiscal year 1917–18 within $250,000. As a matter of fact, its expenses for that year amounted in round numbers to the sum of about $180,000, as appears in the detailed statement appended. The Commission has found it extremely difficult under war conditions to secure the personnel needed for its staff, because of the constant demand for qualified men in departments directly connected with the conduct of the war.

For the year 1918–19 Congress has appropriated the sum of $200,000. This curtailment of its available resources was the natural result of the enormous cost of the war, and the necessity of economy in other than war work. The curtailment amounted in effect to more than the figures indicate. The mounting expenses of living in the District and the increasing salaries in other branches of the Government made it inevitable that the Commission's salaries and expenses should increase, and that the same service should cost more money than before. Indeed, one of the greatest difficulties of the Commission has been that employees, both those already in its service and those newly enlisted, found great difficulty in securing suitable accommodations and food on almost any terms. The appropriation of $200,000 in 1918 was equivalent to not more than $150,000 in 1916. In other words, the Commission's appropriation has been virtually cut in half. It is impossible to carry on the work which the Commission was designed to do and to serve Congress in a manner and to the extent expected with the means which have been put at the disposal of the Commission by the regular appropriation for the current year.

Respectfully submitted,

F. W. TAUSSIG, *Chairman.*
THOMAS WALKER PAGE,
Vice Chairman.
DAVID J. LEWIS.
WILLIAM KENT.
WILLIAM S. CULBERTSON.
EDWARD P. COSTIGAN.

APPENDICES.

APPENDIX I.

The following statement shows the expenditures of the Commission from July 1, 1917, to June 30, 1918:

Salaries of commissioners	$41,979.16
Salaries of staff	105,370.82
Rent of offices	12,473.11
Furniture, equipment, etc	12,764.16
Traveling expenses	7,354.74
Total	179,941.99

A detailed classification of the personnel of the Commission is shown in the following statement:

Commissioners	6
Secretary	1
Clerks to commissioners	3
Special experts	28
Clerks	41
Messengers	3
Telephone operator	1
Laborer	1
Total	84

APPENDIX II.

COMMODITIES COVERED BY TARIFF INFORMATION CATALOGS THAT HAVE BEEN COMPLETED.

Abrasives:
- Natural—
  - Abrasive garnet.
  - Burrstones.
  - Corundum.
  - Diamond dust and bort.
  - Diatomaceous earth.
  - Emery.
  - Flints and flint stones.
  - Grindstones.
  - Hones.
  - Millstones.
  - Oilstones.
  - Pebbles for grinding.
  - Pulp stones.
  - Pumice.
  - Rottenstone.
  - Scythestones.
  - Tripoli.
  - Whetstones.
- Artificial—
  - Carbides of silicon.
    - Grit, shot and sand, made of iron and steel.
  - Oxides of aluminum.
  - Steel wool or steel shavings.

Acetic anhydrid.

Acetphenetidin.

Acids:
- Acetylsalicylic.
- Boracic.
- Citric.
- Formic.
- Glycerophosphoric.
- Hydrochloric or Muriatic.
- Lactic.
- Nitric.
- Oxalic.
- Sulphuric.
- Tartaric.

Aluminum.
Antimony.
Antimony ore.
Antipyrine.
Argols.
Barium:
- Carbonate of.
- Chloride of.
- Dioxide of.
- Sulphate of, artificial.

Barytes.
Baskets.
Bauxite.
Bells.
Bleaching powder.
Boots and shoes.
Borax.
Brier root.
Brierwood.
Bristles.
Brushes.
Buckles.
Buttons.
Cables.
Calcium cyanamid.
Carbon tetrachloride.
Chloral hydrate.
Chloroform.
Chloride of tin.
Chloride of zinc.
Cinchona bark.
Coal.
Cobalt.
Coffee.
Cork.
Cotton gloves.
Cotton collars and cuffs.
Cryolite or kryolith.
Cyanide of potash.
Ethyl chloride.
Ferrochrome or ferrochromium.
Ferromanganese.
Ferromolybdenum.
Glauber salts.
Glycerin.
Glycerophosphoric salts and compounds.
Guaiacol carbonate.
Hay.
Hooks and eyes, metallic.
Iron ore.
Iron or steel:
- Barbed wire.
- Cut nails.
- Cut spikes.
- Horseshoes.
- Ox shoes.
- Rails.
- Railway bars.
- Terneplates.
- Wire nails.

Ivy root.
Laurel root.
Lime:
- Borate of.
- Citrate of.

Matches.
Matte containing antimony.
Molybdenum.
Monazite sand.
Nickel:
- Alloy.
- In pigs.
- Ore.
- Oxide.

Niter cake.
Phenolphthalein.
Pig iron.
Potatoes.
Pyrites.
Quicksilver.
Salol.
Salt cake.
Salt.
Silk:
- Bolting cloth.
- Cocoons.
- Partially manufactured.
- Raw.
- Spun.
- Thrown.
- Waste.

Soda:
- Ash.
- Bicarbonate.
- Borate of.
- Carbonate of.

Soda—Continued.
- Caustic.
- Crystals.
- Monohydrate of.
- Sal.
- Sesquicarbonate of.
- Sulphate of.
- Supercarbonate of.

Spiegeleisen.
Straw hats.
Sulphur.
Sulphuret of iron.
Surgical instruments.
Tea.
Tea plants.
Terpin hydrate.
Thorite.
Thorium.
Thymol.
Tin:
- Black oxide of.
- Grain.
- Granulated.
- In bars, blocks, pigs, and plates.
- Ore.
- Scrap.
- Taggers.

Tungsten.
Tungsten-bearing ores.
Urea.
Wool yarns.
Zaffer.

APPENDIX III.

Work is now in progress on Tariff Information Catalogs covering the following commodities:

Acetanilid.
Acids:
- Benzoic.
- Carbolic.
- Chromic.
- Gallic.
- Phthalic.
- Pyrogallic.
- Salicylic.
- Silicic.

Aconite.
Albumen:
- Egg, dried.
- Egg, frozen or liquid.

Alder bark.
Alkaloids.
Almonds.
Althea root, leaves, or flowers.
Aluminum, manufactures of.
Ammonia:
- Carbonate of.
- Liquid anhydrous.
- Muriate of.
- Nitrate of.
- Perchlorate of.
- Phosphate of.
- Sulphate of.

Ammoniacal gas liquor.
Areca nuts.
Angostura bark.
Anilin oil and salts.
Arnica root and flowers.
Asafetida.
Asbestos, manufactures of.
Bagatelle balls.
Balm of gilead.
Balm of gilead buds.
Balsams:
- Copaiba.
- Canada.
- Peru gurjun.
- Tolu.

Barley.
Bayberry bark.
Beads.
Beans:
- Tonka.
- Vanilla.

Belladonna leaves and root.
Benzaldehyde.
Benzoin.
Blackberry bark.
Black-haw bark.
Bones, crude.

Breech-loading shotguns and rifles.
Brick:
  Chrome.
  Magnesite.
Bristles.
Brittania metal, old.
Bromin.
Brooms.
Buckthorn bark.
Bullion:
  Base.
  Gold.
  Lead.
  Silver.
Bullion.
Cadmium.
Caffein, and compounds of.
Colocynth fruit.
Calamine.
Calendula flowers.
Calomel.
Camphor.
Canella bark.
Cannabis.
Cantharides.
Cascara sagrada bark.
Cascarilla bark.
Castoreum.
Chains.
Chalk:
  Billiard.
  Crude.
  In cubes, blocks, sticks, or disks.
  French, crude.
  Manufactures of.
  Precipitated.
  Red.
  Tailors'.
Chess balls.
Chessmen.
Chinaware.
Chiretta herb.
Chocolate.
Chromium.
Civet.
Cloth:
  Tracing.
  Vegetable fiber.
  Waterproof, cotton.
Cocaine.
Cocculus indicus.
Cocoa butter.
Composition metal.
Condurango bark.
Copal.
Copper ore.
Cotton:
  Bagging for.
  Bandings.
  Bath mats.
  Batting.
  Bed sets, lace.
  Belting for machinery.
  Beltings.
  Belts.
  Bindings.
  Blankets.
  Bone casings.
  Boot lacings.
  Braces.
  Candlewicking.
  Card laps.
  Carded yarn.
  Chenille curtains.
  Chenille table covers.
  Cloth.
  Clothing, ready-made.
  Collets.
  Combination suits.
  Cords and tassels.
  Corduroys.
  Corset covers.
  Corset lacings.
  Crochet.
  Cuffs.
  Darning.
  Drawers.
  Dress facings, bias.
  Embroidery.
  Fabric, suitable for pneumatic tires.
  Fiber cloth.
  Flocks, manufactures.
  Garters.
  Gins.
  Half hose.
  Handkerchiefs.
  Healds.
  Hose.
  Labels for garments.
  Lamp wicking.
  Loom harness.
  Manufactures of.
  Mop cloths.
  Mufflers.
  Nets or nettings.
  Pants.
  Pile fabrics.
  Pillow cases.

Cotton—Continued.
- Pillow shams, lace.
- Plush ribbons.
- Plushes.
- Polishing cloths.
- Quilts.
- Roving.
- Seed.
- Sheets.
- Shirts.
- Shoe lacings.
- Skirt bindings.
- Sliver.
- Spindle banding.
- Spool thread.
- Stockings.
- Stove wicking.
- Suspenders.
- Sweaters.
- Table damask.
- Tapestries.
- Tassels and cords.
- Thread.
- Tights.
- Tire fabric.
- Towels.
- Underwear.
- Union suits.
- Upholstery.
- Velveteens.
- Velvet ribbons.
- Velvets.
- Vests.
- Wash cloths.
- Wash rags.
- Waste.
- Wearing apparel.
- Window curtains.
- Window hollands.
- Yarn.

Cramp bark.
Currants, Zante, and other.
Cut tacks.
Dammar.
Dates.
Dice of ivory, bone, or other material.
Digitalis leaves.
Dominoes.
Drafts.
Dross lead.
Dogwood, Jamaica bark.
Dyes, Carbazol.

Earthenware.
- Common yellow.
- Rockingham.
- White granite.

Eggs:
- Dried.
- Frozen.
- Prepared or preserved.
- Yolk of.

Elm bark.
Ergot.
Eucalyptol.
Eucalyptus leaves and oil.
Ferrophosphorus.
Ferrosilicon.
Ferrotitanium.
Ferrotungsten.
Ferrovanadium.
Files, file blanks, rasps, etc.
Fishhooks, fishing rods, and reels.
Gambier.
Gentian root.
Glass:
- Bottles.
- Carboys.
- Common window.
- Cylinder.
- Decanters.
- Demijohns.
- Jars.
- Unpolished.
- Vials.

Grapefruit.
Grapes, dried.
Guarana.
Gum arabic.
Hair:
- Curled.
- Human.
- Press-cloth.

Haircloth.
Hops.
Hospital supplies.
Hospital utensils, aluminum.
Hyoscyamus leaves.
Iceland moss.
Ichthyol.
Ingots:
- Cogged.
- Nickel.
- Platinum.
- Steel, Bessemer, etc.
- Steel, rolled, hammered, etc.

Instruments:
- Dental.
- Scientific.
- Surveying.

Iodide of potassium.
Iodine.
Iodoform.
Ipecac.
Iron or steel:
- Angles.
- Antifriction balls.
- Anvils.
- Axles.
- Ball bearings.
- Beams.
- Billets and bars.
- Blacksmith's hammers, tongs, etc.
- Blades, knife, etc.
- Blooms and slabs.
- Boiler.
- Brads.
- Card clothing.
- Channels.
- Deck beams.
- Forgings.
- Girders.
- Hobnails.
- Horseshoe-nail rods.
- Horseshoe nails.
- Hospital utensils.
- Joists.
- Kitchen utensils.
- Nail rods.
- Nuts or nut blanks.
- Parasol ribs and stretchers.
- Railway fishplates.
- Railway wheels.
- Rivets, studs, etc.
- Roller bearings.
- Screws.
- Spikes.
- Structural.
- Table utensils.
- Tacks.
- Tagger's tin.
- Umbrella ribs and stretchers.
- Wire fencing.
- Wire rods, cold rolled.
- Wire, round.
- Wire staples.

Jalap.
Karaya gum.
Kauri.
Kitchen utensils, aluminum.
Knives:
- Budding.
- Butcher's.
- Carving.
- Cook's.
- Kitchen.
- Pruning.
- Table.

Laboratory glassware.
Lac dye.
Lace curtains.
Lead:
- Dross.
- Pigs and bars.

Lead-bearing ores.
Leather:
- Bags.
- Baskets.
- Belts.
- Cardcases.
- Enameled upholstery.
- Gloves.
- Jewel boxes.
- Manufactures of.
- Pianoforte.
- Pocketbooks.
- Portfolios.
- Satchels.

Leaves:
- Buchu.
- Coco.

Leeches.
Lemons.
Licorice root and paste.
Limes.
Machine tools.
Magnesite.
Magnesium.
Manganese:
- Ore of.
- Oxide of.

Manganiferous iron ore.
Manna.
Menthol.
Mezereon bark.
Musk, grained and in pods.
Muskets, air rifles, muzzle-loading shotguns and rifles, and parts thereof.
Myrobolans fruit.
Naphthalin.

Needles:
- Crochet.
- Hand sewing and darning.
- Knitting.
- Latch.
- Sewing-machine.
- Shoe-machine.
- Tape.

Nippers and pliers.
Nux vomica.
Oils:
- Cod-liver.
- Olive.
- Peppermint.

Old zinc.
Olives.
Opium.
Oranges.
Penholder tips, penholders, and parts.
Penknives.
Pens, metallic.
Phenol.
Photographic films, plates, cameras, etc.
Pins, with solid heads.
Pipes:
- Cast-iron.
- Lap-welded and butt-welded.

Pitch, Burgundy.
Plate, iron or steel.
Platinum:
- Apparatus.
- Bars.
- Ingots.
- In plates.
- Metal ores.
- Scrap.
- Sheets.
- Unmanufactured.
- Wire.

Pomegranate bark.
Pool balls.
Poplar bark.
Potash:
- Bicarbonate of.
- Bichromate of.
- Carbonate of.
- Chlorate of.
- Chromate of.
- Crude.
- Hydrate of.
- Muriate of.
- Nitrate of, crude and refined.

Potash—Continued.
- Permanganate of.
- Prussiate of, red and yellow.
- Sulphate of.

Prickly ash bark.
Quassia.
Quinia, sulphate of.
Raisins.
Regulus of copper.
Rhubarb root.
Rice.
Root:
- Dandelion.
- Sarsaparilla.

Saccharin.
St. Ignatius beans.
Salep.
Salicin.
Saltpeter, crude and refined.
Santonin.
Sassafras bark.
Saws:
- Drag.
- Crosscut.
- Mill.
- Pit.

Scammony root and gum.
Seeds, cardamom.
Silk:
- Artificial.
- Bandings.
- Belts and belting.
- Bindings.
- Chenilles.
- Clothing, ready-made.
- Combed.
- Floss.
- Handkerchiefs.
- Hatbands.
- Knit goods.
- Mufflers.
- Manufactures of.
- Noils.
- Pile fabrics.
- Plush, black or hatters'.
- Plush ribbons.
- Plushes.
- Ribbons.
- Sewing.
- Sleeve linings.
- Stripes.
- Tram.
- Velvet ribbons.

Silk—Continued.
- Velvets.
- Wearing apparel.
- Woven fabrics.
- Yarn, schappe.

Slag, basic.
Soap bark.
Soda:
- Benzoate of.
- Bichromate of.
- Chromate of.
- Nitrate of.
- Nitrite of.
- Prussiate of, yellow.
- Silicate of.
- Sulphid of.

Spangles.
Steatite.
Steel:
- Bars.
- Crucible.
- Railway bars.
- Scrap.
- Shapes.
- Wool.

Stibnite containing antimony.
Stramonium leaves.
Strychnine.
Styrox root.
Simarubra.
Sword blades, swords, and side arms.
Talc, ground.
Talcum, crude.
Tamarinds.
Tannin.
Tragacanth gum.
Titanium.
Tobacco.
Type metal.
Walnuts.
Wheat.
Whiting.
Wild cherry bark.
Wire fencing, galvanized.
Wire:
- Round.
- Staples.

Witch hazel.
Wool.
Yarn, asbestos.
Zinc-bearing ores.
Zinc:
- Dust.
- In blocks, pigs, or sheets.
- Manufactures of.
- Oxide of.

APPENDIX IV.

SPECIMENS OF TARIFF INFORMATION CATALOGS.

Bleaching Powder or Chloride of Lime.

(Par. 12, act of 1913, one-tenth cent per pound.)

SUMMARY.

Description.—Bleaching powder or chloride of lime is a white powder which evolves chlorine when treated with an acid. It is sold on the basis of the "available chlorine" content. Bleaching powder, in spite of many disadvantages, has been the best means of shipping chlorine until within recent years, when liquid chlorine was introduced. As its name indicates, it is primarily a bleaching agent. It is used for bleaching pulp and paper stock, cotton and linen in textile mills and laundries, and for the purification of public water supplies.

Domestic production.—The production of bleaching powder in 1914 amounted to 310,380,000 pounds, valued at $2,916,225. This quantity was nearly twice the production in 1909. There has been no census of production since 1914. The United States at the present time (1918) supplies its own consumption of bleaching powder. During the fiscal year 1918 there was exported 13,060,401 pounds of bleaching powder, valued at $558,066.

The manufacture of bleaching powder on a commercial scale was established in this country after the passage of the act of 1897, which placed a duty of one-fifth cent per pound on the article. Beginning with 1897 the industry developed rapidly and soon supplied the greater part of domestic requirements. Since 1915 the imports have been negligible.

The materials necessary for the production of bleaching powder are lime and chlorine gas. The chlorine gas is a joint-product in the manufacture of electrolytic caustic soda.

A large part of the bleaching powder is made at Niagara Falls, N. Y. It is also produced by two firms in Michigan and by one firm in California.

There is a marked tendency for the larger consumers of bleaching powder to install electrolytic chlorine plants in which to produce their own bleach in liquid form.

Foreign production.—The largest producers of bleaching powder before the war were the United States, the United Kingdom, and Germany.

Imports.—Previous to 1914 the United States imported each year between 40,000 and 60,000 short tons of bleaching powder; the United Kingdom supplied from 70 to 80 per cent of this, and most of the remainder came from Germany. Since 1914 the imports have declined; in 1918 only two tons were imported.

Prices.—Before the war bleaching powder sold at a constant price of about $25 per ton. During 1916 it was quoted as high as $240 per ton. At the beginning of 1918 the price had declined to about $50 per ton.

Tariff history.—Bleaching powder was free of duty until the passage of the act of 1897, when it was made dutiable at one-fifth cent per pound. This duty was reduced to one-tenth cent per pound by the act of 1913.

Summary table.

Year.[1]	Domestic production.	Imports for consumption.	Domestic exports.[2]	Ratio to production, per cent imports.
	Pounds.	*Pounds.*	*Pounds.*	
1909	116,802,000	83,376,089	.....	80.2
1910	.....	93,838,195	.....	.....
1911	.....	99,478,325	.....	.....
1912	.....	72,706,732	.....	.....
1913	.....	76,092,327	.....	.....
1914	310,380,000	48,497,239	.....	15.6
1915	.....	18,402,130	.....	.....
1916	.....	3,289,790	.....	.....
1917	.....	65,564	.....	.....
1918	.....	535	13,060,401	.....

[1] Domestic production is for the calendar year, while imports for consumption and domestic exports are for the fiscal year ending June 30.
[2] Exports of bleaching powder are not shown in Commerce and Navigation of the United States prior to 1918.

IMPORTS FOR CONSUMPTION.

Year.	Value.	Amount of duty.	Value per unit of quantity.	Equivalent ad valorem rate, per cent.
1910	$750,140.00	$187,676.00	$0.008	25.02
1911	802,015.00	198,957.00	.008	24.81
1912	600,621.00	145,413.00	.008	24.21
1913	619,492.00	152,184.00	.008	24.57
1914	416,898.00	59,237.00	.0085	14.21
1915	197,975.00	18,402.00	.0107	9.30
1916	80,418.00	3,290.00	.021	4.09
1917	3,888.00	66.00	.059	1.69
1918	83.00	.54	.155	.64

GENERAL INFORMATION.

Description.—Bleaching powder is also called in commerce chloride of lime. In scientific nomenclature it may be regarded as a double salt of calcium chloride and calcium hypochlorite mixed with 2 to 5 per cent excess of slaked lime and a little water. The chemical formula is generally conceded to be $CaClOCl$. When bleaching powder is dissolved in water it forms a solution of calcium chloride and calcium hypochlorite.

Bleaching powder is a white powder which readily evolves chlorine when treated with an acid. It absorbs moisture and carbon dioxide from the air and this results in deterioration and decomposition of the product. It must, therefore, be shipped in air-tight containers, such as sheet-iron drums or wooden barrels painted with asphalt paint. Even with these precautions it deteriorates slowly in storehouses, and the shaking during shipment causes more rapid deterioration. Hence the strength of bleaching powder is nearly always guaranteed only at the place of shipment. Lunge states[1] that bleach shipped with 35 per cent available chlorine in England should show at least 32 per cent at Hamburg or New York. It is a mistake to demand a high-test bleach for export shipment, as a high-test bleach deteriorates faster than a low-test bleach. In order to reduce the deterioration to a minimum, the bleaching powder should contain 2 to 5 per cent excess of lime. In spite of the fact that bleaching powder contains a low per cent of chlorine (the active constituent) and that it deteriorates during storage and shipment, it has been the best means of shipping chlorine until within recent years, when liquid chlorine shipped in steel cylinders became a rival of bleaching powder. It is doubtful whether liquid

[1] Lunge: Sulphuric Acid and Alkali, vol. 3, p. 643.

chlorine will replace bleaching powder in export trade on account of the necessity of back shipment of the empty cylinders.

The grade of any product of bleaching powder is determined by its percentage content of available chlorine. Practically all bleaching powder contains at least 30 per cent and is sold on a basis of "35 per cent available chlorine." That is, all price quotations on bleaching powder refer to a product containing 35 per cent of chlorine, and contract prices are usually made on a sliding-scale basis for an article which, on analysis, shows a greater or less per cent of chlorine.

Raw materials.—The materials necessary for the manufacture of bleaching powder are lime and chlorine gas. Lime is produced by burning limestone. The lime should be well calcined and should contain over 95 per cent of lime (CaO), but little magnesia, carbonic acid, iron, and insoluble material such as clay and sand. The chlorine which enters into the manufacture of bleaching powder, in this country, is all produced by passing a direct current of electricity through a solution of common salt. This method, known as the "electrolytic process," produces chlorine gas of a high concentration and purity.

The production of bleaching powder, then, is dependent on the basic raw materials, salt and limestone, both of which are available in large quantities in this country. Considerable electrical power is required, but the cost of electrical power is not so vital to this industry as to most other electrochemical processes, and it has been possible to operate plans dependent on steam power.

Process of manufacture.—Quicklime of a suitable purity is slaked by slowly adding water until the resulting product contains between 2 and 5 per cent excess of water. The slaked lime is sifted to remove all lumps and then should be allowed to cool, protected from the air. For the absorption of the chlorine the lime is piled on the floor of chambers to a depth varying from 1 inch to 8 inches. In the one-chamber process bleaching powder can be made without turning the lime if the depth does not exceed 2 inches. The three-chamber process, which is more or less a continuous one operating on the counter-current principle, permits the lime to be piled 8 inches deep. This system is preferable as it absorbs the chlorine completely and prevents leakage of chlorine, a common occurrence in the one-chamber process. The chlorine is admitted slowly to the chambers until the lime is completely chlorinated. The temperature of the lime during chlorination should be kept below 45° C. It is possible to make a stronger bleaching powder during cold weather than in warm weather. After chlorination the powder is packed in drums or wooden barrels for shipment. In France it is the custom to sift the bleaching powder before packing. During this operation the bleach loses in strength, but the resulting product will keep longer and is much better for shipment. The yield of bleaching powder obtained is, in good practice, one and a half times the quantity of lime used.

Hasenclever, an English chemist, overcame serious engineering difficulties in building an apparatus for carrying out this process in a continuous manner. His apparatus is, in essentials, a series of continuous conveyors; the lime is fed into the top while the chlorine is drawn in at the bottom in a direction opposite to the lime. We have no knowledge that this process is being used in the United States.

The foreign and domestic methods of manufacture are not dissimilar, the primary difference being in the manufacture of chlorine. In England and France the Deacon and Weldon processes have been generally used, although recently the electrolytic process has gained considerable headway. Both of

these processes obtain chlorine by the oxidation of hydrochloric acid, which has been produced from salt. The Deacon process oxidizes the hydrochloric acid by means of air, while the Weldon process uses manganese dioxide which is regenerated and used again. Both are more complicated than the electrolytic process. In Germany the chlorine is obtained from the electrolysis of solutions of sodium or potassium chlorides.

Skilled labor, in the manufacture of bleaching powder, is not a necessity so long as the plant is under the supervision of a competent chemist.

Since the manufacture of bleaching powder in this country is dependent on electricity for the production of chlorine, it naturally follows that Niagara Falls should be a center for this industry. It is not, however, confined to this locality, as plants in other parts of the country have been operated successfully on electricity generated from steam power.

Important uses.—Bleaching powder, as its name indicates, is essentially a bleaching agent. It is used for the bleaching of wood pulp and other paper stocks, cotton and linen fabrics, cotton for the manufacture of guncotton, and as a bleaching agent in laundries. It is also used in the manufacture of other chemicals, principally chloroform; for the purification of public water supplies; and as a disinfectant, deodorant and germicide. For domestic uses, it is sold in small tin cans, under the name of chloride of lime.

Substitutes and rival commodities.—(a) Liquid bleach: This is a solution of calcium hypochlorite and chloride, produced by passing chlorine into a solution of lime, commonly called "milk of lime." It is easier to make than bleaching powder and is usually produced at the place where it is to be consumed. The numerous paper and pulp mills in this country that make their own bleach furnish instances of this practice. There is a marked tendency for the large consumers of bleaching powder to install electrolytic chlorine plants and produce their own bleach in liquid form. This tendency has been accentuated by the war demands for chlorine.

(*b*) Liquid chlorine: Since about 1910 this article has become a rival of bleaching powder and is fast displacing it in the purification of water supplies. It is also being used for bleaching in textile mills. It is doubtful whether liquid chlorine will take the place of bleaching powder for export, owing to the necessary back shipment of the containers.

(*c*) Hypochlorites of sodium and potassium: Owing to the high cost of potassium salts, the hypochlorite of sodium is usually made in this country. It is produced either by a special electrolytic cell at the place of consumption, or it is made from bleaching powder by treatment with soda ash. Sodium hypochlorite is preferred to lime bleach in the bleaching of cotton and linen, because it gives a clear solution and because the salts, formed during the bleaching, are easily removed from the fabric by washing. For this reason it is used extensively in laundries and textile mills.

History of the industry.—Bleaching powder was invented in 1799 by Tennant, an Englishman. It was first made in the same year by the St. Rollox Works, England, and was sold at £140 (about $700) per ton. The early development of the manufacture of this commercial product took place in England. Its manufacture on a commercial scale in the United States was not undertaken until after the passage of the tariff act of 1897, which placed a duty of one-fifth cent per pound on bleaching powder. The plant of the Dow Chemical Co., at Midland, Mich., and of the Castner Electrolytic Alkali Co., at Niagara Falls, N. Y., were both started in the latter part of 1897.

The industry developed rapidly from that time on. As shown by the Census of Manufactures, the production increased from 21,958,000 pounds, valued at

$462,949, in 1899, to 310,380,000 pounds, valued at $2,916,225, in 1914. As the American industry expanded to meet our own demands, there was a gradual decline in imports. Owing to an increase in consumption, there was no marked falling off in imports until 1908. Just prior to the outbreak of the war, the imports of bleaching powder had decreased 30,000,000 to 40,000,000 pounds; they have since become negligible. During the 1918 fiscal year only 4,285 pounds were imported. The importation of bleaching powder has been restricted by the War Trade Board and by the War Industries Board. Europe is the only source of imports; and, as we are now shipping large quantities of bleaching powder and other chlorine products to Europe, its importation from that Continent would be a waste of shipping space. The fact that we now not only supply our own consumption but exported over 13,000,000 pounds during the 1918 fiscal year, indicates the development of the bleaching-powder industry in the United States.

Largest producers.—Although figures on the actual production of bleaching powder in the United Kingdom and in Germany are not available, there are indications that these two countries and the United States are the largest producers of bleaching powder. The import statistics show that from 70 to 80 per cent of the bleaching powder imported into the United States comes from the United Kingdom and that the greater part of the remainder is from Germany. The following table, compiled from the official publications of Germany [1] and the United Kingdom,[2] is indicative of the status of the industry in these countries.

Exports of bleaching powder.

Year.	United Kingdom.		Germany.[a]	
	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*	
1909	51,016	$950,033	31,453	$736,848
1910	56,412	1,024,189	28,734	683,060
1911	51,165	947,858	32,186	961,044
1912	46,254	875,279	35,554	1,170,246
1913	40,678	820,725	40,204	1,284,962
1914	33,561	772,679	.....	.....
1915	27,510	880,501	.....	.....
1916	9,693	694,245	.....	.....

[a] Includes bleaching powder, bleaching lyes, and peroxides of hydrogen and barium. Figures for Germany are not available after 1913.

Lunge states [3] that the production of bleaching powder in England was 125,000 tons in 1909, with the production decreasing. The production in the United States in 1914 was 150,000 tons. These figures indicate that in 1914 the United States was producing as much bleaching powder as any other country. At the present time (1918) the United States is undoubtedly the largest producer.

That the bleaching-powder industry in Japan has expanded greatly since the outbreak of the war is shown by the following table. The exports of this commodity from Japan during 1917 were nearly seven times the prewar exports (1913). Prior to 1916 over 80 per cent of Japan's exports were to China; during 1916 and 1917 British India took over 50 per cent.

[1] Vierteljahrshefte zur Statistik des Deutschen Reichs.
[2] Annual Statement of the Trade of the United Kingdom.
[3] Lunge: Sulphuric Acid and Alkali.

Exports of bleaching powder from Japan.[a]

Country.	1913		1914		1915		1916		1917	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*		*Short tons.*		*Short tons.*	
China	916	$55,102	638	$36,163	1,556	$83,954	1,552	$116,278	1,963	$205,258
Hong Kong	180	10,990	123	6,768	184	10,509	382	36,768	494	47,956
British India	(b)	(b)	(b)	(b)	289	20,429	3,185	275,216	4,192	439,386
All others	23	1,457	83	4,806	184	11,405	800	61,836	482	47,283
Total	1,119	67,549	844	47,737	2,213	126,297	5,919	490,098	7,131	739,883

[a] Compiled from Annual Return of the Foreign Trade of the Empire of Japan.
[b] Included in all others.

During the years 1909 to 1913, inclusive, Italy produced about 10,000 short tons of bleaching powder per annum.[1] Special Agents Series No. 65, Chemical Industries of Belgium, Netherlands, Norway, and Sweden, by Thomas H. Norton, Bureau of Foreign and Domestic Commerce, contains information on the bleaching powder situation in these countries. The annual production in Belgium exceeds 6,000 tons. The other three countries are dependent on foreign countries for their supplies.

Production in United States.

[From Federal census. Listed as hypochlorites. Chiefly bleaching powder and chloride of lime.]

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Pounds.			*Pounds.*	
1899	21,958,000	$462,949	1909	116,802,000	$1,786,846
1904	39,176,000	535,835	1914	310,380,000	2,916,225

Imports by countries, fiscal years 1895 to 1918.

Imported from—	1895		1896		1897	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*		*Pounds.*	
Belgium	1,601,208	$28,562	1,373,706	$20,359	2,444,492	$33,914
France	1,436,825	21,026	4,997,277	66,372	9,511,852	117,299
Germany	2,351,637	33,970	4,893,376	64,089	7,914,934	100,428
United Kingdom	94,642,090	1,554,845	92,760,794	1,428,124	79,236,840	1,121,472
All others	425,114	6,432	28,724	234	166,020	2,447
Total	100,456,774	1,644,835	104,053,877	1,579,358	99,274,138	1,375,560

Imported from—	1898 (free)[2]		1898 (dutiable)[3]		1899	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*		*Pounds.*	
Belgium	301,435	$4,102	2,361,516	$29,631	1,780,561	$18,063
France	523,356	7,291	9,850,095	121,234	9,785,182	93,652
Germany	953,757	10,998	11,937,839	130,531	11,166,411	112,127
United Kingdom	4,828,090	68,506	83,362,490	1,048,037	89,723,643	928,767
All others	114,000	1,590	.....	.....	651,453	6,662
Total	6,720,638	92,487	107,511,940	1,329,433	113,107,250	1,159,271

[1] Annuario Statistico Italiano.
[2] From July 1 to July 24, 1897, under the act of 1894.
[3] From July 25, 1807, to June 30, 1898, under the act of 1897.

Imports by countries, fiscal years 1895 to 1918—Continued.

Imported from—	1900		1901		1902	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*		*Pounds.*	
Belgium	3,412,886	$38,414	1,809,660	$23,119	4,741,616	$62,840
France	10,498,455	102,678	6,911,669	76,082	10,437,496	141,980
Germany	18,563,952	177,682	22,414,748	226,846	28,441,862	344,830
United Kingdom	103,482,859	1,140,559	79,824,194	1,044,977	85,717,633	1,226,346
All other	444,999	4,689	252	4	913,089	12,358
Total	136,403,151	1,464,019	110,960,523	1,371,028	130,251,696	1,788,354

Imported from—	1903		1904		1905	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*		*Pounds.*	
Belgium	1,051,519	$12,528	855,453	$6,775	3,874,588	$30,623
France	5,942,375	71,391	614,018	4,843	1,322,348	11,301
Germany	21,161,570	243,074	22,411,069	168,483	20,990,091	144,822
United Kingdom	79,641,953	799,533	74,448,139	585,445	68,581,632	579,385
All other	29,700	140	[3] 756,707	6,986	[1] 1,351,052	10,150
Total	107,827,117	1,126,666	99,085,386	772,532	96,119,711	776,281

Imported from—	1906		1907		1908	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*		*Pounds.*	
Belgium	2,368,742	$19,637	1,801,484	$15,876	1,802,453	$15,771
France	2,805,452	21,770	1,853,559	14,937	2,120,215	16,098
Germany	22,643,870	154,353	19,813,102	139,531	16,423,545	113,892
United Kingdom	80,630,717	682,554	82,766,399	710,020	69,772,014	607,749
All other	107,535	946	.....	.....	117,488	991
Total	108,556,316	879,260	106,234,544	880,364	90,235,515	754,501

Imported from—	1909		1910		1911	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*		*Pounds.*	
Belgium	769,968	$6,723	700,138	$6,706	748,268	$7,862
France	1,656,677	12,881	2,034,259	15,653	4,295,308	32,867
Germany	23,525,844	161,386	24,279,836	150,121	21,092,984	143,883
United Kingdom	57,371,139	502,575	66,689,586	575,897	71,996,482	606,896
Netherlands	76,032	521	300,867	1,981	1,389,017	9,322
All other	.....	.....	.....	.....	40,516	305
Total	83,399,660	684,086	94,004,686	750,358	99,562,575	801,135

Imported from—	1912		1913		1914	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*		*Pounds.*	
Belgium	321,847	$3,214	245,628	$2,548	290,785	$3,009
France	3,356,377	23,579	2,146,859	15,873	2,016,324	16,003
Germany	19,487,400	133,980	18,119,803	122,159	10,751,098	76,209
United Kingdom	49,788,020	423,205	54,723,908	473,260	34,287,763	320,890
Netherlands	181,935	1,239	.....	.....	.....	.....
Canada	135,837	1,222	38,120	324	.....	.....
All other	2,610	49	1,900	21	77,681	629
Total	73,274,026	586,488	75,276,218	614,185	47,423,651	416,740

[3] Chiefly Italy.

Imports by countries, fiscal years 1895 to 1918—Continued.

Imported from—	1915		1916		1917		1918	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*		*Pounds.*		*Pounds.*	
Belgium	111,887	$1,193	.....	.....	.....	.....	.....	.....
France	268,832	2,143	.....	.....	.....	.....	.....	.....
Germany	2,572,509	19,108	.....	.....	.....	.....	.....	.....
United Kingdom	15,174,575	174,134	2,700,975	$49,043	64,711	$3,769	.....	.....
Canada	22,722	425	488,701	31,389	753	113	.....	.....
All other	.....	.....	112	2	100	6	.....	.....
Total	18,150,525	197,003	3,189,788	80,434	65,564	3,888	4,285	$184

Imports for consumption—Revenue.

Fiscal year.	Rates of duty.	Quantity.	Value.	Duties collected.	Value per unit of quantity.	Actual and computed ad valorem rate.
		Pounds.				*Per cent.*
1909	½ cent per pound	83,376,089	$684,427.00	$166,752.00	$0.008	24.36
1910	.....do	93,838,195	750,140.00	187,676.00	.008	25.02
1911	.....do	99,478,325	802,015.00	198,957.00	.008	24.81
1912	.....do	72,706,732	600,621.00	145,413.00	.008	24.21
1913	.....do	76,092,327	619,492.00	152,184.00	.008	24.57
1914[1]	.....do	10,720,964	90,003.00	21,442.00	.008	23.82
1914[2]	1/10 cent per pound	37,776,275	326,895.00	37,796.00	.009	11.56
1915	.....do	18,402,130	197,975.00	18,402.00	.0107	9.30
1916	.....do	3,289,790	80,418.00	3,290.00	.021	4.09
1917	.....do	65,564	3,888.00	66.00	.059	1.69
1918	.....do	535	83.00	.54	.155	.64

[1] July 1 to Oct. 3, 1913.

[2] Oct. 4 to June 30, 1914.

DOMESTIC EXPORTS.

Exports of bleaching powder are not shown separately in Commerce and Navigation of the United States prior to the fiscal year 1918, when there was exported 13,060,401 pounds, valued at $558,066.

PRICES.

Price quotations on bleaching powder.[1]

Month.	1912	1913	1914	1915	1916	1917	1918
January	1.25–1.30	1.35–1.45	1.20–1.30	1.37–1.62	14.00	4.37–6.50	1.25–3.50
April	1.25–1.30	1.30–1.40	1.20–1.30	1.40–1.50	8.00– 8.50	3.75–6.00	2.25–3.25
July	1.50–2.00	1.25–1.30	1.20–1.30	1.40–1.50	5.50– 8.00	1.75–4.00	2.00–3.25
October	1.35–1.40	1.25–1.30	2.25–3.00	2.50–2.75	4.25– 6.00	2.00–2.50	5.50–6.00

[1] From the Oil, Paint, and Drug Reporter. The prices are in cents per pound, spot at New York, for a product containing 35 per cent available chlorine.

Rates of duty.

Act of—		Tariff classification or description.	Rates of duty, specific and ad valorem.
Year.	Paragraph.		
1883	618	Lime, chloride of, or bleaching powder	Free.
1890	635	.....do	Do.
1894	537	.....do	Do.
1897	8	Bleaching powder, or chloride of lime	½ cent per pound.
1909	8	.....do	Do.
1913	12	.....do	1/10 cent per pound.

COURT AND TREASURY DECISIONS.

There are no decisions directly affecting the classification of bleaching powder or chloride of lime. The only questions in issue were whether certain combinations of chemicals constituted the commodity specifically provided for in the tariff acts and whether tin containers were dutiable.

The decisions are:

Tin cans containing bleaching powder or chloride of lime.—Held not dutiable as unusual containers under the act of 1883. (Dept. Order, T. D. 6568.)

The following articles were held not properly classable as bleaching powder or chloride of lime:

Chloride of calcium.—Held dutiable as a chemical compound or salt under paragraph 92 of the act of 1883. (Dept. Order, T. D. 9008.)

A mixture of soap, carbonate of soda, and saponified resin.—Held dutiable as an unenumerated manufactured article under section 4 of the act of 1890. (In re Ross, G. A. 954 (T. D. 12041).)

Sodium perborate, 31.57 per cent, and *sodium carbonate*, 68.43 per cent. Held dutiable as chemical compound under paragraph 3 of the act of 1909. The term "bleaching powder" was said to have a well-known significance in chemistry and to mean either calcium chloride or a mixture of calcium chloride and calcium hypochlorite, and to be synonymous with chloride of lime. (In re Oberle & Henry, Abstract 35745 (T. D. 34496).)

The following articles were held not to be lime powder:

A mixture of lime, carbonate of lime, and manganese oxide, lime chief value. Held dutiable as lime under paragraph 90 of the act of 1897. (In re Strohmeyer & Arpe Co., Abstract 21596 (T. D. 29922).)

Similar merchandise.—Held dutiable as a chemical mixture under paragraph 3 of the act of 1909. (Strohmeyer *v.* U. S., 2 Ct. Cust. Appls., 285, affirming Abstract 23840 (T. D. 30865).)

COMPETITIVE CONDITIONS.

Bleaching powder and the electrolytic alkali industry.—Bleaching powder has been one of the chief marketable forms of chlorine gas which is a joint product of the electrolytic alkali industry; the other product is caustic soda. The electrolytic process necessarily produces caustic soda and chlorine in chemically equivalent amounts, which are approximately equal in weight. The chlorine in turn will produce, roughly, two and one-half times as much bleaching powder as the caustic soda produced. In normal times the demand for caustic soda is far in excess of the demand for bleaching powder and other chlorine products, therefore the limit to the amount of caustic soda which can be produced electrolytically is determined by the amount of chlorine (bleaching powder and other products) which can be disposed of.

In an effort to supply a greater portion of the large and profitable market for caustic soda there has been a tendency on the part of the electrolytic alkali industry to overproduce chlorine or bleach. The result has been that prices for chlorine and bleaching powder have ruled so low that manufacturers claim that there has been very little, if any, profit in this end of the business. The normal prewar price of bleaching powder was practically constant at about $25 per ton, which made it one of the cheapest chemical products.

Effect of the war on the electrolytic industry.—The war has produced a large, although presumably temporary, increase in the demand for chlorine. A number of important substances used in poison-gas warfare require chlorine in their manufacture. The three of these substances which have been used in the greatest quantities are chlorine gas itself, phosgene, and mustard gas.

Even before the entrance of the United States into the war there was a large increase in the capacity of the existing chlorine plants. The estimated requirements, however, became so great and the prospects of disposing of the increased output when war demands ceased were so small that private concerns were unwilling to enlarge their plants on terms acceptable to the Government. The Government is, therefore, erecting a plant to supply a large part of the increased demand resulting from our entrance into the war.

The output of chlorine in 1918 will probably be at least three times the output of 1914, and there is large additional productive capacity under construction (October, 1918). The war has undoubtedly caused a substantial increase in productive capacity in England, France, and Germany.

As a result of this increased capacity to meet war demands, it is expected that there will be a surplus of productive capacity after the war and that there will be keen competition. This competition will be sharper in bleaching powder and other chlorine products than in caustic soda.

The war demands for chlorine have made it necessary for the Government to control the distribution of all chlorine products, including bleaching powder. In addition restrictions have been placed on the use of bleaching powder by the paper and pulp mills.

Foreign competition.—Germany in the past has interwoven her chlorine industry with her potash industry which has monopolized the world's markets. Much chloride of potash is treated electrolytically in Germany for the production of caustic potash; the chlorine, produced simultaneously, is delivered free of charge to the manufacturer of bleaching powder. The value of the caustic potash is sufficient to cover all the cost of manufacture of both the caustic potash and chlorine and still leave a large profit. This cheap source of chlorine is largely responsible for the rapid rise of the manufacture of bleaching powder and chlorine products in Germany. Germany, prior to the war, had increased her exports of bleaching materials until they were equal in quantity to the exports of bleaching powder from the United Kingdom.

The firms in England and France, which use the Deacon and Weldon processes, are apparently at a disadvantage in the production of bleaching powder, as these processes are more complicated and require more attention than the electrolytic process. Although comparative cost figures are not available, the Deacon and Weldon processes appear to be more expensive, since the electrolytic process is gradually being installed in England and France.

Germany and England, prior to the war controlled the export trade in bleaching powder, while in the United States the industry had developed sufficiently to supply the larger portion of home consumption. The war forced the immediate withdrawal of Germany and later of England from the export trade in this article. The foreign trade of these two countries was thus thrown open to the United States. This country by increased production has been able to supply its own demands and to develop an export trade. During the fiscal year 1918 we exported some 6,000 short tons of bleaching powder.

At the conclusion of the war we may expect a determined effort on the part of England and Germany to regain this trade. A price-cutting war on the United States trade in this commodity will undoubtedly ensue. Our chief advantage in this competition will be our cheap power for electrolysis, but whether this will offset the advantages of cheaper labor in England and the cheap source of chlorine in Germany is a question.

MISCELLANEOUS.

Rates of duty in foreign countries.—The following rates of duty on bleaching powder in foreign countries were compiled from the latest available official

foreign publications. In converting the duties to United States equivalents the par value of foreign money was used.

	Cents per pound.
China	0.271
Russia	1.816
Finland	.411
Germany	.108
France	.460
Portugal	.049
Spain	.263
Italy	.350
Austria-Hungary	.332
Switzerland	.088
Bulgaria	.263
Roumania	.088
Serbia	0.044
Argentina	.236
Brazil	1.240
Chile	.165
Canada:	
In packages containing not less than 25 pounds, 0.15 cent per pound plus 7½ per cent ad valorem.	
In packages containing less than 25 pounds, 32½ per cent ad valorem.	

Norway, Denmark, Great Britain, Netherlands, Belgium, and Greece admit bleaching powder free of duty.

Abstracts of tariff hearings.—

(1908–9. Ways and Means Committee.)

The Dow Chemical Co., Midland, Mich.: We believe the present import duty will furnish a larger revenue to the Government than a lower duty and that the risk of an American industry being blotted out by a foreign monopoly is less than it would be if the import duty were lower. (Herbert H. Dow.)

(1912. Committee on Finance, United States Senate.)

Mr. Edward E. Arnold, of Providence, R. I., representing the Mathieson Alkali Works, Arnold-Hoffman Co., and The Castner Electrolytic Alkali Co.:

"Labor in this country is more expensive than abroad. The fact that half of the bleaching powder consumed in the United States is made here indicates that the industry is not only established, but if aggressively provided for with means to do its best, it could produce the article in a satisfactory manner in this country.

"It is wise to look upon the industry abroad. I venture to say that in England alone there is an idle capacity of 100,000 tons annually of bleaching powder—idle because this country has so quickly come to the front in supplying its own requirements in this line.

"Mr. Arnold stated that he had transported heavy chemicals to this country from Europe at a freight rate of sixty and odd cents per ton.

"To the ordinary workman the wage in England is usually about 3 and 6 pence per day. A dollar and a half is about the lowest that we can get any workmen for. In fact it is the lowest wage I know of in a single instance in the case of workmen in our plant."

Mr. Austin M. Purves, representing the Pennsylvania Salt Manufacturing Co., of Philadelphia, Pa.:

"Eighty thousand tons bleaching powder is manufactured by domestic concerns and 50,000 tons is imported annually. Prior to the development of this industry in this country under a beneficial protection the cost of this article to the consumer was largely in excess of the figure brought about by the perfection of our home industry. The seaboard price to-day is about 1¼ cents, a reduction of about 30 per cent from the price ruling when bleaching powder was admitted into this country free.

"A reduction would be most discouraging to the industry now established in this country."

Brief of the Hooker Electrochemical Co., Niagara Falls, N. Y.:

"A reduction in the duty on bleaching powder would be highly injurious to the industry in this country, and would arrest the progress made in cheapening the price to consumer. From 1892 to the present the price has been reduced from $52 per ton to $25.60 per ton at New York. Chemical research has not found an outlet for the vast amounts of chlorine gas produced in the electrolytic production of caustic other than that of bleaching powder, therefore the American manufacturer must make bleaching powder."

BIBLIOGRAPHY.

The following literature was consulted in the preparation of this catalog:

Lunge: Sulphuric Acid and Alkali, volume 3.
Rogers: Manual of Industrial Chemistry.
Thorpe: Dictionary of Applied Chemistry, volume 2.
Thorp: Outlines of Industrial Chemistry.

ASSOCIATIONS, ESTABLISHMENTS, IMPORTERS, EXPORTERS, TRADE JOURNALS, DIRECTORIES.

Manufacturers of bleaching powder:

- Hooker Electrochemical Co., Niagara Falls, N. Y.
- Niagara Alkali Co., Niagara Falls, N. Y.
- Niagara Electrochemical Co., Niagara Falls, N. Y.
- Isco Chemical Co., Niagara Falls, N. Y.
- Mathieson Alkali Works, Inc., Niagara Falls, N. Y.
- Pennsylvania Salt Manufacturing Co., Philadelphia, Pa. (plant at Wyandotte, Mich.
- Great Western Electrochemical Co., Pittsburg, Cal.
- Michigan Electrochemical Co., Menominee, Mich.

Cotton Gloves.

[Par. 260, act of 1913.]

SUMMARY.

DESCRIPTION AND CLASSIFICATION.

Cotton gloves may be divided into four classes: (1) Canvas or flannel work gloves; (2) gloves made from "circular" cotton cloth; (3) lisle gloves; (4) sueded cotton gloves made of "Atlas" cloth. The last class overshadows all the others in interest, so far as concerns its relation to the tariff. The manufacture of these gloves is one of the industries which have grown up in this country as a result of the war, and the persons who are interested in it feel doubtful about their ability to compete with foreign manufacturers after normal trade conditions are restored. The tariff has never affected the manufacture of work gloves to any extent and the other classes of gloves mentioned are produced in the United States in relatively unimportant quantities.

DOMESTIC PRODUCTION.

Quantity.—Several million dollars worth of work gloves are produced annually in this country, although the total output is difficult to estimate. These gloves are very often made of combinations of cloth and leather, the component material of chief value being as often leather as it is cloth. The value of the annual production of work gloves made entirely of cotton cloth may be conservatively estimated, however, at $3,000,000 to $4,000,000. The value of the annual output of gloves made of "circular" cotton cloth is about $400,000. The value of the output of lisle gloves is small, probably not reaching as large a total as the value of the gloves of "circular" cotton cloth. Probably about 1,300,000 dozen pairs of sueded cotton gloves, valued (price at factory) at $8,450,000, or $6.50 per dozen pairs, were manufactured in 1918.

Methods and processes.—The manner in which the "Atlas" cloth is made prevents it from raveling and makes it firm and strong. It will not stretch the longitudinal way of the weave after being shrunk, and this permits the production of a glove which will not stretch lengthwise, but will have elasticity across the palm so that it will shape itself to the hand and fit well. The "Atlas" process is often spoken of as a "weave," but the process is really knitting. The cloth, however, is of such a close texture that it resembles a woven fabric.

Many technical difficulties have been encountered by the American manufacturers; in fact, they are just emerging from the experimental period. The sueding and the combining, or "duplexing," are both secret processes, and the method of each manufacturer differs slightly from the others. The sueding process has reached a more advanced state in this country than the "duplexing." Very few "duplex" gloves were placed on the market by American manufacturers before the fall of 1918. The scarcity of gloves, and also "Atlas" cloth made it more advantageous for the American manufacturers to make gloves of single thickness. In many respects the domestic product is just as

good as the German—possibly better—but it seems difficult to duplicate the velvety finish of the imported gloves, which are an almost perfect imitation of chamois.

Materials and equipment.—The yarn for making the "Atlas" cloth, which was made almost exclusively from the finest Sea Island cotton, came principally from Manchester, England, before the war. The German manufacturers of this cloth used the English yarn. Stocks of yarn of this sort, in this country, were quickly reduced after the war began, and yarn of domestic make has been used with satisfactory results.

The "Atlas" knitting machines were made in Nottingham and Leicester, England, and in Chemnitz, Germany, before the war. Most of the machines of this sort used in this country have been imported, but some of them were made by the Acme Pattern Co., of Buffalo, N. Y., and some of the makers of the "Atlas" cloth have built machines for their own use.

Organization and capitalization.—Cotton gloves, of all the varieties mentioned, are made chiefly by small concerns. The average firm of glove makers works with a capital of about $50,000, although there are a few concerns with a capitalization of more than $500,000. The sueded cotton gloves are made in several instances by companies previously engaged in manufacturing leather gloves, silk gloves, veilings, or lingerie. Some of these concerns are larger than the typical glove manufacturing company, but most of them are small.

Localities of production.—Work gloves are made by many small companies scattered through the middle west—chiefly in Ohio, Indiana, Illinois, and Wisconsin—and on the Pacific coast (principally in California). The "circular" cotton gloves have been made by a few small companies located in New York city and vicinity. The lisle gloves and sueded cotton gloves are made in New York city and vicinity, and in Fulton County, N. Y., the great center of the leather-glove industry of this country.

Relation of domestic production to domestic consumption.—Practically all of the work gloves used in this country are made here. Prior to 1914, all of the sueded cotton gloves were imported, but now this situation has been almost exactly reversed. Probably 75 per cent of the "circular" cotton gloves used here were made in this country, just before 1914, while now the domestic producers control the market. All of the lisle gloves used here were imported, before the war. Now, probably, at least 50 per cent are imported from Japan, while the rest are made in this country.

FOREIGN PRODUCTION.

Countries of largest production.—Before the European war began, Chemnitz, Saxony, was the great center for the production of sueded cotton gloves. Some of these gloves were made in England, but very few compared with the number produced in Germany. The output from the German factories continued for some time after the war began, but the state of the industry there at present is not known. Japan has begun to make cotton gloves since 1914. The output of the Japanese factories has been chiefly lisle gloves, but recently they have been making sueded gloves in considerable quantities.

IMPORTS.

Principal contributing countries.—Before the European war began, 90 per cent of the cotton gloves imported into this country came from Germany. Imports of cotton gloves from that source continued for some time after the war began. In the year ending June 30, 1915, imports of cotton gloves of all kinds

amounted to $2,386,781, which was greater than the importation for 1914. In 1916 the imports amounted to $1,147,790, and in 1917 the imports were valued at $208,565. In the latter year most of the imports came from Japan. In 1918 practically all of the imports came from Japan, and their value amounted to $590,684.

Classes and varieties.—Up to 1914, imports were chiefly of the sueded variety, but included, also, lisle gloves and "circular" cotton gloves. At the present time the imports are chiefly of the lisle variety, but include, also, some of the sueded gloves.

PRICES.

The price of the domestic sueded gloves on September 1, 1918, was about double the price of the gloves imported in 1913. What may be called the standard price—the price for which the greater number of gloves were sold—was 50 cents per pair at retail in 1913, while in 1918 it was $1 per pair. The price of cotton work gloves averages (1918) about 25 cents a pair, and the price of the "circular" cotton gloves is about the same. Lisle gloves were sold at 35 cents a pair at retail in 1913, while now they are sold for 50 to 75 cents a pair at retail.

TARIFF HISTORY.

In 1913 "gloves, by whatever process made, composed wholly or in chief value of cotton," were made dutiable at 35 per cent ad valorem (Schedule I, par. 260, act of 1913).

Under the tariff laws of 1890 and 1897 the import duty on cotton gloves was 50 per cent ad valorem. Cotton gloves were not specially enumerated under those acts but were included in "clothing, ready made, and articles of wearing apparel of every description, * * * composed of cotton or other vegetable fiber." From 1894 to 1897 the rate of duty on such articles was 40 per cent ad valorem.

In 1909 a clause was added to the hosiery paragraph (Schedule I, par. 328) providing for a duty of 50 cents per dozen pairs plus 40 per cent ad valorem on men's and boys' cotton gloves, knit or woven, valued at not more than $6 per dozen pairs, and 50 per cent ad valorem on men's and boys' cotton gloves valued at more than $6 per dozen pairs. All other cotton gloves remained dutiable, by the law of 1909, under the wearing-apparel paragraph at 50 per cent ad valorem.

SUGGESTION AS TO CLASSIFICATION.

Some manufacturers suggest that instead of the phrase "cotton gloves, by whatever process made," the law should read, "gloves, by whatever process made, of cotton or other vegetable fiber." This change is suggested because it is said that the Germans are using a fabric made of nettles as a substitute for cotton. It is suggested as a possibility that gloves might be made of this fabric and that the product might be so low in price as to compete successfully with cotton gloves.

It might seem that sueded cotton gloves should be separately classified, because of the peculiar conditions which surround their production. It probably would not be feasible to do so, however, because of the difficulty in making an absolute distinction between gloves which are sueded and those which are not sueded. Many gloves made of the lisle thread have a slight nap or suede finish. Such gloves, although in a sense sueded, are by no means the true sueded cotton gloves, the manufacture of which has been described above.

Summary table.

Year.	Value [1] (imports for consumption.	Amount of duty.	Value per unit of quantity.	Equivalent ad valorem rate.
1910	[2] $122,760.00	$123,586.98	$0.824	100.67
1910	[3] 190,182.00	95,091.00	6.97	50.00
1911	[2] 165,840.00	142,965.25	1.08	86.21
1911	[3] 1,655.00	827.50	9.30	50.00
1912	[2] 88,362.78	78,788.45	1.03	89.17
1913	[2] 88,699.00	75,292.94	1.11	84.89
1914	[2] 22,961.72	15,182.89	1.91	66.12
1914	[4] 2,161,077.52	756,377.14	1.43	35.00
1915	[4] 2,386,781.00	835,373.35	1.58	35.00
1916	[4] 1,147,790.00	401,726.50	1.73	35.00
1917	[4] 208,565.00	72,997.75	1.86	35.00
1918	[4] 590,684.00	206,739.40	1.40	35.00

[1] Up to 1914, the figures for imports include only "Men's and boys' cotton gloves." Ladies' and misses' gloves were included in "cotton wearing apparel," hence separate totals can not be given. The figures for 914–1918 include all kinds of cotton gloves. During 1914, 1915, and 1916 most of the imports were suèded cotton gloves, but during 1917 and 1918 lisle gloves made up the greater share of the imports.
[2] Cotton gloves, men's and boys', valued at not more than $6 per dozen pairs.
[3] Cotton gloves, men's and boys', valued at more than $6 per dozen pairs.
[4] Cotton gloves of all kinds (law of 1913).

General Information.

DESCRIPTION.

Work gloves.—The United States is the only country in the world in which the manufacture of work gloves is of any importance. The gloves are made in more than a hundred styles and are used in a large number of industries—from candy making to ship building. These gloves are very often made of canvas, with a palm reenforced by leather; sometimes, as in the case of gloves used for husking corn, they are reenforced with metal as well as with leather.

Gloves made of "circular" cotton cloth.—These gloves are so called because they are made of cloth manufactured on a machine similar to that on which stockings are made. The cloth comes from the machine in tubular form, and the product is cheap and of light weight. The gloves are cut from the piece and are sewed together as are leather gloves. They are not "knit goods" in the sense of being turned out in final form by a special knitting machine. With the exception of work gloves, practically the only kind of cotton gloves made in this country before 1914 were the cheap cotton gloves of this "circular" cloth. These gloves are worn by policemen, soldiers, and sailors, and by lodges and fraternal orders on dress occasions and parades.

Lisle gloves.—This term is an inclusive one and embraces many varieties of women's dress gloves. The gloves coming within this classification are made of various grades and qualities of cotton fabrics and are of much better quality than the gloves made of "circular" cotton cloth. They differ from the sueded cotton gloves in the knitting and finish of the cloth.

Sueded cotton gloves.—These gloves are commonly referred to as "Chamoisette" gloves, but the correct trade name is "sueded cotton" gloves. "Chamoisette" is used because the Kayser Glove Co. advertised the sueded cotton glove, which they imported from Germany, and which they now make in this country under that name. Other companies apply different names to the same kind of glove. "Suedetex," is the name given by the Suedetex Glove Co.; "Fabrichant," by the H. S. Hall Co.; "Filosette," by the Fownes Bros. Co.; "Atlasette," "Suede finish," etc., are applied to the product by others. The gloves are washable, and are light and comfortable for summer wear. The

"Duplex" gloves, made of two thicknesses of the cloth, cemented together, are suitable for winter wear. The popularity of these gloves is increasing on account of their intrinsic merit, and because they are a good substitute for leather gloves, which have advanced greatly in price.

RAW MATERIALS.

The yarn which the Germans used for the Atlas fabric was imported from England. It was made of Sea Island or of fine Egyptian cotton. The German manufacturers received a "drawback" on the imported yarn when the gloves were exported. The American manufacturers are now (1918) making extensive use of yarn made from Upland cotton. The Sea Island cotton is better than the Upland for the purpose, but the price is practically prohibitive. At present there is an even greater difference in price than usual between the two kinds on account of the short crop of the former. The domestic yarn, made from Upland cotton, which is being used, is giving good results.

PROCESSES OF MANUFACTURE.

"Tricot" knitting machines are used for making the cloth out of which the sueded cotton gloves are manufactured. These machines are known as "flat" knitting machines, as distinguished from "circular" knitting machines on which "circular" cloth is made. Cotton cloth of an ordinary loose texture, called "jersey" cloth, can be made on these "tricot" machines, but the cloth which is used for sueded cotton gloves is made by the "Atlas" process, and "Atlas cloth" is the trade name for cloth of this kind. A special pattern wheel is used on the machine when "Atlas" cloth is made. It will not ravel, as does jersey cloth, or as any cloth made on a circular knitting machine will do, and it will not stretch the longitudinal way of the web after having been shrunk. It will stretch, somewhat, across the web. This enables the glove manufacturers to produce a glove which does not stretch lengthwise, but which has elasticity across the palm, so that it shapes itself to the hand and fits well.

The "Tricot" machines were built in Chemnitz, before the war, and also in England, at Nottingham and Leicester. The Acme Pattern Co., of Buffalo, N. Y., Mr. Bergens, manager, now builds them, and some of the makers of the Atlas cloth are building a few machines for their own use, on account of the present state of the machine business.

The next process, after the fabric is knit, is shrinking. The web of cloth is wet and stretched on frames in a very hot room until it is shrunk the required amount. It is then ready for the sueding, or napping. This has been one of the most difficult parts of the whole glove-making process to master, the only other part which has given as much trouble being the "combining" or "duplexing"—that is, cementing two thicknesses of the cloth together—for use in the "duplex" gloves, which are worn in the autumn and winter. The "sueding" is a secret process, and each manufacturer has worked out a method of his own. All are, no doubt, of the same general nature. The sueding machine consists of a series of rolls covered with emery paper or sandpaper, through which the cloth passes. The wire rolls, which are used in raising the nap on flannel, are too harsh for the Atlas cloth. Rolls covered with brushes or with cloth are used to give a smooth finish to the cloth. There are other operations which are not divulged by the possessors of the secret. In some factories there are as many as 18 processes through which the cloth goes in being finished.

The process of cementing two thicknesses of the cloth together is called "duplexing." Manufacturers have had much difficulty in getting this done

properly. Either the cement would show through the cloth after the gloves were washed, making black spots, or it would not be strong enough and the layers would separate. The preparation used could hardly be called cement, because when two layers of cloth are separated, after having been properly "combined," nothing can be seen between them, in the nature of a solid substance, such as would appear if ordinary glue or paste were used. Sometimes, when the work is not well done, the cement dries, the two thicknesses separate, and the dry particles of cement come out like grains of sand, but this does not happen when the work has been properly done.

Only a small proportion of the cloth goes through the process of "duplexing." More gloves are made of the single-thickness cloth than of the double thickness, and this was especially true of the situation during 1917, because it was hard to get enough cloth to satisfy all demands. The operations through which the cloth passes on its way to the finished glove are as follows:

(1) The cloth is prepared and cut in rectangular pieces of the right size for the gloves which are to be made; (2) the gloves are cut; (3) the size of the glove is stamped on the inside of the wrist; (4) the "points," or decorative lines, usually three in number, are sewed on the back of the glove; (5) the ends of silk thread are pulled through to the inside of the glove; (6) second silking (it is customary to do the silking in two operations, as it requires a combination of threads to make a "point" which looks well); (7) the remaining ends of silk thread are pulled through to the inside of the glove and all the ends are fastened by being tied; (8) thumb closing (that is, the top of the thumb is sewed up); (9) thumb inserting (the thumb, which is cut separately from the rest of the glove, is inserted); (10) fourchette inserting (the fourchettes are the narrow strips which are sewed in, making the sides of the fingers); (11) putting in the stays, which are small pieces of cloth designed to reinforce the glove at weak points; (12) closing (this process consists of sewing up the fingers); (13) hemming the edge of the wrist; (14) examining the glove for defects up to this point; (15) "Laying off" (this consists in smoothing and pressing the glove on a heated brass form); (16) making buttonholes; (17) putting on buttons; (18) trimming loose ends of thread; (19) examining and repairing; (20) banding; (21) boxing; (22) shipping.

More men than women are employed in the manufacture of the cotton cloth for the gloves, whereas about 90 per cent of the workers in the glove manufacture are girls and women. The sanitary and other conditions prevailing in the cloth manufacture are about the same as conditions in the textile industry in general. The glove-making business seems to be clean and healthful. The buildings are light and there is usually very little noise or smoke, and no heaps of refuse or waste matter are near the factories.

The workers in the industry are paid by the piece, almost invariably. There has been a considerable increase in the scale of wages in this industry as in others. The sueded cotton glove industry did not exist four years ago, but the average wage in silk-glove making, which is comparable with cotton-glove making, has increased in that length of time from $8 or $10 a week to $12 or $15 a week.

Most of the work of manufacturing sueded cotton gloves is done in factories. The only place where there is any considerable amount of putting out work is Gloversville, N. Y. In that city a large number of women take work to do in the home. A large number of houses in Gloversville have motors installed and the home sewing is done on power-driven sewing machines. Many women who do this work have been formerly employed in glove factories.

HISTORY OF THE INDUSTRY.

Prior to the European war the sueded cotton glove was made almost exclusively by manufacturers in Chemnitz and surrounding villages of Saxony. The industry originated in England but became established in Chemnitz about 1906, and subsequently was entirely discontinued in England. About 1,000,000 dozen pairs of these gloves were imported annually into the United States from Chemnitz before the war, according to estimates made by the American Manufacturers' Association, while estimates of others, both manufacturers and importers, place the importation at a larger amount, possibly 1,200,000 dozen pairs. The German product had reached a very high degree of perfection. The gloves were an excellent imitation of chamois or undressed kid, and were made in all the familiar glove shades, mocha, yellow, or cream, brown and black, as well as white. Some criticism was made, however, of the style and fit of the German gloves.

Soon after the European war began, certain American manufacturers took up the sueded cotton glove business in anticipation of the cessation of imports of these gloves from Germany. The firms which interested themselves in this business had been manufacturing leather or silk gloves before the war, or, in a few cases, were concerns which had been making veilings, lingerie, and women's apparel of other kinds.

The business of manufacturing the sueded-cotton glove grew very slowly at first on account of the technical difficulties involved. A great deal of experimentation was necessary before the American manufacturers could weave and finish as good an "Atlas" cloth as that which had been used by the German manufacturers. The importations of German gloves continued for some time after the war began, but in 1916 there was a marked diminution in the imports, and the domestic manufacture was correspondingly stimulated. Another fact which operated to encourage the manufacture of these gloves was the great increase in the price of leather gloves. This subject is discussed under the heading "Rival commodities."

THE MANUFACTURE OF COTTON GLOVES UNDER THE TARIFF OF 1909.

After the tariff act of 1909 was passed, several manufacturers began to make cheap cotton gloves. This act placed a duty of 50 cents per dozen pairs plus 40 per cent ad valorem, on men's and boys' cotton gloves valued at not more than $6 per dozen pairs. These gloves are sometimes referred to as "Berlin" gloves, but usually as "policemen's" or "undertakers'" gloves. Before 1909 these gloves cost 41 cents per dozen pairs in Germany. The duty amounted to 20.5 cents and the expenses of importing to 3.5 cents a dozen, making a total of 65 cents landed cost. The retail price was 10 cents a pair. After the tari of 1909 went into effect the cost in Germany was still 41 cents, the duty amounted to 66 cents, and expenses of importing to about 5 cents, making total of $1.12 landed cost.

Statements differ as to what happened to the prices after 1909. Some persons assert that the retail prices advanced to 25 cents a pair, which would be practically by the full amount of the duty, while others maintain that it advanced only to 15 cents a pair. The Commerce and Navigation Reports show that importations continued, amounting to one-fourth of the total consumption, according to apparently reliable estimates. The fact that importations continued would indicate that the price for gloves of domestic make was higher than the foreign price by the amount of the duty. After the act of 1913 was passed, the price fell to 10 cents a pair at retail. The American dealers could import them for 70 cents per dozen pairs, landed cost.

The cheap cotton gloves had been made previously in the same style as the better grades of gloves. There were several different operations; the outside and the inside halves of the glove were cut separately, fourchettes for the inside of the fingers were made and sewed in, and the thumb was inserted. The American manufacturers decided that the only way to meet German competition was to reduce the amount of labor expended on sewing up the gloves, so they worked out a plan for cutting the glove all in one piece and sewing it up by one operation. The glove was cut so that the sewer could start at the tip of the little finger and run one seam up and down the fingers and end at the base of the thumb, completing the glove. To cut the gloves so they could be made in this way necessitated a considerable waste of cotton cloth, but this kind of cotton cloth was cheaper in this country than in Germany, and the Germans could not imitate the American process on this account. One American manufacturer said that by using the above method he could make the gloves to sell for 67 cents per dozen pairs. He admitted that the product was inferior, referring to it as not a glove but "four fingers and a thumb." The producers were able to sell them to the retailers, however, notwithstanding the fact that the German-made glove was a better article. The retailers were willing to push the sales of the poorer gloves because of the slight advantage in price which they secured. Both German and American gloves sold, however, for the same retail price—10 cents a pair.

Notwithstanding the fact that the American manufacturers were able to continue in the cotton-glove business after 1913, they assert that the margin of profit was very small and they intended, if the war had not intervened, to invest their capital in some other more productive line. One manufacturer stated that he could have made $50 a week if he had not been obliged to pay a factory superintendent. It appears that the business was just paying costs, including the wages of superintendence.

RIVAL COMMODITIES.

The increasing price of leather gloves after the outbreak of the war had the effect of causing women to turn to the sueded cotton gloves as a substitute for the leather gloves. The percentage of increase in price of the sueded cotton gloves is as great as the percentage of the increase in the price of leather gloves. The price of the sueded cotton gloves to the importers ranged, before the war, from $2.50 to $5 per dozen pairs, and the gloves sold for 50 cents to $1 per pair at retail. In 1918, the price for the domestic product ranged from $1 to $2 per pair at retail. Leather gloves, on the other hand, have increased from their former price of $1 to $2 a pair retail to an average of $2 to $4 a pair retail. It is evident that an increase in the price of an article from $2 to $4 means that there will be substituted for such an article some product which has increased from a former average of 50 cents to an average of $1. This is the situation in regard to the leather gloves and the sueded cotton gloves, and this fact has greatly stimulated the domestic manufacture of the sueded cotton gloves.

The various branches of the glove business are all closely related and the growth of a new industry such as the making of sueded cotton gloves naturally affects the makers of silk and leather gloves. Many manufacturers who formerly devoted all their attention to making leather gloves are buying the sueded cotton cloth from which to make gloves.

METHODS OF MARKETING.

Some of the leading manufacturers of the sueded cotton gloves sell through the jobbers, but the majority of them have a copyrighted name or trade-mark

for their product and sell direct to the retailers. Those who are engaged in marketing the gloves are, for the most part, manufacturers of and dealers in women's wear of various kinds. Some of them also have been interested in the leather glove or silk glove business for some time. Few companies have been organized expressly for the purpose of placing these gloves on the market. They were taken up as a promising side line by those already engaged in a similar line of business, but have become in some instances of more importance than any other class of goods sold by the firms handling them.

PRODUCTION IN UNITED STATES.

The following is an estimate, based upon statements of the manufacturers, of the value of the domestic production of men's and boys' cotton gloves, of the kind commonly worn by policemen, manufactured after the passage of the act of 1909, which levied a duty of 50 cents per dozen pairs and 40 per cent ad valorem on this class of gloves. For purposes of comparison the imports of these gloves are also given.

Men's and boys' cotton gloves.

Year.	Value of "policemen's" cotton gloves produced in the United States (estimated).	Value of imports for consumption of this class of gloves. "Men's and boys' cotton gloves valued at less than $6 per dozen pairs."
1910	$250,000	$122,760.00
1911	250,000	165,840.00
1912	300,000	88,362.78
1913	300,000	88,699.00
1914	150,000	22,961.72
1915	75,000	(1)
1916	150,000	(1)
1917	300,000	(1)
1918	400,000	(1)

[1] After the act of 1913 was passed all imports of cotton gloves were classified together in the Commerce and Navigation Reports. It is therefore impossible to tell the extent of imports of the cheap gloves after this date, but it is known that they declined after the European war began.

The output of work gloves is very difficult to estimate. These gloves are made of various combinations of cloth and leather. The total annual production must be worth several million dollars, as there are some large firms engaged in the business, but only a small proportion of this amount is represented by gloves made wholly of cotton.

The manufacture of sueded cotton gloves is an entirely new industry in this country. The following estimate of the quantity and value of the domestic production is based upon the statements of manufacturers:

Domestic production of sueded cotton gloves.

Year.	Number of dozen pairs.	Value.	Price at the factory, per dozen pairs.
1914	50,000	$200,000	$4.00
1915	200,000	1,000,000	5.00
1916	500,000	2,750,000	5.50
1917	1,000,000	6,000,000	6.00
1918	1,300,000	8,450,000	6.50

IMPORTS.

The foregoing figures may be compared with the imports of cotton gloves of all kinds. These imports were chiefly of sueded cotton gloves up to 1917; during 1917 and 1918 they were chiefly lisle gloves.

The value of imports of cotton gloves of all kinds was in 1914, $2,184,039; in 1915, $2,386,781; in 1916, $1,147,790; in 1917, $208,565; and in 1918, $590,684.

The imports of women's and children's cotton gloves were included in "Cotton wearing apparel" (in the United States Commerce and Navigation Reports) prior to 1914, but their approximate amount may be determined from the following figures, from the Daily Trade and Consular Reports. These imports from Chemnitz represent about 90 per cent of the total imports of cotton gloves into the United States in the years mentioned.

Value of cotton gloves imported from Chemnitz, Saxony, to the United States, 1911–1913: In 1911, $1,211,000; in 1912, $1,741,000; and in 1913, $2,396,408.

Imports for consumption-revenue.

Fiscal year.	Rates of duty.	Quantities, dozen pairs.	Values.	Duties collected.	Value per unit of quantity.	Actual and computed ad valorem rate.
1910[1]	50 cents per dozen pairs plus 40 per cent ad valorem.[2]	148,965.92	$122,760.00	$123,586.98	$0.824	100.67
1910	50 per cent ad valorem [3]	27,276.25	190,182.00	95,091.00	6.97	50.00
1910	50 cents per dozen pairs plus 40 per cent ad valorem less 20 per cent.[4]	12.00	5.00	6.40	.417	128.00
1911	50 cents per dozen pairs plus 40 per cent ad valorem [2]	153,258.58	165,840.00	142,965.25	1.08	86.21
	50 per cent ad valorem [3]	178.00	1,655.00	827.50	9.30	50.00
1912	50 cents per dozen pairs plus 40 per cent ad valorem [2]	86,886.79	88,362.78	78,788.45	1.02	89.17
1913	50 cents per dozen pairs plus 40 per cent ad valorem [2]	79,626.67	88,699.00	75,292.94	1.11	84.89
1914	50 cents per dozen pairs plus 40 per cent ad valorem [2]	11,996.42	22,961.72	15,182.89	1.91	66.12
	35 per cent ad valorem [5]	1,511,732.50	2,161,077.52	756,377 14	1.43	35.00
1915	35 per cent ad valorem [5]	1,513.338.00	2,386,781.00	835,373.35	1.58	35 00
1916	35 per cent ad valorem [5]	664,471.00	1,147,790.00	401,726.50	1.73	35.00
1917	35 per cent ad valorem [5]	112,027.00	208,565.00	72,997.75	1.86	35.00
1918	35 per cent ad valorem [5]	420,667.00	590,684.00	206,739.40	1.40	35.00

[1] Figures for 1910 cover period from Aug. 6, 1909, to June 30, 1910, under act of 1909.
[2] Cotton gloves, men's and boys', knitted or woven, valued at not more than $6 per dozen pairs.
[3] Cotton gloves, men's and boys', knitted or woven, valued at more than $6 per dozen pairs.
[4] Under reciprocity treaty with Cuba.
[5] Cotton gloves, by whatever process made; act of 1913.

PRICES.

Two pairs of sueded cotton gloves were submitted to the Commission as samples. One pair, made in Chemnitz, Germany, bears the name of Alban Aurich. These gloves cost 7½ marks or $1.785 (less 5 per cent) per dozen pairs in Germany, in 1913. The landed cost in this country, after deducting the discount and paying the 35 per cent duty and 10 cents a dozen for expenses, was $2.40. Better grades of the sueded gloves were imported for $3.75 to $4.25 per dozen pairs, landed cost. The average price of the gloves to the retailer was about $4.50 per dozen pairs, and the usual price to the consumer was 50 cents a pair. The other pair is an American product. Both cloth and gloves were made in this country. The particular yarn used in these gloves may not have been made from domestic cotton, but many of the gloves now being made in this country are made from American-grown cotton. Gloves similar to these are being sold now (1918) to jobbers for $6 to $7 per dozen pairs; to the retailers

for $7 to $9 per dozen pairs and to the consumer for $1 a pair, usually, although the cheaper grades are sometimes sold as low as 75 cents. The duplex gloves sell for $1.50 to $2 per pair.

Jobbers used to carry an assortment of cotton gloves ranging in price from $1.90 to $9 per dozen pairs. Now (1918) the assortment is very much more limited; often only two or three grades, ranging in price from $7 to $9.

A lisle glove used to be sold for 35 cents at retail, but of late there has been nothing to take its place, with the exception of some cotton gloves of rather poor quality which were imported from Japan. Some of these cost as low as $2.35 per dozen pairs in Japan, and were sold for about 50 cents a pair at retail. There is a dearth of low-priced cotton gloves. American manufacturers are devoting their attention to the better grades.

Gloves made of "circular" cotton cloth, made on a knitting machine similar to a stocking machine, have been sold for 10, 15, and 25 cents a pair at retail in the past. Gloves, like the sample submitted, sold for 10 cents a pair before 1909, and for 15 to 25 cents a pair from 1909 to 1913. After the rate of duty was reduced to 35 per cent, in 1913, the price fell to 10 cents a pair. Few American manufacturers are engaged in making this kind of gloves, and most of those made are bought for the various branches of the service by the United States Government.

Work gloves are made in a great variety of styles. One company alone makes 100 different varieties. It is said that the gloves are used by workers in almost every line of industry, "from candy pulling to building steel ships." Gloves, like the sample submitted (111K,) sell to the jobber for about $1.50 per dozen pairs. The retail price of the gloves, formerly 10 cents a pair, is now (1918) from 15 to 25 cents a pair.

Rates of duty.

Act of—		Tariff classification or description.	Rates of duty, specific and ad valorem.
Year.	*Par.*		
1883		See p. 70, *infra*.	
1890	349	* * * articles of wearing apparel of every description, * * * composed of cotton or other vegetable fiber, or of which cotton or other vegetable fiber is the component material of chief value * * *.	50 per cent ad valorem.
1894	258	....do	40 per cent ad valorem.
1897	314	....do	50 per cent ad valorem.
1909	324	* * * articles of wearing apparel of every description, composed of cotton or other vegetable fiber, or of which cotton or other vegetable fiber is the component material of chief value * * *.	Do.
	328	Men's and boys' cotton gloves, knitted or woven, valued at not more than $6 per dozen pairs.	50 cents per dozen pairs and 40 per cent ad valorem.
		Valued at more than $6 per dozen pairs	50 per cent ad valorem.
1913	256	* * * articles of wearing apparel of every description, composed of * * * cotton * * * and india rubber * * *.	30 per cent ad valorem.
	260	Gloves by whatever process made, composed wholly or in chief value of cotton.	35 per cent ad valorem.
	358	* * * wearing apparel * * * embroidered in any manner by hand or machinery, whether with a plain or fancy initial, monogram, or otherwise, * * *.	60 per cent ad valorem.
Rev. Stat.	Sec. 2913	In the appraisement of kid and all other gloves imported into the United States there shall be no discrimination in determining by appraisement the foreign market value of such goods, whether protected by trade-mark or not; and in no case shall gloves so protected by trade-mark be appraised at a less foreign market value than the like goods not so protected; and no sale or pretended sale of such goods shall be held to fix the value of the same.	

COURT AND TREASURY DECISIONS.

UNDER THE STATUTES PRIOR TO 1883.

Before 1883 cotton gloves were classified under provisions of various tariff acts for specified articles of wearing apparel, including gloves made on frames. (Acts of July 30, 1846, ch. 74, schedule C, 9 Stat., 42, 44, 45; Mar. 3, 1857, ch. 98, 11 Stat., 192; Mar. 2, 1861, ch. 68, sec. 22, 12 Stat., 178, 191; July 14, 1862, ch. 163, sec. 13, 12 Stat., 543, 556; Rev. Stat., sec. 2504.) **Gloves of silk and cotton,** cotton chief value, were held to fall within those provisions. *Arthur* v. *Unkart,* 96 U. S., 118; *Heinze* v. *Arthur's Executors,* 144 U. S., 28.

UNDER THE ACT OF 1883.

In 1883 **cotton gloves** were omitted from the provision for goods made on frames. They were held to be dutiable either under that provision or as manufactures of cotton, which carried the same rate of duty. Appeals of Morgan et al., T. D. 6248.

But **cotton gloves lined with wool,** the wool constituting a substantial feature but not in chief value, were held dutiable under that act as wearing apparel composed in part of wool. Appeal of Parker, T. D. 6428.

UNDER THE ACT OF 1890.

In cases under the act of 1890 **cotton gloves** were held dutiable as wearing apparel and not as manufactures of cotton. In re Field, G. A. 546 (T. D. 11187). So were so-called **taffeta gloves of cotton, clocked with silk,** cotton chief value. In re Bauer, G. A. 1540 (T. D. 12989). But **not taffeta gloves of cotton with silk threads** of neat or thrown silk giving the gloves a silk face, the silk being the component of chief value, which were classified as wearing apparel in chief value of silk. In re Dingelstedt, G. A. 2144 (T. D. 14145).

Cotton gloves with silk points, consisting of plain rows of two or more strands of silk thread down the backs, were held dutiable as cotton wearing apparel embroidered. In re Bauer, G. A. 2584 (T. D. 15007).

UNDER THE ACT OF 1894.

Classification **of cotton gloves** as wearing apparel rather than as manufactures of cotton was continued under the act of 1894. In re Elworthy, G. A. 2956 (T. D. 15856).

UNDER THE ACT OF 1897.

Gloves were held not to be garments, and **men's cotton gloves** having an elastic braid or band at the wristband for the purpose of holding them closely upon the wearer's wrists, were accordingly held under the act of 1897 not to be outside garments having india rubber as a component material, because not a "garment." In re Neustadter, G. A. 5023 (T. D. 23356).

Cotton gloves having three rows of stitching on the back, known as "kid point," were held not embroidered. In re Goldschmidt, G. A. 4656 (T. D. 22006). But men's **cotton gloves having four parallel lines of needlework near the top,** giving the appearance of a scroll border, were declared both ornamental and useful and dutiable as embroidered wearing apparel. In re Field, G. A. 6461 (T. D. 27663).

Gloves made of yarn, composed of cellulose filaments obtained from cotton waste by chemical treatment, were held dutiable by similitude as wearing apparel in chief value of cotton. *Thomass* v. *U. S.,* 1 Ct. Cust. Appls., 86.

UNDER THE ACT OF 1909.

Cotton gloves knitted or woven needed not to be shaped by a weaving process nor knitted, fashioned and shaped wholly by a machine to be classified under the provision in the act of 1909 for men's and boys' cotton gloves knitted or woven. *Spielmann* v. *U. S.*, 3 Ct. Cust. Appls., 368; *Lehman Co.* v. *U. S.*, 5 Ct. Cust. Appls., 441. But the provision was held not to include **gloves lined with wool**, which was declared to constitute a substantial and necessary part of the gloves and to enhance their value, add to their comfort and warmth, and aid in their sale. The provision for knitted articles in part of wool was held to govern classification. *U. S.* v. *Burne*, 4 Ct. Cust. Appls., 298.

The three preceding cases decided by the Court of Customs Appeals were followed by the Board of General Appraisers in Abstracts 33958 (T. D. 33833); 34296 (T. D. 34000); 34531 (T. D. 34090); 37131 (T. D. 35027), and 37343.

Women's cotton gloves, not being specifically provided for, were held dutiable as cotton wearing apparel and not as manufactures of cotton under paragraph 324 of that act. In re Calhoun, G. A. 7091 (T. D. 30892).

Women's gloves of cotton and silk, cotton chief value, were likewise classified. In re Lehman Co. et al., Abstracts 33253 (T. D. 33668) and 35852 (T. D. 34548).

UNDER THE ACT OF 1913.

Gloves composed of cotton and rubber and used by electricians and linemen were held dutiable as wearing apparel under paragraph 256 of the act of 1913 as more specific than the provision for manufactures in chief value of rubber under paragraph 368. In re American Express Co. et al., Abstracts 37512 and 38390.

Women's embroidered cotton gloves were held dutiable under paragraph 358 and not as cotton gloves. In re Goldschmidt, Abstract 38251.

Gloves classified as composed in chief value of silk at 50 per cent ad valorem under paragraph 317 of the act of 1913 were found to be in chief value of cotton and classified accordingly under paragraph 260. In re Borgfeldt, Abstract 39964.

COMPETITIVE CONDITIONS.

Domestic competition.—Competition among the domestic producers has not been severe up to the present time (1918). The demand for gloves has been great and the supply has been very limited, but the output is steadily increasing and the time is probably near when the jobbers and retailers will become more critical of the goods offered them. The shortage has been so acute, for a part of the time at least, during the past two years that almost any kind of a cotton glove has been acceptable if offered at a price anywhere near the figure formerly prevailing. The increasing competition among producers may be expected to keep the price from rising greatly in the near future, even though the cost of production continues to advance. American manufacturers probably will not only turn out a much greater number of cotton gloves in the near future, but, the initial disadvantages having been overcome, they should greatly improve the quality of the gloves produced.

Comparative costs of production.—Figures in regard to the comparative costs of production in the different countries are worth little. Estimates have been secured from manufacturers, but all admit the hopelessness of trying to come to any conclusion about the matter at present. Comparative figures as to prewar costs can not be secured, because the industry did not exist on this side of the water until after 1914. German costs will, no doubt, be quite different from what they were before the war. Little is known about Japanese costs, because the industry is entirely new in that country.

Competition with Germany.—The question of the respective merits of the German-made and American-made Atlas cloth and sueded cotton gloves is often discussed, but hard to answer. Large retailers in the country disagree radically. Some of them say that the American product has attained an excellence unsurpassed by any gloves which the Germans ever sent over. Others say that the American-made gloves are markedly inferior to the ones which they used to import. There is substantial agreement, however, that the American manufacturers are steadily improving the quality of their output, and very few persons deny that the domestic product is now at least nearly as good as the Chemnitz gloves.

Some of the American manufacturers assert that there has always been criticism of the style and fit of the German gloves. They become "baggy" after a little wear, and, furthermore, the clasps and other small details of finish were not so good as those of the domestic product. In regard to the tendency of the German-made gloves to get "baggy" it seems that the reason for this did not lie in the way the cloth was woven but in the manner in which it was shrunk, or perhaps, better, the degree to which it was shrunk. The more it was shrunk, the less its elasticity, and the German cloth was shrunk about to the maximum. The American-made gloves, therefore, seem to have much more elasticity. The principal point in which American gloves seem to be inferior is the finish, or sueding. American manufacturers do not seem to have yet learned the secret of the beautiful velvety finish which made the best German gloves almost a perfect imitation of chamois or mocha skin.

The sueded cotton gloves imported from Germany before the war averaged $3.75 to $4.50 per dozen pairs and sold at retail for 50 to 75 cents a pair. The price of the domestic gloves is just about double the price of the gloves formerly imported from Germany. The "chamoisette" gloves now cost the jobber $6.50 to $7 per dozen pairs; the jobber sells them to the retailer for $8.50 or $9 per dozen pairs, and the latter gets $1 a pair for them. It must be remembered, however, that we are comparing the prewar prices in Germany with present prices in this country.

Competition with Japan.—There seems to be a great deal of confusion about the cost of production in Japan, especially labor cost. Some of this, very likely, arises from the fact that costs vary greatly within the country. It is stated, on good authority, that some of the work on gloves is done in "bush shacks," and that what costs one manufacturer 13 yen, costs another but 3 yen. It may safely be assumed that the actual labor cost of cotton gloves in Japan is low, because most of the work is done by women and girls. The Japanese are exceptionally quick to learn operations of that sort. Some of the American manufacturers, who have had Japanese operatives, report them to be as good as any workers ever employed in the industry.

Some of the importations from Japan in the spring of 1918 were brought in at $2.35 per dozen pairs (cost in Japan). The cheapest gloves imported from Germany before the war, with the exception of the gloves made from circular cotton cloth, were valued at $2.25 per dozen pairs (landed cost); so that the Japanese have been selling the gloves nearly as cheaply as the Germans did, although the quality of the goods was much below the German standard. Not many of the cheaper gloves have been made in the United States since 1914, and the dealers have had practically nothing to take the place of the lisle gloves which used to sell at retail for 35 cents a pair until the gloves from Japan were brought in. The supply of cotton gloves of all kinds has been so small that it has been better for the domestic manufacturers to devote their whole attention to making the gloves of better grade; consequently they have concentrated on the sueded gloves.

Status of the domestic manufacture.—The manufacture of sueded cotton gloves in this country is, in a sense, an "infant industry." Viewed from another angle, it is merely a new subsidiary or side line to an old industry, or rather several old industries, viz, the manufacture of silk gloves, of leather gloves, and of cotton cloth. Most of the machines for making the "Atlas" cloth and for sewing the gloves have been adapted to this new line of work from former utilization for the branches of manufacture mentioned. A special pattern wheel is put on a "tricot" knitting machine when it is used for making the "Atlas" cloth. The sueding process, however, requires the use of a highly specialized new machine. Ordinary napping machines, used in making cotton flannel, etc., will not do at all for the "chamoisette." The wire rolls are too harsh, and a much finer sort of roughing process must be employed. The "duplexing" process for cementing layers of the cloth together, which is done under hydraulic pressure, is another specialized operation. In glove making the same sewing machines will do for many kinds of fabric. Cotton gloves can be sewed on the machines on which light leather gloves are made or on those on which silk gloves are made.

It is an open question whether the American manufacturers can continue to make cotton gloves in competition with Germany and Japan after normal conditions are restored. American manufacturers are paying a great deal of attention to securing high quality, excellent style, and good pattern in their gloves, and if they attain all these desired ends it may be that they will be able to hold their own in the future, even against a lower-priced imported glove. This is not their view of the situation, however; most of them have expressed the opinion that the present rate of duty is too low to enable them to meet foreign competition successfully.

BIBLIOGRAPHY.

Tariff acts of the United States, 1789–1909.
Tariff act of 1913.
Tariff hearings, Committee on Ways and Means, 1909 and 1913.
Commerce and Navigation Reports.
Daily Consular and Trade Reports.
Commerce Reports.

There is practically no literature of a technical or descriptive character on the subject.

ASSOCIATIONS, ESTABLISHMENTS, IMPORTERS, EXPORTERS, TRADE JOURNALS, DIRECTORIES.

An association of glove manufacturers has been proposed, but an organization has not yet been effected. Mr. James Warbasse, Gloversville, N. Y., editor of "The Glover's Review," has been active in the endeavor to get the glove manufacturers to form an association, and he is probably the best person from whom to get information as to the progress of the movement.

The following establishments are engaged in the manufacture of sueded cotton gloves: The Merrill Silk Co., Hornell, N. Y.; Julius Kayser & Co., 45 East Seventeenth Street, New York, N. Y.; The Suedetex Glove Co., 874 Broadway, New York, N. Y.; E. & Z. Van Raalte, Fifth Avenue, at Sixteenth Street, New York, N. Y.; Fownes Bros. & Co., 119 West Fortieth Street, New York, N. Y.; H. S. Hall, 215 Suydam Avenue, Jersey City, N. J.; Becker & Grant, St. Johnsville, N. Y.; The Ormsby-Morris Co., Waterford, N. Y.; The Littauer Glove Co., Gloversville, N. Y.; The Elite Glove Co., Gloversville, N. Y.; The J. W. Rose Glove Co., Gloversville, N. Y.; Atlasette Gloves, Inc., 225 Cook Street, Brooklyn, N. Y.

Firms which manufacture the cloth but do not make the gloves: The Fulton Country Silk Mills, Jones and Naudin, proprietors, Gloversville, N. Y.; The Underwood Manufacturing Co., Palatine Bridge, N. Y.

Manufacturers of cheaper grade of cotton gloves: O'Callaghan & Fedden, 121–123 East Twenty-fourth Street, New York, N. Y.; The Sudbury Co., New York, N. Y.

Importers: The Topken Co., 257–265 Fourth Avenue, New York, N. Y.; Wimelbacher & Rice, Union Square, New York, N. Y.; the large department stores have imported a good many cotton gloves.

Manufacturers of work gloves: The Boss Co., Kewaunee, Ill.; The Indianapolis Glove Co., Indianapolis, Ind.; The Economy Glove Co., Fort Wayne, Ind.; M. B. Hamilton, Leavenworth, Kans.; The Hansen Glove Co., Milwaukee, Wis.; The Enoch Manufacturing Co., Mount Sterling, Ky.; The Summers Manufacturing Co., 837 South Los Angeles Street, Los Angeles, Cal.

Suppliers of yarn for atlas cloth manufacturers: T. J. Porter & Sons, 119 South Fourth Street, Philadelphia, Pa.

Trade Journal: "The Glover's Review," published at Gloversville, N. Y.; Mr. James Warbasse, editor.

Quicksilver.

(Pars. 154 and 404, act of 1913.)

SUMMARY.

Description.—Quicksilver or mercury is a silver-white metal, distinguished from other metallic elements by the fact that it is a liquid at ordinary temperatures. It occurs native, but practically all the production comes from sulphide ores, notably cinnabar. Since the metal is invariably reduced at the mines, the ores are not an article of commerce.

Quicksilver is marketed in flasks containing 75 pounds each.

Uses.—Mercury is a most important war metal. Its direct military uses are vital and its industrial uses, though not directly military, are no less necessary to the successful carrying on of war.

Mercuric fulminate, made from mercury, is the chief constituent in detonators or blasting caps for high explosives, not only those used in warfare but also those used in mining, quarrying, and general excavation. It is thus a factor in the production of all the other ores and minerals and in railway and highway construction. Even in time of peace from one-third to one-half of the quicksilver output is made into fulminate.

When used in the metallic state, the extraordinary weight and mobility of quicksilver adapt it for use in barometers, thermometers, and various forms of physical apparatus.

The two chlorides—calomel and corrosive sublimate—have important uses in medicine. In normal times the consumption of quicksilver for drugs is nearly as great as that for fulminate.

A new and important application of quicksilver is in the manufacture of antifouling paint for ship bottoms, for which purpose it excels all other substances.

DOMESTIC PRODUCTION.

Quantity.—The domestic production of quicksilver in 1917 was 36,351 flasks of 75 pounds each. This amount is more than double the production in 1914. In 1876 the United States produced 75,000 flasks—as much as the total production of all Europe. Even in 1905 this country was the leading producer of quicksilver in the world. In 1914 it ranked fourth and its output was only one-sixth of the world production. The United States production in 1905 was 30,451 flasks. It declined fairly steadily until 1914, when only 16,548 flasks were produced.

Methods and processes.—Furnace treatment without concentration has always been the common method for recovering mercury from its ores. In the United States fully 75 per cent of the production is made in Scott furnaces. Other methods have been developed but have not been widely adopted.

Equipment.—The cost of a Scott furnace and accessory equipment is at least $750 per ton-day capacity, and the usual estimate is $1,000 for each ton of daily capacity. Individual furnaces at the present time are commonly built

with a capacity of 75 tons of ore a day. Thus the cost of a treatment plant, consisting of only one furnace and exclusive of the cost of developing the mine to the stage at which it can supply an adequate tonnage of ore, is more than $50,000.

Organization and capitalization.—About one-third of the domestic production is made by the New Idria Quicksilver Mining Co., capitalized at $500,000. The remainder comes from a large number of companies, many of whom operate on a small scale.

Localities of production.—About 66 per cent of the domestic production (1917) came from California. About 33 per cent came from Nevada, Arizona and Texas, and the remaining 1 per cent was mined in Oregon and Idaho. On account of the extreme low grade of quicksilver ores and because they are rarely mechanically concentrated, reduction plants are located at the mines. The production of both ore and metal occur, therefore, in the same localities.

Relation of domestic production to domestic consumption.—The United States normally used approximately 25,000 flasks of quicksilver a year as compared with an average output for the years just preceding the war of about 20,000. The estimated requirements in 1918 called for 22,600 flasks for nonmilitary uses and 13,500 flasks for military uses. In 1917, for the first time in many years, there was a large excess of domestic production over consumption.

Export of domestic product.—The exports in 1917 were the greatest in the history of the industry, amounting to over 13,500 flasks or more than 37 per cent of the total production. For three years previous to the war an average of less than 500 flasks was exported annually. The bulk of the exports in 1917 went to Japan, England and Canada. An embargo prohibited exports during the greater part of the year 1918.

FOREIGN PRODUCTION.

Spain has been the leading producer of quicksilver since 1906 and has contributed about one-third of the annual supply of the metal. Italy, Austria, and the United States have made up the remainder of the output.

The last year for which complete production data are obtainable is 1913. In that year the world production was a little more than 125,000 flasks, of which Spain produced 35 per cent, Italy 23.5 per cent, Austria 21.5 per cent, the United States 16.5 per cent, and Mexico and other countries 3.5 per cent.

COMPETITIVE CONDITIONS.

The cost of producing quicksilver in the United States (1918) averages between $70 and $75 a flask and the average is constantly increasing. The mines at Almaden, Spain, yield the metal at a cost of $16 a flask and the entire output is contracted to the Rothschilds at $34 (£7 sterling) a flask. Both Austria and Italy produce the metal at costs less than one-half those prevailing (1918) in the United States.

The difference in cost is ascribable directly to the great difference in the grade and extent of the ore deposits. Metallurgical and mining methods in the United States are highly efficient. This is also true of Austria and Italy, but not of Spain. Nevertheless, Spain can produce the metal at costs much lower than those even of the other European countries. The quicksilver deposits of California are small compared with those of European countries. The average ore mined in the United States contains only 5 pounds of mercury to each ton of ore treated (i. e., a metal content of only 0.25 per cent). The average ore mined in Spain runs 11 per cent, in Italy 0.8 per cent, and in Austria 1 per cent.

IMPORTS AND REVENUE.

Most of the quicksilver imported into the United States has been Spanish metal shipped from England. Mexico has contributed a varying supply. The greater part of her output is shipped to the United States, partly for American consumption and partly for export to Europe. The Mexican output of quicksilver is small and fluctuating—largely because of the unsettled political conditions.

Practically all the imported metal is shipped to New York and distributed from there.

Previous to the war foreign metal was competitive with the domestic product. Very little metal was imported prior to 1910, but after that year the imports increased greatly. In the latter part of 1916 an extraordinary demand for war purposes absorbed the entire European supply and a large export from the United States. This condition continues, with a drop in the American exports owing to increased home requirements (1918).

The dominating factor governing importations of quicksilver has been the American price. Following the cut in the tariff of 1913, there was a decided increase in imports, but this increase had been begun before the tariff went into effect and may perhaps be accounted for by the decrease in American production caused by the closing of American mines that were unable to compete at then existing prices.

The amount of duty collected on imports of quicksilver has varied in the last five years from a little less than $60 (1913) to nearly $60,000 (1916). These imports can not be considered a dependable source of revenue. Because of the extraordinary prices of recent years, the ad valorem duty of 10 per cent fixed by the tariff act of 1913 has resulted in a greatly increased revenue per unit of quantity.

PRICES.

All price quotations for quicksilver are in dollars per flask of 75 pounds. Until 1911 very little foreign metal came into the United States, and the price fluctuations (which have always been excessive in the case of this metal) were an index of the relation of domestic supply and demand. Since then imports of foreign metal have played an important part in the American market.

Prices on the two American markets, San Francisco and New York, have generally differed by 50 cents a flask or less. Because of transportation difficulties, however, the New York quotation has frequently been as much as $4 higher, and in January, 1916, was $31 higher than the San Francisco quotation. This was in the period of great inflation, and in the following months foreign imports drove the New York market down as much as $17 below the western market. The New York market has been temporarily lower at other times, but is generally higher. The difference rarely has any relation to the cost of transportation, but depends on relative supplies or speculation.

For many years before the outbreak of the European war the price of quicksilver rarely exceeded $50 and was generally below $40 a flask. Early in 1916 an extraordinary demand carried the price temporarily to $300 a flask. In 1918 the Government price was fixed by agreement with producers at $105. The open market ranges from $5 to $20 a flask higher.

TARIFF HISTORY.

In the tariff act of 1913 quicksilver was made dutiable at 10 per cent ad valorem. The flasks, bottles, or other vessels in which the quicksilver is

imported were made subject to the same rate of duty as they would be subject to if imported empty.

By the act of 1883 mercury was dutiable at 10 per cent ad valorem. This was changed to a specific rate of 7 cents a pound ($5.25 a flask) in 1894—an increase. The same specific rate was continued in the acts of 1897 and 1909, but in 1913 the old ad valorem rate was placed on quicksilver imports. At existing prices that amounted to a reduction of about 5 per cent, but at present prices of over $100 a flask, it amounts to nearly double the 7-cent rate.

FOREIGN DUTIES.[1]

Quicksilver is admitted free of duty in Great Britain, France, Norway, Sweden, Denmark, Austria-Hungary (a producing country), and Japan.

Canadian imports are dutiable at 7½ per cent (British preferential tariff 5 per cent). A light tax of only ⅛ cent per pound is levied on imports of quicksilver into Italy (a producing country). It is not specially provided for in Spain and so comes under the blanket clause for metals providing a duty of ⅛ cent per pound.

TARIFF QUESTIONS.

At a conference of producers, consumers, importers and exporters of quicksilver, held by the United States Tariff Commission in San Francisco, on June 26, 1918, the dominant note was the emphasis laid by producers on the need for price stability in the quicksilver industry. It was the practically unanimous opinion of producers at the conference that if domestic deposits are to continue to meet a substantial proportion of the home demand, a stable price must be assured and the price must be a high one, i. e., about $100 a flask under wartime costs of production. Producers requested a duty of $35 a flask in addition to the present 10 per cent ad valorem duty.

Quicksilver is a commodity which illustrates with special emphasis certain unsatisfactory characteristics of ad valorem tariffs as compared with specific. Its price fluctuations have been extreme, and it is seen at a glance that at the high point—$300 per flask—10 per cent provides a duty which is not only excessive but is levied at a time when protection is least needed. Normally this ad valorem duty on quicksilver is 10 per cent on a market valuation of some $45.

In the case of quicksilver the question can be squarely raised as to whether the production of this metal can be considered an effective American industry, in as much as abundant, cheaper sources of supply exist elsewhere. It is particularly an example of an industry whose products are placed on the market at high cost because of the relatively inferior natural resources of this country in the raw material.

Quicksilver is an essential metal, however, of vital necessity in the conduct of war and widely used in the industries. It is stated that American resources, although low grade, can furnish an adequate supply for many years if a stable and sufficient price be guaranteed. Without tariff protection the United States will be dependent in large part on outside sources for a vital commodity, and a grave question of national expediency is involved.

[1] Kelly's Customs Tariffs of the World, 1918.

Summary table.

Calendar year.	Domestic production.[1]	Imports for consumption.[2]	Exports.		Domestic consumption.
			Domestic.[1]	Benefit of drawback.[2]	
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
1910	1,545,075	667	[3] 144,225	.....	1,401,517
1911	1,594,200	471,944	21,825	.....	2,044,319
1912	1,879,800	82,706	23,283	.....	1,939,223
1913	1,515,975	171,653	85,521	.....	1,602,107
1914	1,241,100	614,869	108,426	.....	1,747,543
1915	1,577,475	421,884	252,852	592	[5] 1,745,915
1916	2,244,900	424,396	666,047	36,601	[5] 1,966,648
1917	2,726,325	390,495	842,186	42,788	[5] 2,231,846

[1] From Mineral Resources, U. S. Geological Survey.
[2] From Commerce and Navigation, Department of Commerce.
[3] Abnormal exports to Canada in 1910.
[4] Fiscal year ending June 30.
[5] Approximate (involves use of fiscal year exports with benefit of drawback and calendar year figures of production plus imports).

General Information.

DESCRIPTION.

Mercury is a silver-white metal, which remains liquid at ordinary temperature. It freezes at minus 39.6° C., boils at 375° C., and is 13.6 times heavier than water.

Ores.—About 20 minerals containing mercury have been identified, but of these only three are of commercial importance.

Cinnabar is the well known cochineal-red mercuric sulphide (HgS). When pure, it contains 86.2 per cent of the metal. It is soft (hardness 2 to 2.5) and heavy (specific gravity 8.0 to 8.2). The occurrence is crystalline, massive, or earthy. Its most common associates in ores among other metallic minerals are pyrite (or marcasite), sulphides of antimony or arsenic, sulphur, and, less frequently, sulphides of copper and native gold. Frequent gangue minerals are calcite, silica, barite, bitumens, and, less often, fluorite. Cinnabar in a more or less pure state is the chief ore of quicksilver and almost the only ore worked on a commercial scale in the United States.

Meta-cinnabarite has the same chemical constitution, when pure, as cinnabar, but is usually massive, gray black in color, and slightly harder.

Native quicksilver.—The native metal, occurring as minute drops or in cavities, and also as an amalgam with silver and other metals, is a frequent associate of the other ores. It is usually considered to be a natural reduction product of cinnabar or meta-cinnabarite.

USES.

As the only metal that is a liquid at ordinary temperatures, quicksilver has unique and special uses in the metallic state. Its comparative chemical inertness together with its weight and mobility, make it valuable for many instruments. It alloys readily with other metals to give more or less soft amalgams. The most important use is as fulminate in blasting caps and other detonators. Both the chlorides of the metal are used in medicine, and the oxide is the active poison in antifouling paint for ships bottoms.

Non military uses.—Making drugs, chemicals, fulminate for blasting caps, red oxide for antifouling paint, barometers, thermometers, thermostats, gas governors, mercury vapor lamps, batteries, cosmetics, silvering mirrors, boiler compounds, phthallic acid, vermilion and dental amalgam; it is also used in

preparing raw material by hatters and furriers, and in the amalgamation of gold and silver ores.

Military uses.—Fulminates for detonating high explosives and fixed ammunition; drugs (calomel, corrosive sublimate), and dental amalgam for medical use; antifouling paint for ships bottoms; storage batteries, barometers, etc.

SUBSTITUTES.[1]

A possibly important factor in the demand for quicksilver after the war is the use of substitutes. Just prior to the war the detonator manufacturers were using substitutes for fulminate of mercury. These substitutes were obtained from Germany and the supply was cut off by the war. Now there are several detonators on the market that are composed of substitutes. The substitutes for fulminate are commercially important, according to the opinion of American manufacturers of blasting caps. While they are not going to replace fulminate entirely (as most of them require fulminate to explode them), they will perhaps cut down the consumption of fulminate about 75 per cent.

Prior to the war, substitutes for fulminate could be secured from Germany at a price equivalent to about $41 a flask for quicksilver. The American substitutes can not compete with pure fulminate at prices lower than $75 a flask for mercury and even at $105 a flask many of them are little cheaper.

As to the reliability of the substitutes for fulminate, the most tangible evidence is that the ordnance department of no Allied Government has permitted their use in caps or detonators for war purposes. The use of substitutes is, therefore, confined to the manufacture of blasting caps for use in mining and excavation and in the making of sporting ammunition. A misfire in either of these commodities is not so vital. In blasting, it is possible to use two caps in every important shot and 100 per cent detonation is practically certain when this is done.

There are comparatively few applications of mercury where a substitute is not possible, although the substitute is generally not so good and frequently not so cheap. Mercury can be done away with in making cosmetics, for which 300 flasks are used annually. A large part of the consumption in drugs and chemicals could be saved by eliminating certain preparations for which substitutes can be used. Most of the consumption for water-treating compounds and for vermilion could be saved if necessary.

COUNTRIES OF LARGEST PRODUCTION.

During 1904 and 1905 the United States led the world in production, but since 1906 Spain has been the leading producer and has accounted for about one-third of the total. Italy, Austria, and the United States made up the major part of the remaining two-thirds. In 1913, the last year for which complete figures are obtainable, Spain produced 1,490 metric tons; Italy, 988; Austria, 855; United States, 688; Mexico and other countries, 150. On the outbreak of the war, Austrian supplies were at once commandeered by the Central Powers and Spanish supplies, controlled mainly in London, were held

[1] Data largely from evidence of Leslie Oliver, of the California Cap Co. and F. L. Ransome, of the U. S. Geological Survey, before the U. S. Tariff Commission at the San Francisco conference, June 26, 1918. The composition of these substitutes is varied. Lead (or silver) azide is one of the most important. Chlorato-trimercuraldehyde, diazobenzene nitrate, nitrogen sulphide, basic mercuric nitro-methane, sodium fulminate, and other compounds are also employed.

for Allied use. Spanish and Italian production is believed to have largely increased since 1914. Minor production is also being derived from low-grade ores in Peru and Chile, with possible future extension under the present stimulus.

DEPOSITS IN THE UNITED STATES.

The quicksilver deposits of the United States are found in more or less simple fissure fillings, often irregular and linked together to form stock works; in compound-fracture zones; along bedding and joint planes; and disseminated through the country rock. Ore shoots are extremely irregular. Ore and gangue are found as fissure filling, cementing breccias, or impregnating and replacing the wall rock.

Quicksilver ores are found in many kinds of igneous, sedimentary, and metamorphic rocks of various ages. Deposits often follow lines of regional fissuring. The relation is noticeably frequent between igneous activity and the deposition of quicksilver ores. A considerable number of deposits have proved to be very superficial, decreasing rapidly in size and value at depth.

It is claimed that the United States can furnish an adequate supply of quicksilver for years to come, provided prices are maintained. The rich ores are practically exhausted and few mines have large reserves of even low-grade ore. Treatment of material carrying less than one-quarter of 1 per cent mercury is not unusual in the United States.

LOCALITIES OF PRODUCTION.

In 1917, 66 per cent of the United States production came from California. Texas, Nevada, and Arizona made up 33 per cent, the remaining 1 per cent being produced in Oregon and Idaho. The largest American producer is the New Idria mine in San Benito County, Cal., which furnishes about one-third of the entire output of the United States. The Chisos mine in Brewster County, Tex., is credited with the second largest production.

Total ore production from domestic mines.

Year.	Short tons.	Pounds metal recovered.		Per cent of ore recovered as metal.
		Per ton.	Total.	
1910	123,562	12.5	1,545,075	0.625
1911	138,525	11.5	1,594,200	.575
1912	155,693	12.1	1,879,800	.605
1913	136,278	11.1	1,515,975	.555
1914	122,998	10.1	1,241,100	.505
1915	158,817	9.9	1,577,475	.497
1916	[1] 249,643	9.0	2,244,900	.448
1917	.....	.....	2,726,325	.....

[1] Estimated.

The above table, prepared from figures furnished by the United States Geological Survey, clearly shows the gradual decline in metal content of the American ores.

PROCESSES OF EXTRACTION.

Furnace treatment, without previous concentration, has always been the common method for recovering mercury from its ore. The two essential features of this process are calcining (volatilization of the metal by heating) and

condensation. Few other processes that promise success have been developed. Preliminary wet concentration has received serious consideration. Although perfectly feasible, it has failed utterly to equal the results of efficient furnace treatment either in the matter of recovery or of low costs. Its only attractive fields are in new mines whose development does not warrant the expense of furnace installation, for the isolated mines remote from fuel supplies, or, in established mines, for gaining temporary increase in capacity. Leaching with alkaline sulphides is a possibility, but the leaching process is even less generally applicable than concentration.

Furnace methods.—The most important advance in quicksilver reduction in the United States was the development of the Scott furnace in 1875. This is a shaft type of furnace with a fire box at the bottom. The ore travels from top to bottom on tiles or shelves, which are set at an angle and staggered. About 24 hours are allowed for the ore to pass through the furnace.

The installation cost of a Scott furnace plant is high, being generally estimated at approximately $1,000 per ton-day. More modern condenser construction permits the reduction of this estimate to $750 per ton of daily capacity. No device has yet proved so generally efficient in operation. Severe tests have shown that with careful supervision extractions of over 90 per cent can be obtained with this type of furnace, and this from ore carrying only 5 or 6 pounds of metal per ton. Average practice (1918) in California probably does not recover over 75 per cent.

Encouraged by favorable results achieved by producer-gas fuel, an Austrian plant (Idria) has erected a new Kroupa furnace (patented) which has proved a distinct step toward the bettering of quicksilver metallurgy. The fundamental idea of this furnace construction is to drive off the mercury from the ore between highly heated walls. This type of furnace has vertical parallel shafts separated by walls built of refractory masonry, which contain the heating flues.

Rotary furnaces[1] which have lately been built at one or two plants, give thorough satisfaction, and for certain types of ore may even displace the standard Scott furnace. Cast-iron retorts of round or D-shaped section have a limited use at small high-grade properties or for the treatment of residues. In addition to these, a great variety of furnace construction, notably furnaces of the Herreschoff type, have been tried out and abandoned.

Condensation.—The object of condensers is to cool the furnace gases sufficiently to allow the vaporized mercury to condense and to collect the liquid metal. Condensers are built of brick, stone, cast iron, glass, wood, concrete, or hollow tile. Sometimes the walls are made hollow and are cooled by water or air. Direct water sprays are open to the objection that they carry away floured (very finely divided) mercury. The chief requirements of condenser material are that it should not absorb a large amount of quicksilver, nor be attacked by the furnace vapors. Wood has lately proved quite satisfactory.

The condensers are arranged in series. The first condenser collects little quicksilver and is mainly a dust catcher. The products of the following condensers contain less ore dust and show varying amounts of mercury and water. "Mercurial soot" is an undesirable but inevitable product of the condensation system. It is usually mixed with wood ashes or lye to brighten the surfaces of the little metal globules and then worked by hand or machinery to make these tiny globules run together so that they can be collected. The residue always contains quicksilver and is generally charged back to the furnace. It is the general theory among producers that there is consid-

[1] cf. Rotary cement kilns.

erable room for improvement in quicksilver metallurgy along the lines of condensing practice.

Losses in furnace work.—1. Absorption of mercury by the brickwork of the furnace and condensers is less difficult to estimate and is not considered an ultimate loss, as the mercury so absorbed is largely recovered when the plant is dismantled. It is an important factor in a new plant since, by tying up a considerable amount of metal, it has the effect of increasing the capital investment required at the commencement of operations. In periods of abnormal prices, furnaces have frequently been dismantled to recover this mercury.

2. Fume loss (metal lost up the stack) has generally been considered most serious, but has recently been proved in California to be negligible.

3. Water losses, chiefly as floured mercury (in suspension) in the water leaving the condensers, is another quantity difficult to measure and subject to considerable variation dependent upon the care used in operation and, more particularly, in cleaning up. The amount of mercury dissolved by the acid vapors and carried off in solution in the water is very small.

4. The amount of cinnabar or metallic mercury left in the calcined ore is negligible in good furnace work.

5. Plant leaks may cause loss of fume if care is not taken to maintain an indraft.

DOMESTIC CONSUMPTION AND FUTURE SUPPLY.

In normal times about one-third of the domestic output is required for blasting caps. There is a decreasing consumption in amalgamating gold and silver ores. This is attributable to the increased adaptation of cyanide and flotation processes to precious metal ores and to considerable curtailment of quicksilver losses in amalgamation plants. Silver salts are being substituted in silvering mirrors.

In 1917, 21,253 flasks of 75 pounds each were consumed in the United States. This consumption was divided as follows: In flasks, 5,000 were used to make fulminate; over 6,000 for production of drugs and chemicals; 1,700 for hatters and furriers; about 1,800 for electrolyzers and mercury rectifiers; over 3,000 for vermilion; about 850 for gold and silver amalgamation; and a little less than 3,000 for all other uses—barometers, thermometers, and other instruments; cosmetics, boiler compounds, primary batteries, lamps and phthallic acid.

Estimated requirements for 1918 are 22,600 flasks for nonmilitary uses. Domestic production for 1918 is estimated by the Geological Survey at 35,000 flasks, with 3,856 flasks in the hands of consumers the first of the year and some stocks at the mines delayed by lack of transportation. A further increase of domestic production above the 1917 level is not likely. An output of 35,000 flasks per annum may be expected for the next year or two, provided high prices are maintained.

EXPORTS.

Previous to 1910, the United States made rather large exports of mercury. Little metal was imported, and the domestic production was, therefore, in excess of domestic requirements. This situation was reversed in 1911. Exports dwindled to about 300 flasks, compared with an average of over 4,200 flasks exported annually during the preceding four years. Imports increased in inverse proportion; but, in spite of the increased importation, exports continued to be persistent.

Soon after the outbreak of the European war exports began to increase rapidly. The exports in 1917 (1,018,094 pounds) were the greatest in the history of the industry. In that year France, Japan, and Canada received greatly increased supplies from American sources, and for the first time in many years quicksilver was exported to Great Britain. An embargo, placed as a war necessity on all exports of quicksilver, reduced the exports during 1918 to only a few hundred flasks.

QUICKSILVER IN FOREIGN COUNTRIES.[1]

Spain.—The Almaden mine in Spain is the largest quicksilver mine in the world. The main ore body has an average assay value of 14 to 15 per cent mercury, while the two northerly ore bodies, which are not so large, carry ore that probably runs about 2.5 per cent. The average content of the ore treated in recent years has remained fairly constant at 11 per cent mercury. Ore developed in 1913 assured a life of at least 40 years for the property at the rate of 1,500 tons annual output of mercury. The production could be much increased if the price were not threatened by too large an output. The output before the war was nearly 45,000 flasks annually. It fell to 35,000 in 1916.[2]

The mines are owned by the Spanish Government. Complete cost reports are available for the production since 1750 and production figures are published since 1499.[3] For more than 50 years the production cost has been less than $13 a flask. Latest reports of costs during the war indicate that the cost per flask is now (1918) less than $16.[4]

Methods of mining and reduction in Spain are not efficient. Dr. Ranier's figures show the production cost per ton of ore at Almaden is seven times as great as at Idria, the largest mine in Austria. Most of the ore is treated in an ancient type of furnace. One has been in operation since 1646, while the newest furnace was built in 1882.

The Spanish Government is bound by contract to sell the entire quicksilver production of the Almaden mines, with the exception of 500 flasks reserved for the national industries of Spain, through the house of Rothschild in London. The latter is bound to sell, in London, the greatest possible quantity of mercury, which the house takes over f. o. b. reduction plant, at a price of at least £7 ($34) a flask. This contract was made in 1912 and is effective for 10 years.

Italy.—The Monte Amiata (Tuscany) mines are the principal producers. These mines were discovered and exploited by Germans. Since the war the mines have been taken over by the Italian Government. The British Government took about 25,000 flasks of Italian quicksilver in 1917.[2]

The average ore runs about 0.8 per cent quicksilver; but a rich shoot of ore running 30 per cent is mined, furnishing close to 25 per cent of the total output of metal. The German-Italian methods of mining and treating the ore are up-to-date and efficient. Costs are higher per flask than in Spain because of the lower grade of ore.

The rich ore is hand sorted underground, and premiums are given the miners to stimulate their output. The minimum content of the sorted ore is placed at 12 per cent, while the average content of the ore that is sent to the furnaces is

[1] Data largely from article by Dr. Roland Sterner Ranier, published in Austria in 1914. Abstract in Rept. of Tariff Commission conference on Quicksilver, pp. 86–100.
[2] Statements of F. L. Ransome, U. S. Geol. Sur., at conference in San Francisco.
[3] Report of Tariff Commission Conference on Quicksilver, pp. 90–93.
[4] Statement of W. W. Bradley, Tariff Commission Conference Rept., p. 173.

between 18 and 20 per cent. The higher grade ore requires longer roasting than the leaner material and is furnaced separately.

The low grade ore is dried and sized at 40 mm. (slightly more than 1½ inches in diameter). The coarse and fine products are treated in separate furnaces.[1]

Austria.—Like Italy, Austria has only one locality where any considerable quantity of quicksilver is produced, although there are many occurrences. Idria has been producing mercury for more than 500 years, and has been an important factor in the war since it was the source of practically all of the mercury used by the Central Powers. The total production in 1913 was 26,720 flasks. Statistics of later production are not available, but war necessity has doubtless increased the output.

The deposits are large, easily mined, and average 1 per cent quicksilver. All the producing mines are controlled by the Government.

Peru.—Once a steady exporter, this country is now but an irregular producer of small amounts of quicksilver. The great Santa Barbara mine of Peru was the largest single producing quicksilver mine in the world up to the time of shutting down in 1789, under competition with cheaper Spanish metal. It is credited with 1,500,000 flasks. The property has recently been purchased by Chilean capital. It is, however, 90 miles from a railroad and 12,800 feet above sea level.

IMPORTS.

The published records of the Department of Commerce do not show the imports of quicksilver by countries. It was brought out in the Tariff Commission conference in San Francisco[2] that most of the imports before the war were of Spanish metal shipped from England. Less amounts came from Mexico.

The Spanish metal was offered in this country whenever dealers could get a better price here than at home. Whenever the price advanced a little in the United States, there were offers of Spanish quicksilver from England. When the American market went down, the offers from England stopped. The limiting price was variable, depending on conditions. No metal was exported to the United States from England when the price was $35 a flask. After the outbreak of the war, considerable metal was imported when the price was $90 in 1915 and 1916, but later every available pound of metal from the Spanish mines was needed in Europe for war purposes.

Foreign quicksilver was strictly competitive with the domestic output before the war. The imports have fluctuated enormously in spite of the fact that exports have been persistent (although frequently small in amount). Imports for 1917 fell to 242,526 pounds, less than one-half those of the years immediately preceding. A large part of these imports came from Mexico, but some metal must have come from England as the Mexican production was insufficient to supply that amount. This was the first year that there was an exchange of metal with the United Kingdom.[3]

Previous to 1911, imports of quicksilver were very small, never exceeding 17,000 pounds in any one calendar year, although in the fiscal year 1909 over 30,000 pounds were imported. Early in 1911 imports increased in marked degree; over 360,000 pounds were imported in the first six months of the year. Most of the metal came from England but the high prices in New York at-

[1] This sizing operation is not practiced in the United States. It is possible that cheaper labor may make it profitable in the Italian mines in view of the fact that a shorter treatment may be given the coarse ore, but in the United States it is cheaper to send all material to the furnace that contains enough quicksilver to pay the cost of treatment.

[2] Report of Conference, pp. 145 et seq.

[3] Over 300,000 pounds were exported to England in 1917.

tracted about 1,000 flasks from Italy. There was a decided falling off in imports in 1912–13 because of the drop in price from $46.54 in 1911 to $39.54 in 1913 with a slack demand.

In the latter part of 1913 and 1914 the imports were the largest on record. This can not be wholly attributed to lowering of the tariff, but is rather a result of slackened domestic production that had to be supplemented by foreign metal. The domestic producers were losing out against the pressure of foreign competition and many mines were closing down.

The high prices of 1915–16 attracted all the available foreign quicksilver, and in spite of the fact that exports increased to several times prewar figures, the imports also increased above the high-water mark of 1914.

FOREIGN TRADE IN MERCURY COMPOUNDS.

The import figures on the preceding page do not include the mercury contained in vermilion and mercury salts. The value of these products imported into the United States in 1916 was $106,077 and in 1917 $34,124. The imports for the former year were exceptionally large. There has also been a considerable importation of fulminates—both those suited for miner's use and for other purposes—and some importation of blasting caps and of percussion caps. The total value of these imports in 1917 was about $187,000. These products contain more or less mercury in the form of fulminate, but there is no way of ascertaining the amount of mercury so imported. It is not great compared with the total imports. Before the war, mercuric fulminate was made both in this country and in Canada from domestic metal. Comparatively little metal was used in making percussion caps for rifle cartridges. Since the war, fulminate has been made in the United States and Canada from both domestic and imported metal, for blasting and rifle caps. A large part of the exports to Canada are used in the making of fulminate.

In 1918, the Government prohibited the export of quicksilver—even of foreign metal in bond.

PRICES.

As most quicksilver mines have their own reduction plants, ores are rarely sold and do not form an important article of transportation or commerce.

The primary domestic market is San Francisco, since California is the largest producing State. A large amount of the domestic metal is sold in New York as is practically all of the imported metal. The New York price is usually in the neighborhood of 50 cents a flask higher than the San Francisco price, and has averaged approximately $3 a flask higher than the London quotation. Prices received by producers in individual sales have varied from the market prices as published. The latter are annual averages of generally prevailing quotations. Sales have been influenced by the amount of metal involved; buyers of only one or two flasks must pay more than buyers of carload lots. New York and London prices for several years are given on page 92, together with prices received for the metal by California producers.

The most important factor in the world market for quicksilver is the Spanish metal. This is contracted for by the Rothschilds at a price of not less than £7 ($34) sterling a flask. It is such a larger proportion of the world supply of quicksilver that London interests can greatly influence the price by regulating the output. The production of other countries, however, is great enough to prevent an actual monopoly.

The price of quicksilver has always been subject to considerable fluctuation. In 1874 it reached $100 a flask, but it fell rapidly to below $40. There was a

steady rise in the price from $37 a flask in 1896 to $51 in 1900 (yearly averages). In the next two years the price sagged and broke in 1903 to $41.32. The price continued to fall until in 1905 it was down to $38.50. A gradual rise brought the price to $47.06 in 1910.

The above variations resulted almost entirely from the relation of domestic supply and demand. Practically no metal was imported.

In 1911 the price began to fall under the pressure of competition from London and the decline continued until early in 1914. Just previous to the war (July) American quicksilver producers were receiving only $35 a flask for their product.

Immediately after the outbreak of the war in August, 1914, the American market fluctuated enormously. The expected demand did not materialize; prices fell in October to an average of $53, as compared with an average of $80 in August. In 1915 the general price trend was upward. Monthly averages ranged from $51.90 in January to $92.90 in October, with a maximum of $95 in July. In the latter months of 1915 the price of the metal rose steadily and rapidly and this upward turn resulted in the record price of $300 a flask quoted in the last weeks of February, 1916. American markets were bought up late in 1915, but the excessive price caused foreign Governments to cease buying, although they were in great need of the metal.

In order to secure their requirements at a reasonable price, over 3,000 flasks were sold by their agents in the American market during the first quarter of 1916 and 1,700 flasks in the second quarter.[1] This was probably largely Spanish quicksilver. These sales drove the price down from $300 to $80 a flask and at the latter figure the foreign Governments began to buy back the metal slowly Their buying was done with extreme caution. Offers were made only for quicksilver placed on the market, without showing any keen demand for the metal. By thus using up only the production without actively bidding on futures, the market was kept in control without the inflation that resulted from the less cautious purchases in 1915.

The foreign influence on the American market is well illustrated by the records of imports and exports of quicksilver in 1916. Of the total exports of quicksilver in 1916, only 0.2 per cent was exported in the first quarter while high prices prevailed; 15.2 per cent went out during the second quarter; 38.8 per cent in the third; and 45.8 per cent of all the exports for the year went out in the last quarter. Imports for the year were in opposite ratio—53.3 per cent came in in the first quarter, 30 per cent in the second, 9.4 per cent in the third, and only 7.3 per cent in the last quarter. The following table brings out the effect of high prices on imports, as well as the careful operations of the buyers for the allied Governments.

Effect of prices on imports and exports, 1916.

Quarter number.	Imports.		Exports.		Price per flask, New York.
	Pounds.	*Per cent.*[2]	*Pounds.*	*Perc ent.*[2]	
1	226,098	53.3	1,547	0.2	$242.92
2	127,385	30.0	101,262	15.2	102.82
3	39,978	9.4	258,262	38.8	76.68
4	30,935	7.3	304,976	45.8	79.55

[1] Clifford G. Dennis and V. E. Bogard, Mineral Industry (1916), p. 639.
[2] Per cent of total imports (exports) for year.

In February, 1917, another sudden rise brought the New York price above $120 a flask, and except for the month of June, when the price fell to $84.34, the average monthly price was always above $100. On account of transportation difficuties, the differential between the New York price and the San Francisco figure continued to be greater than it was in normal times, although during the period of slack demand in June the Western market was the higher for a few weeks.

In 1918 the Government contracted with the quicksilver producers to take 40 per cent or more of their production at $105 a flask. The price was not a fixed one, and the outside market has been generally considerably above that figure.

TARIFF HISTORY.

A duty of 10 per cent ad valorem was placed on quicksilver in 1883. In 1894 the duty was increased to 7 cents a pound ($5.25 a flask), and this flat rate was continued in the acts of 1897 and 1909. In 1913 the duty was again put back to a 10 per cent ad valorem basis. Although at the average prices for the year 1913 ($39.54 a flask) the change resulted in a reduction of protection amounting to $1.30 a flask, or, based on actual import statistics and valuation, from 15 per cent ad valorem to 10 per cent. No protests were made by domestic producers in tariff hearings before Ways and Means Committee.

In the same act the duty on vermilion reds containing quicksilver, and on mercurial preparations was fixed at 15 per cent ad valorem.

COMPETITIVE CONDITIONS.

In 1914 most American producers were losing money. Now (1918) most of them are making money. Prevailing prices are two or three times those existing before the war. The American industry has temporarily practical immunity from foreign competition. Imports continue in substantial amount, but the metal brought in is supplementary to the domestic supply. No stocks are held by brokers and the disposal of flasks is merely a matter of transportation. Small advances have been made in American metallurgy which is probably more efficient than that of any of the other producing countries. Both Italy and Austria have had efficient reduction methods. A new furnace was installed in Austria in 1914 that has a capacity of 140 tons a day. This is twice as great as any previous foreign furnace and should still further increase the efficiency of the operation and reduce its cost. Reduction methods in Spain have been costly and inefficient, but the high metal content of the ore counteracted the most wasteful methods, and although the cost per ton of ore treated is seven times that in Austria, the cost per flask is much less.

The rise in cost of production in the United States has not kept pace with the price increase. There are no data on which to estimate the increased cost in foreign countries since the outbreak of the war, but it is doubtful if the increase has been as great in any country as in the United States. The following estimates of 1918 costs are taken from the Report of the Tariff Commission Conference in San Francisco.

Country.	Grade of ore (average).	Production cost per flask.
Spain	11 per cent, or 220 pounds a ton	$10 to $25.
Austria	1 per cent, or 20 pounds a ton	$15 to $28.
Italy	0.8 per cent, or 16 pounds a ton	$28 to $35.
United States	0.25 per cent, or 5 pounds a ton	$70 to $75.

DOMESTIC COSTS OF PRODUCTION.

Cost figures for the New Idria mine, the largest quicksilver producer in the United States, producing approximately one-third of the total domestic output, were presented by H. W. Gould before the United States Tariff Commission at the conference in San Francisco. The following summary indicates the increase in cost since the beginning of the war.[1]

New Idria Quicksilver Mining Co.: Comparative costs, 1914–1917.

Year.	Tons treated.	Flasks produced.	Pounds.[1]	Cost per flask.	Cost per ton of ore.	Price received per flask.
1914	62,578	6,550	7.8	$51.96	$5.44	$41.00
1917	125,445	11,000	6.58	68.66	4.50	92.70

[1] Per ton of ore treated.

The net income of the company in 1917 not deducting Federal income taxes, was $215,176.74 as compared with a loss of $43,010.28 in 1914.

Wages increased 75 per cent during the period 1915–18. This is a serious item as labor amounts to 43 per cent of the total cost of production at New Idria. At the Sulphur Bank mine, a large low grade steam-shovel operation, the labor cost is less, proportionately. At smaller mines, it is greater.

The average cost of producing a flask of 75 pounds of quicksilver was stated to have been $50 for a period of five years preceding the war, among California producers. As the price of metal was only a little over $35 during this period the miners were operating at a loss.

The big cost in the production of quicksilver is the mining of the ore. Mining costs have usually been at least three times the reduction costs. At present the ratio is probably a little higher and likely to increase. Reduction costs have been kept down by increased efficiency. The average cost per ton of ore treated in a Scott furnace is between 70 and 80 cents. Fuel requirements as low as 0.031 cords of wood per ton of ore have been reported for a Scott furnace, but it is doubtful if such a small consumption is general. Rotary kilns, recently tested at New Idria, have shown a somewhat better fuel economy than the Scott furnace. The lower first cost and generally cheaper operation may result in a slight decrease in reduction costs, but the great need is for a lowering of the mining costs, if the cost per flask is to be reduced. It is doubtful if this is possible as American mining is efficient and as cheap as possible under high labor and material cost.

A factor that keeps up the cost of American mining is the pockety nature of many of the deposits that require continual prospecting and the driving of many "dead" drifts through barren ground to connect kidneys of ore. At one mine (Guadalupe, California) at least, prospecting accounts for 75 per cent of the underground cost.

The average cost per flask in 1917 in the United States was between $60 and $70. The average costs of six mines during the first half of 1918, whose output represents 63 per cent of the total United States production, was $61.12 per flask. Five other mines, representing 18 per cent of total production, averaged $91.12 per flask. Of these 11, only 4 properties reported profitable opera-

[1] Detailed costs are given in Report of Quicksilver Conference, pp. 27–29, and in auxiliary files of commission.

tion in 1916.[1] The average cost of all the quicksilver produced in this period in the United States was between $70 and $75 per flask.

In the world market American producers are at a distinct disadvantage. No metallurgical advances that can conceivably be made can offset the marked handicap of their low grade ore bodies. Even assuming that, by careful management and technical superiority, the American miner cuts down his costs per ton, in the face of higher wage costs, to a figure lower than the European, the handicap of a possible recovery of only 5 pounds of metal a ton as against 16 to 220 pounds from the same amount of foreign ore is a serious one.

The decreasing grade of American ore has resulted in a steady reduction in the output of metal per furnace. To offset this reduction some new furnaces have been built; at other properties wet concentration has permitted the treatment of more ore, as the higher grade concentrated product permits a larger yield of metal per furnace. Doubt as to the stability of adequate prices has held up the investment of the capital necessary to build much additional permanent equipment, even during the period of high war prices.

Although the position of the American producer has been a prosperous one in the war market, his position in a normal market is a real problem. Figures as to foreign production since the outbreak of the war can not be secured, but it is reasonable to assume that war demands have stimulated foreign production as they have the domestic production. Before the war the world's potential production exceeded requirements. The Almaden mine worked only about six months each year. Either Spain or Austria alone could probably supply the peace needs of the entire world. The expanded production may continue for some time after peace is declared. This will result in an accumulation of stocks and a consequent serious break in price. The new price level can doubtless be met by foreign producers, but the high cost domestic producer must fall out unless his home market is protected.

It was the practically unanimous opinion of producers attending the San Francisco conference that a price of about $100 a flask is necessary to the continuance of American production at war-time costs. In spite of the large price increases since the war began, operators in the quicksilver industry are few in number. Fully 90 per cent of the output now (1918) comes from companies that were operating four years ago.

Producers requested a tariff of $35 per flask in addition to the present 10 per cent ad valorem duty[2] for protection against foreign competition after the war. The estimate was based upon a $70 to $75 cost in the United States, as compared with the price that Spanish metal can be put down in New York ($40 per flask).

No claim was made that a lower tariff would result in the abandonment of all domestic quicksilver mines, but it was the opinion that the above protection was necessary to a continuance of a production sufficient to supply home consumption.

---

[1] 1918 costs, from Report by Non-Ferrous Metals Section, War Industries Board to R. S. Brookings, chairman Price Fixing Committee, Nov. 16, 1918. 1917 costs, General Reports from Industry No direct investigation of quicksilver mining costs made by U. S. Tariff Commission.

[2] Statement of H. W. Gould, representing the producers of more than one-half the domestic quicksilver, before U. S. Tariff Commission, San Francisco, June 26, 1918. Reports of Conference, p. 56 et seq.

Production of quicksilver in United States by States, 1902–1917.[1]

[Figures from U. S. Geological Survey.]

Year.	California.		Nevada.		Oregon.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Flasks.		*Flasks.*		*Flasks.*	
1902	28,972	$1,251,590	.....	.....	.....	.....
1903	30,526	1,382,523	65	$2,800	.....	.....
1904	29,217	1,270,940	17	739	.....	.....
1905	24,635	892,820	.....	.....	43	$1,677
1906	20,310	802,245	.....	.....	3	109
1907	17,431	690,268	.....	.....	.....	.....
1908	16,984	750,183	.....	.....	[2] 386	17,170
1909	16,078	730,745	[3] 809	36,769	([3])	.....
1910	17,211	800,484	70	3,256	.....	.....
1911	18,860	867,749	([4])	.....	.....	.....
1912	20,524	863,034	([4])	.....	.....	.....
1913	15,591	627,228	1,645	66,178	.....	.....
1914	11,303	554,414	2,089	102,465	.....	.....
1915	14,283	1,174,881	2,327	209,911	([5])	.....
1916	21,045	.....	2,198	.....	378	.....
1917	23,733	.....	997	.....	388	.....

Year.	Texas.		Utah.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Flasks.		*Flasks.*		*Flasks.*	
1902	5,319	$239,350	.....	.....	34,291	$1,490,940
1903	5,029	211,218	14	$568	35,364	1,597,109
1904	5,336	232,116	745	30,545	36,315	1,534,340
1905	4,723	173,362	1,133	43,620	30,534	1,110,939
1906	4,761	178,829	1,009	41,268	26,083	1,022,451
1907	3,686	148,387	437	18,136	21,554	856,791
1908	2,382	122,260	.....	.....	19,752	889,613
1909	4,188	190,345	.....	.....	21,075	957,859
1910	3,320	154,413	.....	.....	20,601	958,153
1911	[4] 2,396	110,240	.....	.....	21,256	977,989
1912	[4] 4,540	190,907	.....	.....	25,064	1,053,941
1913	[6] 2,977	119,765	.....	.....	20,213	813,171
1914	[6] 3,156	154,801	.....	.....	16,548	811,680
1915	[6] 4,423	442,120	.....	.....	21,033	1,826,912
1916	[6] 6,311	.....	.....	.....	29,932	.....
1917	[7] 10,836	.....	.....	.....	35,954	.....

[1] Flasks contained 76½ pounds net for 1902, 1903, and five months of 1904; 75 pounds since June 1, 1904.
[2] Arizona and Oregon combined for 1908.
[3] Nevada and Oregon combined for 1909.
[4] Nevada and Texas combined for 1911–12.
[5] Arizona, Oregon, and Texas combined for 1915.
[6] Arizona and Texas combined for 1913–1914–1916.
[7] Arizona, Texas, and Idaho combined for 1917.

Production of quicksilver in principal foreign countries.

[Mineral Resources, U. S. Geological Survey.]

Year.	Austria-Hungary.	Italy.	Russia.	Spain.	Mexico and other countries.	Total.
	Flasks.	*Flasks.*	*Flasks.*	*Flasks.*	*Flasks.*	*Flasks.*
1910	20,400	26,279	118	32,746	[1] 4,409	83,952
1911	23,310	27,367	([3])	[2] 43,681	[1] 4,409	98,767
1912	23,016	28,983	([3])	[2] 43,799	[1] 4,409	100,207
1913	26,720	29,513	([3])	[2] 43,799	[1] 4,409	104,441
1914	([3])	31,541	([3])	([3])	([3])	([3])

[1] Estimated.
[2] Exported—practically total production, as Rothschild contract allows only 500 flasks to remain in Spain.
[3] Statistics not available.

Imports of quicksilver for consumption—Revenue.

Fiscal year.	Rates of duty.	Quantity (pounds).	Values.	Duties collected.	Value per unit of quantity.	Actual and computed ad valorem rate (per cent).
1907	7 cents per pound	15,282.00	$6,147.00	$1,069.74	$0.402	17.40
1908	do	1,323.50	603.51	92.65	.456	15.35
1909	do	30,857.00	16,301.00	2,159.99	.528	13.25
1910	do	677.00	366.00	47.39	.541	12.95
1911	do	361,332.00	191,108.00	25,293.24	.529	13.24
1912	do	193,411.00	100,270.50	13,538.77	.524	13.50
1913	do	830.00	387.00	58.10	.466	15.01
1914[1]	do	76,635.00	33,548.00	5,364.45	.438	15.99
1914[2]	10 per cent	367,738.00	159,061.00	15,906.10	.433	10.00
1915	do	561,924.00	292,244.00	29,224.40	.518	10.00
1916	do	554,792.00	595,007.00	59,500.70	1.072	10.00
1916[3]	10 per cent less 20 per cent.	60.00	50.00	4.00	.833	8.00
1917	10 per cent	241,330.00	237,779.00	23,777.90	.989	10.00
1917[3]	10 per cent less 20 per cent.	1,196.00	622.00	49.76	.518	8.00
1918	10 per cent	579,848.00	641,056.00	64,105.60	1.106	10.00
1918[3]	10 per cent less 20 per cent.	58.00	46.00	3.68	.793	8.00

[1] July 1 to Oct. 3, 1913, under act of 1909.
[2] Oct. 4, 1913, to June 30, 1914, under act of 1913.
[3] Reciprocity treaty with Cuba, rebating 20 per cent of duty.

Prices (wholesale or retail) of quicksilver or mercury.

[Average price per flask of 75 pounds, in dollars.]

Year.	New York.[1]	London.[2]	United States.[3]	Year.	New York.[1]	London.[2]	United States.[3]
1895	39.58	.....	.....	1907	41.50	.....	.....
1896	37.00	.....	.....	1908	44.84	.....	40.42
1897	38.50	.....	.....	1909	46.30	.....	40.04
1898	40.70	.....	.....	1910	47.06	.....	43.29
1899	43.63	.....	.....	1911	46.54	.....	41.65
1900	51.00	.....	.....	1912	42.46	39.61	38.69
1901	47.00	.....	.....	1913	39.54	35.91	36.58
1902	48.03	.....	.....	1914	48.31	[4] 34.80	41.00
1903	41.32	.....	.....	1915	87.01	71.78	74.21
1904	41.00	.....	.....	1916	125.49	96.25	89.54
1905	38.50	.....	.....	1917	106.30	.....	92.70
1906	40.90	.....	.....				

[1] Engineering and Mining Journal, Jan. 26, 1918.
[2] Mineral Resources, U. S. Geological Survey.
[3] Net prices received by California producers. H. W. Gould, U. S. Tariff Commission conference.
[4] January–July, inclusive.

Domestic exports of quicksilver.

[Fiscal years.]

Year.	Canada.		Mexico.		Nicaragua.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*		*Pounds.*	
1907	101,887	$52,695	158,749	$83,115	3,280	$1,800
1908	42,520	22,449	156,241	90,407	1,882	1,047
1909	181,963	94,665	96,738	54,209	3,667	2,215
1910	367,180	195,155	86,783	52,439	2,970	1,790
1911	8,313	4,979	18,250	10,927	1,387	852
1912	9,460	6,110	4,973	2,928	756	507
1913	31,201	16,515	1,500	821	550	406
1914	56,879	28,074	1,276	604	1,258	737
1915	28,535	20,987	2,335	1,639	1,036	808
1916	31,313	60,849	1,545	1,947	962	1,193
1917	205,077	249,079	861	1,117	1,176	1,598
1918	249,435	355,466	68	122	585	738

Domestic exports of quicksilver—Continued.

[Fiscal years.]

Year.	Costa Rica.		All other.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*		*Pounds.*	
1907	2,475	$1,245	229,999	$104,792	496,390	$243,647
1908	1,650	904	8,528	4,954	210,821	119,761
1909			4,150	2,477	286,518	153,566
1910	2,475	1,585	8,026	5,115	467,434	256,0 4
1911	1,650	1,060	4,405	2,792	34,005	20,610
1912	3,100	1,848	5,942	3,424	24,231	14,817
1913	1,956	1,137	5,203	3,006	40,410	21,885
1914	450	238	4,327	2,588	64,190	32,241
1915	550	370	190,471	131,285	222,927	155,089
1916	150	250	198,793	209,847	232,763	274,086
1917	451	533	[1] 810,529	818,998	1,018,094	1,071,325
1918	5	10	251,995	323,078	502,088	679,414

[1] Includes 307,554 pounds valued at $284,926 to the United Kingdom, 327,558 pounds valued at $334,437 to Japan, and 93,625 pounds valued at $99,861 to Hongkong.

Rates of duty on quicksilver or mercury.

Act of—		Tariff classification or description.	Rates of duty, specific and ad valorem.
Year.	Paragraph.		
1883	211	Quicksilver	10 per cent ad valorem.
	649	(Quicksilver flasks or bottles of American production not specifically exempted when returned.)	
1890	207	Quicksilver. The flasks, bottles, or other vessels in which quicksilver is imported shall be subject to the same rate of duty as they would be subjected to if imported empty.	10 cents per pound.
	493	* * * quicksilver flasks or bottles, of either domestic or foreign manufacture, which shall have been actually exported from the United States * * *.	Free.
1894	170½	Quicksilver	7 cents per pound.
	387	* * * quicksilver flasks or bottles, of either domestic or foreign manufacture, which shall have been actually exported from the United States * * *.	Free.
1897	189	Quicksilver. The flasks, bottles, or other vessels in which quicksilver is imported, shall be subject to the same rate of duty as they would be subjected to if imported empty.	7 cents per pound.
	483	* * * quicksilver flasks or bottles, of either domestic or foreign manufacture, which shall have been actually exported from the United States * * *.	Free.
1909	189	Quicksilver. The flasks, bottles, or other vessels in which quicksilver is imported shall be subject to the same rate of duty as they would be subjected to if imported empty.	7 cents per pound.
	500	* * * quicksilver flasks or bottles, * * * of either domestic or foreign manufacture, which shall have been actually exported from the United States * * *.	Free.
1913	159	Quicksilver. The flasks, bottles, or other vessels in which quicksilver is imported shall be subject to the same rate of duty as they would be subjected to if imported empty.	10 per cent ad valorem.
	404	* * * quicksilver flasks or bottles, * * *, of either domestic or foreign manufacture, * * * which shall have been actually exported from the United States * * *.	Free.

BIBLIOGRAPHY.

Commerce and Navigation of the United States.
Mineral Resources, United States Geological Survey.
Mining and Scientific Press.
Canadian Mining Journal.
Engineering and Mining Journal.
Mineral Industry.
Transactions American Institute of Mining Engineers, vol. LI (1916).
Chemical and Metallurgical Engineering.
Record of conference United States Tariff Commission and quicksilver industry, June 26, 1918.

Rails.

(Par. 587, act of 1913.)

SUMMARY.

Description.—Rails are rolled shapes, now usually made of steel, used for guiding and carrying the wheels of railroad cars. They are divided into heavy and light, the dividing line being determined by the weight per lineal yard. This line is variously fixed at 40, 45, or 50 pounds per yard. Heavy rails, which are the ones figuring principally in international trade, are the rails used by the steam railroads of the world, and to a large extent by electric roads. Light rails, now largely manufactured out of old heavy rails, are used for private roads, by mining and other industrial companies. The high T and girder rails, which constitute a third class, are used for street railways.

DOMESTIC PRODUCTION.

The production of rails in the United States during the period 1910 to 1917, inclusive, averaged a little over 2,900,000 gross tons per annum, of which approximately 90 per cent consisted of heavy rails. Variation in output from year to year was considerable. During the eight-year period noted the maximum annual production was 3,636,031 gross tons in 1910, and the minimum, 1,945,095 gross tons in 1914. The year of greatest production in this country was 1906, when the output was 3,977,887 gross tons. Variation in output is closely related to the amount of railroad building going on and the degree of prosperity enjoyed by the country.

Methods and processes.—Rails are rolled from heated ingots. The process is one of gradual compression, reduction, and consequent elongation to the shapes and sizes desired, and is accomplished in large mills built for that purpose. Although a machine-made article, great care must be exercised in order that the product may conform to exact specifications. The gross loss of weight in rolling is much larger than in the case of billets or sheet bars on account of the extensive cropping of the ends made necessary in order to avoid defects in the steel caused by premature cooling. There is considerable labor involved in straightening and finishing the rail after it is cool.

Materials.—The raw material of heavy steel rails is the steel ingot. The steel ingot and the pig iron of which it is made are domestic products, as are also the coke and limestone used in their manufacture. The raw material of light rails is largely old heavy rails.

About 80 per cent of the country's production is made of open-hearth steel, a matter worthy of note in view of the fact that the Bessemer rail is the principal product of other rail producing countries. In the manufacture of open-hearth steel ferromanganese plays an important part, and this product is derived from manganese ore, the greater part of which is imported. The home production of this ore, however, is increasing and now (1918) constitutes something like 25 to 35 per cent of the country's total supply.

Organization and integration.—The manufacture of steel rails, which necessitates a heavy outlay of capital, has become a highly concentrated industry. In the United States a small number of companies produce the bulk of the output, the United States Steel Corporation itself producing over half the country's tonnage. There has been a marked tendency for rail-producing concerns in the United States to secure control of the anterior stages of production—from the mining of ore and coal to the manufacture of the rail.

Localities of production.—The principal manufacturing establishments are located in the region from Chicago to eastern Pennsylvania and in the Birmingham district of Alabama. The industry has localized in these regions because the development of iron and steel manufacturing has followed the principal deposits of ore, coal, and limestone.

The demand for rails has tended to move westward on account of the need for greater and better transportation facilities in the Middle West and on the Pacific coast. It was partly to satisfy this demand that the town of Gary, Ind., was built by the United States Steel Corporation.

Domestic consumption and exports.—The production of steel rails in the United States has for many years been greater than the consumption. Hence there has been a surplus for export. During the fiscal years 1916 and 1917 exports aggregated over 1,100,000 gross tons, or nearly 20 per cent of the domestic production. During the period 1910 to 1917 they constituted about 15 per cent of the domestic production. Our exports of steel rails have gone mainly to Canada, Latin America, Australia, and Japan. Since the outbreak of the war exports to Europe have increased. During the fiscal year 1916 Russia (European and Asiatic) took over half the total amount exported.

History of the industry.—Before the Civil War only iron rails were produced in commercial quantities and these not in large amounts. Steel rails were first produced in appreciable quantities in 1867. The high import duties imposed upon iron and steel products in general, the introduction of the Bessemer process for manufacturing steel, the great demand for improved transportation facilities in the rapidly growing West, and the great resources of the country in ore and coal, all gave an impetus to the manufacture of steel rails. Steel rails were largely supplanting iron rails in the 70's, and since 1882 the production of iron rails has been relatively small. The introduction of the open-hearth process is resulting in the substitution of open-hearth rails for the Bessemer product. Since 1910 the United States has produced more open-hearth rails than Bessemer rails.

FOREIGN PRODUCTION.

Before 1914 Germany was the greatest producer of steel rails in Europe. The annual output was something over a million metric tons—or less than one-half that of the United States. Great Britain produced a little less than a million tons. In Russia, France, Belgium, Canada, Austria-Hungary, and Italy the output of rails was considerable. The rails which these countries produced and exported were in the main heavy rails manufactured from steel produced by the Bessemer process.

IMPORTS.

With the exception of the years 1915 and 1916 imports of rails have been for a long time considerably less than 1 per cent of the total production in the

United States. During the fiscal years 1915 and 1916 the amount and proportion imported showed a material increase, though this increased importation was still small compared with the total production. In 1917 there was a decided falling off in the amount and value of imports of rails.

Before the outbreak of the war in Europe Germany and Canada supplied this country with most of the imported product, but after 1914 Canada was almost the sole source of imports until the embargo of September, 1917.

Rails being a commodity of which the cost of transportation forms an important element in price are affected very materially in their movement by freight rates. On account of the high rail rates the imported product does not seriously compete with domestic rails in the interior, but does compete to a limited extent on the coasts and in the Great Lakes region. Before the war the cost of transporting rails from the leading centers of production in the United States to the Pacific Coast was materially greater than the cost of shipping them from the mills of England and Germany to the same region. The enormous increase in ocean freights since the beginning of the war has for the present changed that situation.

PRICES AND COSTS.

The mill prices of rails in this and other rail-producing countries do not differ greatly. In other countries fluctuations in quotations have been greater than in the United States where rail prices have been stable for long periods. From April, 1901, to May, 1916, the quotations for heavy, standard section steel rails in the United States remained at $28 per gross ton, although premiums, especially in late years, have been paid for prompt delivery. Present (1918) quotations are: Bessemer, $55; open hearth, $57.

Export prices in rail-producing countries are generally lower than domestic prices. Commerce in steel rails is encouraged in some countries by indirect bounties. In Germany, before the war, transportation rates to seaports were lower on export goods than on goods destined for home consumption. The same has been true of the United States until very recently (1918). In Germany ore associations and coal and pig iron producers sold their material at lower prices when such material entered into the manufacture of export rails than when it entered into the production of rails to be used at home.

Evidence shows that costs of production vary greatly in different parts of this and other countries. This variation is more noticeable in the anterior stages of production—in the mining of ore and coal and in the manufacture of pig iron—than in the production of rails from steel ingots. Evidence tending to show that rails are produced more cheaply in Europe than in the United States is not conclusive.

TARIFF HISTORY.

Paragraph 587 of the tariff of 1913 provides for the free admission of "railway bars, made of iron or steel and railway bars made in part of steel, T-rails, and punched iron or steel flat rails."

In 1870, when steel-rail production in the United States was in its infancy steel railway bars were specifically provided for at 1¼ cents per pound ($28 per gross ton), and those in part of steel at 1 cent per pound ($22.40 per gross ton). These duties were reduced 10 per cent in 1872 but were restored three years

later. In 1883 the duty was changed to $17 per gross ton on railway bars whether made wholly or in part of steel when weighing more than 25 pounds to the yard. On iron railway bars weighing more than 25 pounds to the yard a duty of 7/10 cent ($15.68 per gross ton) was imposed. Specific provision was also made in the act of that year for iron or steel "tee" rails, weighing not over 25 pounds to the yard, with a duty of 9/10 cent per pound ($20.16 per gross ton), and for iron or steel flat rails, punched, at 8/10 cent per pound ($17.92 per gross ton). At times during this period these rates were equivalent to an ad valorem duty of 60 per cent or more. In the act of 1890, and later acts, these manufactures of iron and steel were combined in one paragraph and the adjective "tee" before "rails" was changed to the letter "T". The rate of duty which was fixed at 6/10 cent per pound ($13.44 per gross ton) in 1890, was further reduced to 7/20 cent per pound ($7.84 per gross ton) in the acts of 1894 and 1897, and to 7/40 cent per pound ($3.92 per gross ton) in 1909.

The reduction prior to 1913 apparently had no permanent effect upon importation. After the passage of the act of 1913, however, placing rails upon the free list, importations for consumption, which had been running from 3,800 to 5,000 tons per annum in the three preceding years, rose to 55,000 tons in the fiscal years 1915 and 1916. The importation was almost entirely across the lakes from Canada.

High protective duties are imposed on rail imports in France, Germany, and Italy. Canada, which has in recent years supplied the United States with the bulk of its rail imports, itself has a general rate of $7 per ton on "iron and steel railway bars or rails," with an intermediate rate of $6 per ton and the British preferential rate of $4.50 per ton.

TARIFF QUESTIONS INVOLVED.

The United States leads the world in the production of steel rails and is practically independent in regard to most materials entering into their manufacture. This branch of manufacture is to-day maintaining itself without any tariff protection. The large export trade of the United States, a trade which antedated the present war, indicates the competitive strength of the American industry even in foreign markets.

The manufacture of light rails out of old heavy rails presents a problem in the matter of tariff classification. Light rails, like heavy rails, are admitted free under the act of 1913. Old heavy rails, to a large extent, constitute the raw product for splice bars and other railway steel protected by moderate duties. The manufacturers of light rails are thus restricted in their competition for raw material as against manufacturers of other railroad material. It is obvious, however, that some difficulty presents itself in imposing an import duty on light rails while heavy rails are still retained on the free list.

From a revenue standpoint the importation of rails has not in recent years been important. During the period 1907–1913, when rails were still dutiable, the greatest amount of revenue derived by the Government in any one year was $30,670, in 1907, when a duty of $7.84 per ton was levied. In 1909 under the same tariff the revenue was only a little over $9,000.

Summary table.[1]

Year.	Domestic production.	Imports for consumption.	Domestic exports.	Ratio to production.	
				Imports.	Exports.
	Gross tons.	*Gross tons.*	*Gross tons.*	*Per cent.*	*Per cent.*
1910	3,636,031	[2] 2,488.01	353,180	.....	9.71
1911	2,822,790	3,841.49	420,874	.14	14.90
1912	3,327,915	4,024.95	446,473	.12	13.42
1913	3,502,780	4,770.68	460,553	.14	13.15
1914	1,945,095	20,301.50	174,680	1.04	8.98
1915	2,204,203	78,525.00	391,379	3.56	17.76
1916	2,854,518	26,367.00	540,349	.92	18.93
1917	2,944,161	9,263.00	510,439	.31	17.34

Year.	Value (imports for consumption).	Amount of duty.	Value per unit of quantity per gross ton.	Equivalent ad valorem rate, per cent.
1910	[2] $63,117.66	[2] $9,752.97	$25.37	15.45
1911	99,471.00	15,031.19	25.89	15.11
1912	108,024.00	15,777.82	26.84	14.61
1913	115,406.68	[3] 16,890.06	24.19	[4] 16.39
1914	567,547.00	.....	27.94	Free.
1915	2,088,532.00	.....	26.60	Free.
1916	742,923.00	.....	28.18	Free.
1917	307,139.00	.....	33.16	Free.

[1] Figures given in this table are for calendar years.
[2] Six months. It was not until after June 30, 1910, that figures for imports for consumption were compiled by the U. S. Bureau of Foreign and Domestic Commerce for quarters. The figures for imports (quantity and value) are for the last two quarters of the calendar year 1910.
[3] Amount of duty collected on 4,308.68 tons, valued at $103,048.68, imported during the period Jan. 1-Oct. 3, 1913, under the act of 1909.
[4] Equivalent ad valorem duty on 4,308.68 tons valued at $103,048.68, under the act of 1909.

GENERAL INFORMATION.

Description.—Rails are rolled shapes for guiding and carrying the wheels of railroad cars. The steel from which rails are rolled is prepared to conform to standard specifications, the sections of rails in the United States being made in accordance with the standards of the American Society of Civil Engineers.[1] The T section rail, invented in 1830, is in universal use on steam railroads in the United States and Canada. In England the so-called bull-headed rail is used.[2] Rails in addition to being sawed square and straightened are drilled at their ends for holes to receive bolts for splicing and joining. The standard length when shipped is 30 to 33 feet, although rails are rolled to 120 feet and more.[1]

Kinds of rails.—Rails are usually divided into light and heavy, the classification being determined by weight per linear yard. The dividing line between these classes is variously fixed at 40, 45, and 50 pounds per yard. Light rails are now largely manufactured out of old heavy rails and are used in mining and other industrial operations. The high T and girder rails, the latter so called because of their shape which resembles a girder, may be considered a third class. Their production in the United States forms a small proportion of the country's total—from 100,000 to 200,000 tons.[3] These rails are used for street railways. Iron rails which were once manufactured in large amounts are now produced in negligible quantities in the United States.

[1] The A. B. C. of Iron and Steel, p. 166.
[2] International Encyclopedia, vol. 19, p. 493.
[3] Annual Report of the American Iron and Steel Institute, 1916, p. 38

The rails which enter into international trade in large amounts are the heavy rails. On the main lines of the principal American railroads the 85 or 90 pound rail is the standard, and on roads of heavy traffic, such as the Pennsylvania, New York Central, and New York, New Haven & Hartford, the 100-pound rail has lately been the standard. In 1914 the Pennsylvania Railroad began the use of the 125-pound rail. Where traffic is light and on branch roads 65 and 70 pound rails are in use.[1]

Manganese rails are being experimented with for use on curves, as rail wear is there much greater than on straight track. In the French tariff of 1910 manganese rails, i. e., rails containing 9 per cent manganese and over, are subject to higher duties than those of iron or common steel.[2]

With reference to process of manufacture, another division may be made between Bessemer and open-hearth rails—the latter having become more important in the United States in recent years than the former. It is important to recognize this fact, because the great bulk of the heavy rails produced in other countries are made from steel produced by the Bessemer process, either acid or basic, and it is the Bessemer rails which have figured most prominently in international trade.[3]

DOMESTIC PRODUCTION.

Quantity.—The production of steel rails in the United States far exceeds that of any other country in the world. In the years immediately preceding the outbreak of war in Europe this production was approximately double that of the next most important rail-producing country—Germany. In 1917 the rails produced in the United States amounted to 2,944,161 gross tons. During the years 1910–1917, inclusive, production varied from 1,945,095 gross tons in 1914 to 3,636,031 gross tons in 1910.

The greater part of the rails produced in the United States are made of open-hearth steel. In 1916, out of a total output of 2,854,518 gross tons, 2,269,600 gross tons consisted of the open-hearth product. This development is comparatively recent. In 1910 more than half the rails manufactured in this country were of Bessemer steel. The production of iron rails is negligible.

The output of heavy rails vastly exceeds that of light rails. Of the 1916 total, only 295,535 gross tons, or slightly more than one-tenth, were rails of less than 50 pounds weight per linear yard, and 1,992,192 gross tons were rails weighing 85 pounds or more per linear yard.

Processes of Manufacture and Industrial Integration.—Rails are a rolled product, and the production of rolled forms of iron and steel is accomplished in rolling mills. The operation proceeds by passing heated steel between two or more sets of rolls which compress and reduce the material into desired shapes.

Rails, while primarily a machine-made article, are not a particularly simple product, because they must be made with great care and according to exact specifications. There is a much larger gross loss in weight in rolling than for billets or sheet bars, on account of the extensive cropping of the ends of the material, this cropping being necessary to avoid defects in the steel caused by premature cooling.[4] The labor element entering into the manufacture of steel rails is not inconsiderable. In figuring book costs of production for the United States Steel Corporation for 1910, the Commissioner of Corporations found

[1] International Encyclopedia, vol. 19, p. 493.
[2] Bureau of Manufactures, Tariff Series, No. 25.
[3] Report of Commissioner of Corporations in the Steel Industry, Part III, p. 460.
[4] Report of Commissioner of Corporations on the Steel Industry, Part III, p. 209.

that the labor element directly engaged in the production of steel rails amounts to from 6 to 9 per cent of the total cost.[1] However, if the value added to the steel ingot in the process of manufacture be taken alone, the labor element constitutes about 40 to 50 per cent of the total mill cost of converting the ingot into the steel rail. There is much labor involved in straightening and finishing the rail after it is cool.[2]

Mills manufacturing standard section steel rails require a large investment of capital. Where the anterior stages of production are controlled by the producing company, as is more commonly the case in the United States, the investment amounts to many millions of dollars. On account of the large investment necessary for the proper equipment of such a plant, the number of companies engaged in the production of steel rails is small compared with the country's output. One corporation, the United States Steel Corporation, produces between 50 and 60 per cent of the country's output.

Materials used in manufacture.—The raw material for the production of heavy standard steel rails is the steel ingot—either the Bessemer rail ingot or the open-hearth rail ingot. The ingot, and the pig iron out of which the ingot is made, is a domestic product, as are also the coke and limestone used in their production. The most important steel rail producers, such as the United States Steel Corporation and the Bethlehem Steel Corporation, control their own sources of supply of raw materials.[3]

In the case of light rails, old heavy rails are largely utilized, and the sources of supply are the railroads of the country or dealers who secure their stock from the railroads.

With respect to the materials entering into the production of steel rails, the United States is self-sufficient. In the manufacture of steel, ferromanganese is of great importance. The raw material of this alloy is manganese ore, of which until recently there was a very limited production in this country. Manganese ore was imported mainly from Brazil, British India, and Cuba. Before the outbreak of war in 1914, Russia furnished this country a considerable part of the supply.

Regions of production, distributing agencies, and principal markets.—The principal manufacturing establishments are located in the (east-central) region extending from Chicago to eastern Pennsylvania and in the Birmingham district of Alabama. The prices of steel rails in the United States are normally fixed by the prices quoted at the Pennsylvania mills, plus cost of transportation to consuming regions.

Rails are made on orders from railroad companies and for the general market. They are usually sold direct to consumers (railroads), but in the export trade they are often handled through dealers or export merchants. The United States Steel Corporation has such an agency in one of its subsidiaries, the United States Steel Products Co., which handles its export trade.

Within the United States the demand for rails has tended to move westward. The reason for this is the increasing need for better transportation facilities in the Middle West and on the Pacific Coast, on account of the rapid industrial growth of those regions. It was partly to satisfy this demand—to have a

[1] Report of Commissioner of Corporations on the Steel Industry, Part III, pp. 461–465. The reason for the small percentage is, of course, the fact that the cost of the ingot constitutes over 80 per cent of the mill cost of the rail.

[2] Report of Commissioner of Corporations on the Steel Industry, Part III, p. 209.

[3] The Bethlehem Steel Corporation has been relying, especially in late years, upon ore from its Cuban holdings. Owing to the location of some of its plants, it is cheaper to utilize ores from Cuba, on account of low transportation cost by water, than to get the ore from the Lake Superior Region.

greater number of mills serving this need—that led the United States Steel Corporation to build the town of Gary, Ind.

Domestic consumption.—For many years the production of steel rails has far exceeded the consumption, leaving a surplus for export. In 1917 (calendar year) with an output of 2,944,161 gross tons the country imported for consumption 9,263 gross tons and exported 510,439 gross tons. The apparent consumption that year thus amounted to 2,442,975 gross tons. In 1915 (calendar year) when our imports reached the relatively high figure of 78,525 gross tons, our exports were approximately five times as great.

Exports.—During the calendar years 1910 to 1917, inclusive, rail exports from the United States ranged from 174,680 gross tons in 1914 to 540,349 gross tons in 1916, and constituted approximately 9 to 19 per cent of the domestic production. Before the war, rails exported from the United States went mainly to Canada, Mexico, Cuba, Brazil, Argentina, Japan, and Australia (including Tasmania). After the outbreak of the war the exportation of rails to Russia (both European and Asiatic) increased enormously for a time—1916 and 1917. The export to Cuba continues large but there has been a marked decline in the trade with Mexico and South America.

HISTORY OF THE INDUSTRY.

The first rails produced in the United States were flat and were made of iron. The T-rail began to be manufactured in this country in 1844, although it had been imported for over a decade, as were also other forms. The rail mills of the country met with much foreign competition. In 1849 Abram Hewitt wrote that of 15 mills in the country, only two were then in operation, doing partial work for limited orders of neighboring railroads, and that when these orders should be executed not a single rail mill would be at work in the land. The production of iron rails that year amounted to 21,712 gross tons.[1]

The high import duties imposed on iron and steel during and after the Civil War, and the great demand for railroad materials in the rapidly developing West gave a great impetus to the rail industry. The introduction into the United States of the Bessemer process for making steel created a demand for steel rails as a substitute for iron rails, the latter having reached their maximum output in 1872, when the production amounted to 808,866 gross tons. Since 1882 the production of iron rails has been relatively small, and at the present time is negligible. The average annual output of steel rails during the 70's was 252,560 tons, but during the succeeding decade this average amounted to 1,310,152 tons.[2] In 1906, the year of maximum production, the output of steel rails in the United States was 3,977,877 tons. In 1917 it was 2,944,161 tons.[3]

The introduction of the open-hearth process has resulted in the substitution of open-hearth steel rails for the Bessemer product. Since 1910 the United States has produced more open-hearth rails than Bessemer rails, and in 1916 nearly 80 per cent of the rails produced in the United States were of the former kind.[4]

FOREIGN PRODUCTION.

Statistics on rail production in European countries since 1914 are not at present (1918) available. During the years immediately preceding the outbreak of war, Germany, the leading producer next to the United States, had an

[1] James M. Swank: Our Iron Industry and the Protective Policy, p. 6.
[2] Statistical Abstract 1916, p. 534.
[3] Figures furnished by Washington office of American Iron and Steel Institute.
[4] Annual Report of the American Iron and Steel Institute, 1916, p. 37.

annual output considerably in excess of 1,000,000 tons. Great Britain, the third greatest producer, manufactured an annual tonnage of something less than 1,000,000. Russia and France each had an output of approximately half a million tons. Other producers of importance were Belgium, Canada, Austria-Hungary, and Italy. The production of Canada reached 506,709 gross tons in 1913, but has declined materially since that year.

The rails which these countries produced and exported were in the main heavy rails manufactured from steel made by the Bessemer process.

IMPORTS.

The importation of rails during the fiscal years 1912–1917 varied from 3,297 gross tons in 1912 to 55,092 gross tons in 1915. The imports for consumption for the calendar years 1912 to 1917, inclusive, ranged from 4,025 gross tons in 1912 to 78,525 gross tons in 1915. With the exception of the years 1915 and 1916, our importation of rails for consumption has been for a long time considerably less than 1 per cent of the domestic production.

In the years immediately preceding the outbreak of hostilities in Europe, our imports came mainly from Germany and Canada. In the fiscal years 1912 and 1913 Germany supplied us with over three-fourths of our imported rails. Since 1914 our imports have come almost entirely from Canada, largely through the customs districts of Chicago and Michigan.

The revenue derived from imported rails has not been large. In the fiscal year 1907, with an import duty of $7.84 per gross ton (7/20 cent per pound) the duties collected amounted to $30,670, and in 1909 under the same tariff the revenue amounted to only $9,122. Between 1909 and 1913 the annual duties collected varied from $14,924 in 1912 to $25,349 in 1910, and during the period from July 1 to October 4, 1913, the date on which the present tariff, placing rails on the free list, went into effect, $5,332 was collected.

PRICES.

In 1867, when steel rails were first produced in commercial quantities in the United States, the price per gross ton was $166 (currency).[1] By 1885 it had declined to $28.52, after which it rose to $37.08 in 1887. It again declined until the minimum annual average ($17.62)[1] was reached in 1898 but rose again to $32.29 in 1900. From April, 1901, to May, 1916, the price remained fixed at $28. The present (1918) quotations per gross ton for heavy, standard section steel rails are: Bessemer, $55; and open hearth, $57.[2]

In England prices have fluctuated more than in the United States. In the years 1910 and 1911 the quotations at mill averaged in American currency $26.57 and $27.63 per gross ton, respectively. During 1912–1914, inclusive, prices averaged over $30 per gross ton. After 1914 the effect of the war was noticeable in the marked upward trend of quotations. In 1916 the price per gross ton averaged $53.09.

Export prices in rail manufacturing countries are frequently lower than domestic prices. This is likely to be the case in periods of industrial depression when there is an effort to dispose of surplus stocks, in foreign countries, which have been accumulated during times of prosperity. The export of rails has been encouraged in some countries by a system of indirect bounties taking the form of lower rates on material destined for foreign consumption than on the same material to be used at home. Reduced prices for raw material to be used in the

[1] Statistical Abstract 1916, p. 724.
[2] Iron Age, June, 1918.

manufacture of export articles have also been granted in certain instances. These and similar practices have influenced prices of steel rails moving in international trade.

TARIFF HISTORY.

Paragraph 587 of the tariff of 1913 provides for the free admission of "railway bars, made of iron and steel, and railway bars made in part of steel, T-rails, and punched iron or steel flat rails."

In 1870 the first specific mention of "steel railway bars" is made in an American tariff. The duty imposed was 1¼ cents per pound ($28 per gross ton) on all steel rails and 1 cent per pound ($22.40 per gross ton) where the rail is part steel. Before 1870 imported steel rails were subject, under a general tariff provision, to an ad valorem duty of 45 per cent. With the exception of the period from 1872 to 1875, during which a horizontal 10 per cent reduction in duties was in operation, the 1870 tariff on rails prevailed until 1883. The law of 1883 imposed a duty of $17 per ton on "steel railway bars made in part of steel weighing more than 25 pounds to the yard." Other railway bars and "iron and steel T-rails, weighing not over 25 pounds to the yard," bore duties ranging from 7/10 cent to 9/10 cent per pound ($15.68 to $20.16 per gross ton). In the law of 1890 all railway bars and T-rails were grouped together in one paragraph and made subject to a duty of 6/10 cent per pound ($13.44 per gross ton). This tariff was further reduced to 7/20 cent per pound in the laws of 1894 and 1897, and to 7/40 cent per pound in the law of 1909.

These successive reductions in duties apparently exercised little permanent influence on importations. After the passage of the act of 1913 the annual importation of rails from Canada rose from a few hundred gross tons in 1912 and 1913 to over 50,000 gross tons in 1915 and 1916. In 1917, however, importation of rails declined to a little over 14,000 tons. As the war practically shut out importation from Europe, and as railroad building in Canada was greatly restricted at a time when rail mills with large capacity had been completed, it is impossible to draw any conclusions with respect to the effect on imports of putting rails on the free list.

Substantial duties are imposed on rail imports into France, Germany, Italy, and Canada. In France the rate of duty under the general tariff amounts to $0.79 per 100 pounds and $0.53 per 100 pounds under the minimum tariff. In Germany the duty is $0.27 per 100 pounds for ordinary standard rails. Canada, which in recent years has supplied the United States with the bulk of its rail imports, has a general rate of $7 per ton on "iron and steel railway bars or rails," with an intermediate rate of $6 per ton and a British preferential rate of $4.50 per ton.

TARIFF QUESTIONS INVOLVED.

The United States leads the world in the production of steel rails and is practically self-sufficient with regard to most materials entering into their manufacture. This branch of manufacture is to-day maintaining itself without any tariff protection. The large export trade of the United States in steel rails, a trade which antedated the present war, indicates the competitive strength of the American industry even in foreign markets.

While the United States leads the world in the production of rails and exports a large tonnage, the shipment of such a commodity any great distance, especially by land, materially adds to the price charged the consumer. As the principal producers of steel rails in the United States are located mainly in the Middle Atlantic and East North-Central States and in the Alabama region, the imported product in districts remote from these regions, especially on the

Pacific Coast, may be cheaper than the domestic commodity. Water transportation is normally much less costly than land transportation, and articles low in value in proportion to bulk can often be shipped from Europe to our Pacific coast ports at lower rates than they can be transported by rail across the continent. The freight on steel rails from Chicago to San Francisco was $20.16 per gross ton before the 25 per cent increase in rates in June, 1918, and is now (1918) $25. The same rates have prevailed on shipments from Birmingham, Ala., to San Francisco. From Pittsburgh to the same destination, these rates have been from $2 to $3 more. On the basis of the quoted price at Pennsylvania mills before the war began to affect market conditions in this country, the freight on steel rails shipped to San Francisco would add 80 per cent to their price at mill. On the basis of present (1918) prices the existing railroad rates would increase the cost to consumer at San Francisco $28 per gross ton, or approximately 50 per cent. The ability of the rail manufacturer to compete with his foreign rival on the Pacific coast depends in part upon relative rail and water rates from mills in the East and abroad. The importation of rails through the customs districts of the Pacific coast has been small compared with the total for the country. In the year 1910, however, imports through those districts constituted over 45 per cent of the rail tonnage imported. The great increase in ocean freight rates following the outbreak of war in 1914, as well as other conditions, prevent, for the present, any considerable shipments from Europe.

Tariff questions are sometimes raised by common practices, political and commercial, with respect to exports, and such a commodity as steel rails has been subject to the practices in question. Bounties are often given on exported commodities. These bounties are now generally indirect, that is, in the form of reduced transportation rates on exported goods, relatively low prices on raw material entering into the manufacture of commodities to be sent to foreign markets. In periods of financial panic goods are often "dumped" on the foreign market, i. e., sold in large quantities at prices much below those obtained at home. In some countries countervailing and antidumping laws have been passed limiting these practices. In Canada there is an antidumping tax which applies "in respect to iron and steel, rolled, drawn, or polished when the difference between the fair market value and the selling price of such iron and steel to the importer in Canada" exceeds "5 per cent of their fair market value." A dumping tax of this description was recommended for this country by Mr. Gary in 1908 for iron and steel products.

The question of tariff classification arises in the case of light and heavy rails because of the differences in the material used in their manufacture. When the tariff of 1913 was under discussion the manufacturers of light rails (weight 40 pounds per yard or less) protested against having their product classed with heavy rails (weighing 50 pounds and more per yard) and put on the free list. The contention was that light rails are made out of larger old rails, of which the supply is limited. Mills producing splice bars, for example, use old steel rails in the manufacture of their products but are protected by a duty of 10 per cent. The cost of producing splice bars is practically the same as that for the manufacture of light rails which are unprotected. The producers of the former are the competitors of the manufacturers of the latter in the purchase of the limited supply of old heavy rails with the artificial advantage of a protective tariff. The producers of railway splice bars are enabled to bid higher for their raw material than the producers of light rails.[1]

[1] Tariff, schedules, briefs, and statements with Senate Committee on Finance, H. R., vol. 3, pp. 1881–1883.

Production of rails in United States by States.[1]

Year.	Pennsylvania.		Ohio.		All other.[2]		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Gross tons.		*Gross tons.*		*Gross tons.*		*Gross tons.*	
1899....	1,218,289	$24,597,034	[3] 142,918	[3] $4,143,069	890,250	$17,793,056	[4] 2,251,457	[4] $46,533,159
1904....	812,691	20,204,210	[3] 107,663	[3] 3,194,504	1,273,351	35,041,546	[5] 2,193,705	[5] 58,236,050
1909....	848,924	24,077,184	.....	.....	2,009,675	57,051,111	[6] 2,858,599	[6] 81,128,295
1914....	566,125	16,197,964	.....	.....	1,275,916	37,811,954	1,842,041	54,009,918

[1] U. S. Census of Manufactures, 1910, Vol. IX, p. 1063. Also U. S. Census of Manufactures, 1914, Iron and Steel, pp. 44–45.
[2] A large tonnage was produced in Illinois in 1904; it amounted to about 25 per cent of the total for the country. (Census of Manufactures, 1905, Pt. II, p. 201.) This tonnage, however, was not separately listed, as entire production of State was by one concern.
[3] U. S. Census of Manufactures, 1905, Pt. II, p. 831.
[4] U. S. Census of Manufactures, 1900, Vol. X, p. 59.
[5] U. S. Census of Manufactures, 1905, Special Rep., Pt. I, p. cli.
[6] Figure is for steel rails only. (U. S. Census of Manufactures, 1910, Vol. VIII, p. 407.)

Production of rails in United States by States, 1908–1917.[1]

[In gross tons.]

Year.	Pennsylvania.	New York, New Jersey, Maryland.	West Virginia, Alabama, Ohio.	Indiana, Illinois, Wisconsin, Colorado, Washington, California.	All other.	Total.
1908	493,024	.....	.....	.....	1,428,587	1,921,611
1909	855,707	621,373	367,039	1,179,726	.....	3,023,845
1910	986,702	711,975	496,716	1,440,638	.....	3,636,031
1911	839,663	490,980	447,905	1,044,242	.....	2,822,790
1912	888,672	585,817	622,121	1,231,305	.....	3,327,915
1913	971,820	654,207	657,912	[2] 1,218,841	.....	3,502,780
1914	592,532	.....	.....	.....	1,352,563	1,945,095
1915	694,545	.....	.....	.....	1,509.658	2,204,203
1916	707,851	.....	.....	.....	2,146,667	2,854,518
1917	.....	.....	.....	.....	.....	[3] 2,944,161

[1] Figures from annual statistical report of the American Iron and Steel Institute, 1916, pp. 37–39. Ibid., 1914, p. 60; and 1913, p. 100. After 1913 the annual reports of the American Iron and Steel Institute give figures for the country as a whole and for Pennsylvania only, among the States.
[2] In this figure California is not mentioned. See Report 1914, p. 60.
[3] Figure from office of American Iron and Steel Institute, Washington.

Production of rails in principal foreign countries, 1907–1916.[1]

[In gross tons.][2]

Year.	Canada.	France.	Germany, including Luxemburg.	Belgium.	Italy.	Austria-Hungary.	Great Britain.	Russia.	China.	Mexico.	Spain.
1907....	311,461	344,513	1,409,915	[3] 314,760	75,000	163,055	912,108	311,806	.....	.....	38,144
1908....	268,692	390,205	1,213,330	[3] [4] 191,370	67,710	259,865	907,632	361,669	.....	.....	59,833
1909....	344,830	[4] 419,767	1,126,392	[3] [4] 214,000	123,290	207,211	929,633	500,626	28,500	[5] 25,056	58,044
1910....	366,465	498,467	1,242,030	347,890	121,370	155,839	[6] 947,606	[5] 497,370	[7] 33,248	23,546	45,565
1911....	360,547	449,818	.....	.....	107,431	205,659	[6] 836,525	520,228	24,215	.....	47,524
1912....	423,885	[6] 531,304	[8] 1,928,824	.....	.....	.....	.....	.....	.....	.....	.....
1913....	506,709	[6] 430,760	.....	.....	.....	.....	.....	.....	.....	.....	.....
1914....	382,344	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1915....	209,752	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1916....	81,497	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Figures for 1907 to 1911, inclusive, were derived from the reports of the American Iron and Steel Association, appearing years 1908–1912, inclusive. In the case of Canada the figures were those appearing in the 1916 issue of the Annual Statistical Report of the American Iron and Steel Institute. Figures for Germany in 1912 and of France in 1912 and 1913 were taken from the Iron and Coal Trades Review, London, Mar. 13, 1914, p. 387, and Apr. 10, 1914, p. 541.
[2] The metric ton (2,204 pounds) is the unit used, except in Great Britain, United States, and Canada, and other Anglo-Saxon countries.
[3] Includes "sleepers."
[4] For the years 1908 and 1909 different figures are given for the same years in the case of France and Belgium. The figures used are those of the later publication in each case.
[5] Inconsistent figures are given for Russia in 1910 and Mexico in 1909. The later figures are those used.
[6] Includes fishplates and sleepers.
[7] Includes fastenings.
[8] Includes sleepers, fish and sole plates, and fastenings.

Imports of rails by countries.[1]

[Fiscal years.]

Imported from—	1910[1]		1912[2]		1913[2]		1914[2]	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	G. tons.		*G. tons.*		*G. tons.*		*G. tons.*	
Belgium	714	$16,230	141	$4,383	145	$2,887	1,115	$30,767
France	37	977	20	278				
Germany	1,990	49,609	2,778	73,902	3,991	103,361	2,838	76,672
United Kingdom:								
England	249	8,253	201	5,385	70	1,877	596	19,500
Scotland			22	669				
Canada	2,481	58,911	135	2,775	622	11,010	10,958	222,600
Mexico	1,545	24,405			196	6,006		
Cuba	14	281						
Total	7,030	158,666	3,297	87,392	5,024	125,141	15,507	349,539

Imported from—	1915[2]		1916[2]		1917[2]		1918	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	G. tons.		*G. tons.*		*G. tons.*		*G. tons.*	
Belgium	805	$19,879						
France								
Germany	1,491	40,649						
United Kingdom:								
England					1	$27		
Scotland								
Canada	52,796	1,503,090	53,944	$1,373,764	14,065	402,810	7,520	$278,044
All other					1	50	865	20,807
Total	55,092	1,563,618	53,944	1,373,764	14,067	402,887	8,385	298,851

[1] Foreign Commerce and Navigation of the U. S., 1912, p. 273. No separate figures are given for the year 1911, the imports of "rails for railways" being included under the general head of "Other manufactures of."
[2] Foreign Commerce and Navigation of the U. S., 1916, p. 169, 1917, p. 170.

Imports of rails for consumption—Revenue.[1]

Fiscal year.	Rates of duty per ton.	Quantity (gross tons).	Value.	Duties collected.	Value per unit of quantity.	Actual and computed ad valorem rate (per cent).
1907	$7.84	3,939.00	$107,308.50	$30,885.45	$27.22	28.78
1908	$7.84	3,042.69	91,746.83	23,854.66	30.15	26.00
1909	$7.84	1,343.91	36,001.70	10,536.25	26.79	29.27
1910[2]	$7.84					
1910[3]	$3.92	6,928.38	156,089.00	27,160.59	22.53	17.40
1911	$3.92	4,296.54	109,807.66	16,842.42	25.56	15.34
1912	$3.92	3,940.21	103,523.00	15,445.60	26.27	14.92
1913	$3.92	5,047.97	125,641.68	19,788.09	24.89	15.75
1914	$3.92	1,371.41	34,689.00	5,375.93	25.29	15.50
1914	Free	6,226.50	171,487.00		27.54	
1915	do	55,092.00	1,563,618.00		28.38	
1916	do	53,944.00	1,373,764.00		25.47	
1917	do	14,135.00	405,701.00		28.70	
1918	do	8,385.00	298,851.00		35.64	

[1] From Foreign Commerce and Navigation of the U. S.
[2] To Aug. 5, 1909. From July 1 to Aug. 5, 1909, when the Dingley Act was still in force; no separate figures are given in Foreign Commerce and Navigation of the U. S. Those for the year 1909 are apparently for the fiscal year ending June 30, 1909.
[3] From Aug. 5, 1909, to June 30, 1910.

Domestic exports of rails.[1]

[Fiscal years.]

Exported to—	1910		1911		1912	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*		*Long tons.*	
Canada	27,255	$801,084	39,065	$1,168,101	118,726	$3,369,894
Panama	13,543	413,169	7,786	239,781	8,491	254,651
Mexico	67,920	1,916,640	63,812	1,838,585	32,459	893,758
Cuba	40,042	1,105,733	30,991	904,028	37,606	1,094,364
Argentina	80,269	2,317,312	49,917	1,327,754	30,484	862,511
Brazil	35,367	1,031,774	20,887	639,592	40,730	1,187,462
Chile	6,192	179,970	14,131	418,683	44,137	1,369,525
Japan	12,355	363,724	48,375	1,467,337	37,513	1,118,942
Australia Tasmania	52,140	1,417,538	59,406	1,714,502	25,060	744,822
Philippine Islands	4,684	145,094	11,296	345,409	2,811	82,980
All other	29,811	854,142	45,762	1,313,672	39,530	1,155,537
Total	369,578	10,546,180	391,428	11,377,444	417,547	12,134,446

Exported to—	1913		1914		1915	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*		*Long tons.*	
Russia in Europe					12,275	$356,952
Canada	138,439	$3,980,657	115,666	$3,415,167	7,676	230,111
Mexico	19,979	551,576	3,119	101,705	1,874	64,633
Cuba	31,742	949,870	29,477	908,280	24,191	670,086
Argentina	24,773	695,018	28,424	861,281	5,332	143,880
Brazil	31,629	1,031,884	45,367	1,529,309	4,224	128,082
Chile	13,939	458,827	7,302	253,166	13,332	372,777
China	11,069	322,542	12,998	367,801	11,409	320,866
Japan	41,554	1,267,264	17,964	502,573	7,894	216,926
Australia	57,690	1,793,234	9,655	300,808	23,999	649,210
Philippine Islands	11,587	347,914	16,452	460,523	639	21,353
All other	70,144	2,030,525	52,189	1,549,496	46,742	1,363,102
Total	452,545	13,429,311	338,613	10,250,109	159,587	4,537,978

Exported to—	1916.		1917.		1918.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*		*Long tons.*	
France	83,114	$2,917,442	157,055	$6,895,977	118,618	$5,037,458
Russia in Europe	114,481	3,960,784	76,957	3,828,970	31,028	1,407,220
Canada	11,106	369,650	69,384	2,661,427	43,819	1,965,464
Mexico	3,609	123,652	1,750	72,341	4,118	233,798
Cuba	53,391	1,536,314	75,015	2,650,753	61,660	3,172,699
Argentina	5,486	161,605	132	5,026	20	1,968
Brazil	4,097	137,092	1,878	86,420	418	26,454
Chile	8,470	238,313	15,921	713,514	7,284	334,273
China	118	5,577	1,393	51,539	2,586	170,565
Japan	1,287	44,869	28,214	1,347,004	106,940	6,653,272
Russia in Asia	159,408	5,278,105	40,620	1,858,435	16,263	742,090
Australia	20,291	661,498	1,206	48,550	250	14,162
Philippine Islands	9,540	287,834	1,890	102,372	3,507	226,542
All other	63,520	1,909,021	122,974	5,083,141	33,836	1,831,435
Total	537,918	17,631,756	594,389	25,405,469	430,347	22,817,400

[1] From Foreign Commerce and Navigation of the U. S.

Prices of steel rails, heavy, standard section, at mills in Pennsylvania.[1]

Kinds or grades.	Per gross ton—			
	April, 1901, to December, 1915	1916	1917	1918 [2]
Bessemer:				
Average	$28.00	$32.00	$38.00	$55.00
Highest	28.00	38.00	38.00	55.00
Lowest	28.00	28.00	38.00	55.00
Open hearth:				
Average	28.00	.....	40.00	57.00
Highest	28.00	40.00	40.00	57.00
Lowest	28.00	28.00	40.00	57.00

[1] Data from Iron Age and annual statistical reports of the American Iron and Steel Institute.
[2] No prices for standard section rails are quoted in the Iron Age for the first few weeks of 1918. For the remainder of the year the quotations are as stated.

Prices of rails, standard section, at mills in England.[1]

Kinds or grades.	1910	1911	1912	1913	1914	1915	1916
Average for year	$26.57	$27.53	$30.23	$32.23	$30.86	$40.52	$53.09
Highest monthly average	26.76	27.97	32.53	32.84	32.84	51.21	53.53
Lowest monthly average	26.15	27.21	27.52	31.63	28.58	31.75	52.95

[1] Data from annual statistical reports of American Iron and Steel Institute, 1916, p. 90 (compiled from weekly quotations in Iron and Coal Trades Review).

Rates of duty.

Act of—		Tariff classification or description.	Rates of duty, specific and ad valorem.
Year.	Paragraph		
[1] 1870	Sec. 21	On steel railway bars	1¼ cents per pound.
		And on all railway bars made in part of steel (*Provided*, That metal converted, cast, or made from iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as steel).	1 cent per pound.
1872	Sec. 2	10 per cent reduction of the tariff rates	
Rev. Stat.	Sec. 2503	.....do	
Mar. 3, 1875	Sec. 4	Reduction to 90 per cent repealed	
Rev. Stat.	Sec. 2504	Steel railway bars	1¼ cents per pound.
	Sched. E.	Railway bars made in part of steel (and metal converted, cast, or made from iron by the Bessemer or pneumatic process, or whatever form or description, shall be classed as steel).	1 cent per pound.
1883	146	Iron railway bars, weighing more than 25 pounds to the yard.	$\frac{1}{10}$ cent per pound.
	147	Steel railway bars and railway bars made in part of steel, weighing more than 25 pounds to the yard.	$17 per ton.
	149	Iron and steel tee rails, weighing not over 25 pounds to the yard.	$\frac{1}{10}$ cent per pound.
		Iron or steel flat rails, punched	$\frac{8}{10}$ cent per pound.
1890	141	Railway bars, made of iron or steel, and railway bars made in part of steel, T rails, and punched iron or steel flat rails.	$\frac{1}{10}$ cent per pound.
1894	117	.....do	$\frac{7}{10}$ cent per pound.
1897	130	.....do	Do.
1909	126	.....do	$\frac{7}{10}$ cent per pound.
1913	587	.....do	Free.

[1] Provisions for iron railroad bars omitted prior to the act of 1883.

COURT AND TREASURY DECISIONS.

Decisions have been rendered upon importations of iron or steel rails under provisions of various tariff acts for scrap iron or steel. The leading cases in construction of three representative provisions follow:

Dwight v. *Merritt*, 140 U. S., 213 (1891): Completed rails, somewhat rusty but never in actual use, were held dutiable at 70 cents per hundred pounds as "iron bars for railroads," under section 2504 of the Revised Statutes, schedule E, and not under the provision in the same schedule and section reading: "Wrought scrap iron of every description: eight dollars per ton. But nothing shall be deemed scrap-iron except waste or refuse iron *that has been in actual use, and is fit only to be remanufactured.*"

Illinois Central Railroad Co. v. *McCall*, 147 Fed., 925 (1904): New steel rails depreciated in value because of defects, but which had not lost their character or identity as rails, were held dutiable at four-tenths of 1 cent per pound as "rails" under paragraph 130 of the act of 1897, and not under the provision in paragraph 122 reading; "* * * wrought and cast scrap iron, and scrap steel, four dollars per ton; but nothing shall be deemed scrap iron or scrap steel except waste or refuse iron or steel *fit only to be remanufactured.*"

Benjamin Iron & Steel Co. v. *U. S.*, 2 Ct. Cust. Appls., 159 (1911): Old steel rails, so broken, worn and damaged as to be unfit not only for the uses for which they were originally manufactured, but also for the secondary purpose and less exigent needs of contractors' or industrial railways, were held dutiable at seven-fortieths of 1 cent per pound as "rails" under paragraph 126 of the act of 1909, and not under paragraph 118 reading: "* * * wrought and cast scrap iron, and scrap steel, one dollar per ton; but nothing shall be deemed scrap iron or scrap steel except waste or refuse iron or steel *fit only to be remanufactured by melting* * * *."

COMPETITIVE CONDITIONS.

The competitive strength of American steel rail manufacturers in the United States as against manufacturers of other countries may be considered with reference to prevailing mill prices, foreign and domestic; export prices with a consideration of "dumping" possibilities; export bounties; cost of production at home and abroad; and transportation in connection with geographical distribution of markets in the United States.

Mill prices, foreign and domestic.—A comparison of the mill prices of steel rails in the United States and in England for the years 1910–1916 shows a higher average[1] for England than for the United States. In England the average was $34.43 per gross ton, while in the United States it was $28.25, the difference reflecting the more immediate effect of the war upon English than upon American prices. During years unaffected by war conditions (1910–1913), the annual average mill price in England varied from $26.57 per gross ton in 1910 to $32.23 in 1913. In the United States during the same years the Pennsylvania mill price—published in April, 1901—was $28 per gross ton.

According to E. H. Gary's testimony before the Ways and Means Committee in 1908, the domestic price of steel rails at that time in Germany was $29.02; in Great Britain, $27.98; in France, $33.33; and in Belgium, $27.45.[2] In 1907,

[1] The term "average" as used here is the simple arithmetic average. As the quantities sold at different price levels are not shown the weighted average is of course impossible.

[2] Tariff Hearings before Committee on Ways and Means, 1908–9, 60th Cong., pt. 1, p. 1743.

according to E. C. Felton, president of the Pennsylvania Steel Co., the price in Germany was $31 or $32.[1]

In the last two years prices at home and abroad have been much higher. During the early part of 1918 the prices of steel rails in the United States have been, Bessemer, $55 per gross ton, and open hearth, $57.[2] In England steel rails have been for approximately the same price.[3]

Export prices and dumping.—Export prices are often lower than domestic prices, because of a desire on the part of producers to capture foreign markets, "dumping" during periods of industrial depression, and various artificial encouragements in the way of bounties, direct or indirect.

Mr. Schwab stated in 1908 that manufactured steel rails sold abroad for probably $10 less than at home. "It is a wise process to sell abroad for less than at home."[3] Mr. E. C. Felton testified that in 1907 the export price of steel rails from his mills was $27.52 f. o. b. at Sparrows Point, Chesapeake Bay. The domestic price which he received was $28.08.

In the leading rail-exporting countries, outside of the United States, there is apparently a marked difference at times between the domestic and export prices. In Germany, Great Britain, France, and Belgium, the export prices in 1908 were $22.20, $23.61, $25.69, and $22.50, respectively, as against domestic prices of $29.02, $27.98, $33.33, and $27.45 respectively.[4]

The difference between the domestic and export price becomes accentuated in periods of depression, especially during the earlier months or the first year of such a condition. The amount of goods already produced or ordered is based upon an earlier period of prosperity, and the product must be disposed of. In order to keep the domestic price from falling, the so-called surplus is sold abroad at prices not infrequently below cost. This "dumping" as it is popularly called, is resorted to by producers in both Europe and America, and has been a feature of the commerce in steel rails. Mr. Gary recommended in 1908 a countervailing or dumping tax similar to the one prevailing in Canada. "If Germany, for instance, is proposing to dump its products in this country at any time because business is dull, there ought to be such a tax as would prevent them selling here more than 5 per cent below the price they get in their own country. In that case * * * you would protect this country against dumping."[5]

Export bounties.—The export of steel rails like that of other products is sometimes encouraged by bounties. These bounties, in the main, are indirect, i. e., in the form of reduced transportation rates or lower prices for raw material rather than in the form of payments directly from the Government. Canada has for a number of years paid bounties on the production of iron and steel, but not on the export of these commodities. Germany, often cited as an example of Government-fed industries, pays no direct bounty on the export of steel rails.[6]

In Germany reduced freight rates were given to exporters of steel products on the Government roads.[6] In addition to this well-known form of indirect bounty, encouragement is given to the export of steel products by some of the cartels. In 1897 certain German syndicates adopted an export bounty policy

[1] Ibid., p. 1573.
[2] Iron Age, January to June numbers.
[3] Iron and Coal Trades Review, January and February numbers.
[4] Tariff Hearings before Committee on Ways and Means, 1908–9, 60th Cong., pt. 1, p. 1743.
[5] Ibid., p. 1744.
[6] Tariff Hearings, 1908–1910, pp. 1743–1744.

by subsidizing iron and steel manufacturers with respect to goods to be sent out of the country. The unions controlling the output of such products as fuel, iron, and raw steel have supplied such materials at lower prices when required in the manufacture of materials for export than when produced for sale in the home market.[1] An English writer in Cassier's Magazine, referring to German competition in English markets, says:[2] "The chief factor in the promotion of Germany's foreign trade these last ten years has been the policy of granting cooperative bounties." In 1918 reduced railway rates for exports were discontinued in the United States.

Cost of production.—The cost of production in the United States and in foreign countries is stated variously by different persons according to the elements entering into their cost estimates. Furthermore, costs vary considerably with different plants in the same country. Most cost estimates are little more than guesses.

The figures of the Commissioner of Corporations, published in 1913, estimated for the United States Steel Corporation the integrated mill costs per gross ton for producing steel rails in 1910 as follows:[3]

Heavy standard Bessemer rails	$15.37
Heavy standard open-hearth rails:	
Northern works	17.35
Southern works	19.24

These figures make no allowance for depreciation and general expense, but such an allowance was assumed by the commissioner to be about $1.30 per ton in the case of Bessemer rails, and $1.55 per ton for northern works, and $1.65 per ton for southern works, in the case of open-hearth rails. The cost per gross ton of producing steel rails at mill in 1910 for the United States Steel Corporation, exclusive of any intercompany profit or return on investment, was thus estimated at $16.67 for Bessemer steel rails, $18.90 for northern open hearth, and $20.89 for southern open hearth. These costs, however, were considerably less than the estimated average cost of producing Bessemer rails in the years 1902–6, for which figures were published for the country as a whole. In the items making up the cost in the case of the United States Steel Corporation the cost of steel ingots constituted 77 to 85 per cent of the total mill cost. Of the cost of converting ingots into rails, the labor element constituted from 40 to 50 per cent.

There is no satisfactory evidence that mill costs were lower abroad than in the United States in the period immediately before the war. Prices in Europe, as has been indicated, did not differ greatly from those prevailing in the United States. Unless European manufacturers were receiving exorbitant profits their mill costs were not much, if any, below those indicated in the figures of the Bureau of Corporations.

Since the outbreak of the war costs and prices here and abroad have advanced very materially. In England the price of steel rails at the present time (1918) is approximately the same as in the United States.

Transportation and geographical conditions.—Cost of transportation is an important element in determining the price of steel rails to the consumer, because rails are a heavy and bulky commodity compared with the price charged. Shipment any great distance, especially by land, materially adds to the price charged the consumer. As the principal producers of steel rails in

[1] Daily and Consular Reports, May 6, 1911.
[2] Cassier's Magazine, July, 1908.
[3] Report of Commissioner of Corporations on the Steel Industry, Part III, pp. 461–465.

the United States are located mainly in the Middle Atlantic and East North-Central States and in the Alabama region, the importation of steel rails in substantial amounts in other parts of the country, especially near the seacoast, is a possibility even where the mill costs in the countries of origin may be greater than in the United States.

The transportation rates on rails per gross ton in carload lots from Chicago, Pittsburgh, and Birmingham to important ports were obtained from the Interstate Commerce Commission for the period just preceding the 25 per cent increase in railroad rates in June, 1918, and the new rates effective for the last half of 1918. These rates are as follows:

	Rate per gross ton—			Rate per gross ton—	
	Before 25 per cent increase in June, 1918.	After 25 per cent increase in June, 1918.		Before 25 per cent increase in June, 1918.	After 25 per cent increase in June, 1918.
From Chicago to—			From Pittsburg to—		
New York	$5.70	$7.10	Mobile	$4.70	$5.90
Buffalo	3.40	4.30	New Orleans	4.70	5.90
Mobile	4.25	5.30	San Francisco	22.40	28.00
New Orleans	4.25	5.30	From Birmingham (Ala.) to—		
San Francisco	20.16	25.00	Mobile	2.50	2.10
From Pittsburgh to—			New Orleans	3.00	3.80
New York	3.20	4.00	San Francisco	20.16	25.00
Buffalo	2.00	2.50			

As the quoted prices of heavy standard section steel rails in the United States are the Pennsylvania mill prices, the prices at San Francisco, on the basis of the rail rates and quoted prices ($55 and $57 per gross ton for Bessemer and open-hearth steel respectively) for the latter half of 1918, would be under ordinary conditions approximately 50 per cent greater than the Pittsburgh prices. On the basis of the old $28 per ton quotation, the rail rate from Pittsburgh, before the 25 per cent increase of June, 1918, would add 80 per cent to the price at San Francisco.

In normal times ocean freight rates are much lower than rail rates. Rails shipped from Europe to the Pacific coast of the United States go, ordinarily, in tramp vessels with fluctuating rates. These rates have been considerably less than the rail rates from the mills of Pittsburgh, Chicago, and Birmingham It has been urged that a substantial tonnage of imported rails has been sold on the western coast of this country at prices below cost to manufacturers in the East.[1]

Notwithstanding this apparent advantage on the part of European producers over domestic manufacturers very little use seems to have been made of it.

[1] In the tariff hearings before the Ways and Means Committee, 60th Cong., Mr. Gray gave the rates from foreign mills in Germany and England to leading ports of the United States and Canada, as follows:

Foreign mills to—	Rails, per gross ton.
New York	$2.85
Mobile	3.35
San Francisco	7.50
New Orleans	3.35
Montreal	2.75

See pages 1741 and 1742.

The country's aggregate imports from Europe have for many years been small—in no year from 1907 to 1917, inclusive, being more than a fraction of 1 per cent of the domestic production. Of the total imported product only a moderate percentage came into the United States through customs districts on the Pacific coast. In the fiscal year 1910 over 45 per cent came through the ports of Los Angeles, Puget Sound, and San Francisco, but this proportion was exceptional and amounted only to 3,265 tons.

The great increase in ocean freight rates since the beginning of the war in Europe, as well as other conditions, prevent such shipments from European countries for the present.

The proximity of location and cheap water transportation resulted in a large importation of steel rails from Canada during recent years, especially 1915 and 1916. In a Canadian government publication, attention is called to the falling off of steel rail importations since the establishment of the rail mills at Sydney, Nova Scotia, and at Sault Ste. Marie, and the export of rails, especially to the United States.[1] The location of the steel mills at Sault Ste. Marie gives them cheap water transportation on the Great Lakes. It is significant that of the total importation of steel rails into this country in 1915, amounting to 55,092 gross tons, 42,857 gross tons, or 78 per cent, came through the customs districts of Chicago and Michigan. In 1916 out of a total importation of 53,944 gross tons—all from Canada—42,158 gross tons came through the same two districts.

MISCELLANEOUS.

Production of rails according to kind, 1909–1916.[2]

[In gross tons.]

Year.	Open hearth.	Bessemer.	Rerolled.[3]	Electric.	Iron.	Total.
1909	1,256,674	1,767,171	.....	(4)	.....	3,023,845
1910	1,751,359	1,884,442	.....	(4)	230	3,636,031
1911	1,676,923	1,053,420	91,751	462	234	2,822,790
1912	2,105,144	1,099,926	119,390	3,455	.....	3,327,915
1913	2,527,710	817,591	155,043	2,436	.....	3,502,780
1914	1,525,851	823,897	95,169	178	.....	1,945,095
1915	1,775,168	326,952	102,083	.....	.....	2,204,203
1916	2,269,600	440,092	144,825	.....	.....	2,854,518

Production of rails, by weight per yard, 1913–1916.[5]

[In gross tons.]

Years.	Under 50 pounds.	50 and less than 85 pounds.	85 and less than 100 pounds.	100 pounds and over.	Total.
1913	270,405	967,313	2,265,062		3,502,780
1914	238,423	309,865	868,104	528,703	1,945,095
1915	254,101	518,291	742,816	688,995	2,204,203
1916	295,535	566,791	1,225,341	766,851	2,854,518

[1] Annual Report on Mineral Products of Canada, published by the Department of Mines, p. 117.
[2] Annual Statistical Report of the American Iron and Steel Institute, 1916, p. 37.
[3] Rerolled from old steel rails. Included with Bessemer and open-hearth steel rails in 1910 and before.
[4] Small tonnage rolled in 1909 and 1910 included with Bessemer and open-hearth rails for these years.
[5] Annual Statistical Report of the American Iron and Steel Institute, 1916, p. 38.

Production of steel rails by the United States Steel Corporation and independents, 1902 and 1910–1916.[1]

Year.	United States Steel Corporation.	Independents.	Total.	Proportion of United States Steel Corporation.
	Gross tons.	*Gross tons.*	*Gross tons.*	*Per cent.*
1902	1,992,010	949,411	2,941,421	67.7
1910	2,138,946	1,496,855	3,635,801	58.8
1911	1,583,942	1,238,614	2,822,556	56.1
1912	1,872,772	1,455,143	3,327,915	56.27
1913	1,944,352	1,558,428	3,502,780	55.51
1914	985,082	960,013	1,945,095	50.64
1915	1,140,605	1,063,598	2,204,203	51.75
1916	1,551,956	1,302,562	2,854,518	54.37

[1] Figures for 1910-1916 are taken from the Annual Statistical Reports of the American Iron and Steel Association and its successor in 1912, the American Iron and Steel Institute. For 1902, the figures of Swank in "Our Iron Industry and the Protective Policy" are taken (see p. 24). The percentage for Bessemer rails alone is 65.4 in 1902 (see First Annual Report of United States Steel Corporation). Also Berglund, "The United States Steel Corporation," p. 98.

Geographical distribution of rail mills.

States.	Bessemer mills.	Open-hearth mills.	Total.
New York	1	1	2
New Jersey	1	.....	1
Pennsylvania	4	5	9
Maryland	2	2	4
West Virginia	1	.....	1
Alabama	1	4	5
Ohio	1	2	3
Illinois	2	1	3
Indiana	.....	1	1
Colorado	1	1	2
Washington	1	.....	1
California	1	1	2
Total	16	18	34

Foreign tariffs on steel rails.

FRANCE—TARIFF OF 1910.

Tariff number.	Tariff classification or description.	Rates of duty in francs,[1] per 100 kilos.		Rates of duty in dollars, per 100 pounds.	
		General.	Minimum.	General.	Minimum.
213	Rails of iron or common steel	9.00	6.00	0.79	0.53
	Rails of special steel, i. e., containing more than 9 per cent of manganese	15.00	10.00	1.31	.88

GERMAN CUSTOMS UNION—LAW OF 1902, REVISED IN 1907.

Tariff number.	Tariff classification or description.	Rates of duty in marks, per 100 kilos.[2]		Rates of duty in dollars, per 100 pounds.	
		General.	Conventional.	General.	Conventional.
796	Rails for railways, cogged or not, flat rails, switch rails, frogs of malleable iron, all these also drilled or riveted in the lower flanges, railway sleepers, fishplates, and bedplates	2.50	.....	0.27	.....

[1] Franc=$0.193. (Bureau of Manufactures, tariff series No. 25.)
[2] Mark=$0.238. Kilo=2.2046 pounds.

Foreign tariffs on steel rails—Continued.

ITALY—TARIFF OF 1910.

Tariff number.	Tariff classification or description.	Rates in lira per quintal.[1]		Rates of duty in dollars per 100 pounds.	
		General.	Conventional.	General.	Conventional.
215	Iron and steel rails for railways	6.00	6.00	0.525	0.525

JAPAN—REVISED TARIFF, JULY, 1912.

Tariff number.	Tariff classification or description.	Rates in yen per 100 kin.[2]	Rates in dollars per 100 pounds.
482	Rails	0.80	0.30

CHILE—CUSTOMS TARIFF, 1916.

Tariff number.	Tariff classification or description.	Rates in pesos per kilo.[3]	Rates in dollars per 100 pounds.
415	Rails and crossing points for railways and tramways, including those for portable or aerial railways, G. W	0.01	0.17

CANADA—THE CUSTOMS TARIFF, 1907.[4]

Tariff number.	Tariff classification or description.	British preferential tariff (per ton).	Intermediate tariff (per ton).	General tariff (per ton).
388	Iron and steel railway bars or rails of any form, punched or not, n. o. p., for railways, which term for the purposes of this item shall include all kinds of railways, street railways, and tramways, even although they are used for private purposes only, and even although they are not used or intended to be used in connection with the business of common carrying of goods or passengers	$4.50	$6.00	$7.00
388-a	Iron or steel railway bars or rails, which have been in use in the tracks of railways in Canada and which have been exported from Canada and returned thereto after having been rerolled, and weighing not less than 56 pounds per lineal yard when rolled, and which are to be used by the railway company importing them on its own tracks, under regulations prescribed by the Minister of Customs	*Per cent.* 25	*Per cent.* 25	*Per cent.* 25
	Provided that the value for duty of such rerolled rails shall be the cost of rerolling the same; provided also, that whenever the Governor in Council is satisfied that a mill adapted and equipped for rerolling such rails in substantial quantities has been established in Canada, the Governor in Council may by order in council to be published in the "Canada Gazette" abolish the duty specified in this item, and thereupon all such rails when imported shall be subject to such duty as otherwise provided in the customs tariff.			

[1] Lira=$0.193. Quintal=100,000 grams. (Bureau of Manufactures, tariff series No. 15.)
[2] Yen=$0.498. Kin=1.32277 pounds avoirdupois. (Bureau of Manufacturers, tariff series No. 28.)
[3] Peso=$0.365. Kilo=2.2046 pounds (Kelly's Customs Tariffs of the World, p. 956).
[4] Customs Tariff of Canada, 1907.

CANADIAN EMBARGO ON EXPORT OF RAILS.[1]

Prohibition of exports from Canada affects cast scrap iron and steel rails. Prohibition covers exports to any country outside of the United Kingdom, British possessions and protectorates. (Sept. 11, 1917.)

THE INTERNATIONAL STEEL RAIL ASSOCIATION.

Some 12 or 14 years ago there was much discussion over the formation of an international combination supposed to control the output and distribution of steel rails throughout the world. Frequent references are made to it in tariff hearings before congressional committee meetings. The formation and purposes of this association were discussed in the Iron Age about the time the combination was supposed to have been effected.[2] There is no evidence that American export and import trade was seriously affected by any such combination. An international organization of this character is rarely effective, and pools in general are notoriously weak in periods of depression.

BIBLIOGRAPHY.

United States Census Reports, especially 1900, Vol. X; 1905, Parts I and II of Special Report; 1910, Vols. VIII and IX; 1914, Special Report on Iron and Steel. Also Abstract 1910.

Commerce and Navigation, for years 1907–1916.

Monthly Summary of Foreign Commerce, June and December, 1917.

Statistical Abstract, 1916.

Annual Reports of the American Iron and Steel Association for 1908–1911.

Annual Reports of the American Iron and Steel Institute, 1912–1916.

Iron Age, especially numbers appearing in 1917 and 1918, but including numbers in years 1904 and 1905.

Iron Trade Review, numbers appearing in 1918.

Tariff Acts, 1789–1909, published by United States Government.

The Tariff Act of October 3, 1913.

Tariff Hearings, 1890–1913, especially before Ways and Means Committee in 1909.

Tariff Schedules, Briefs and Statements with Senate Committee on Finance, Vol. III.

Tariff Series of Bureau of Foreign and Domestic Commerce, including those of the former Bureau of Manufactures. Also Foreign Tariff Notes.

Notes on Tariff Revision, prepared for use of Committee on Ways and Means, 1909.

Daily and Consular Reports, including Commerce Reports.

Report of Commissioner of Corporations on the Steel Industry, especially parts I and III.

Report of the Industrial Commission, Vol. XIII.

Poor's Manual of Industrial Corporations, 1917.

Thomas's Register, 9th edition.

The A, B, C, of Iron and Steel.

The International Encyclopedia, vol. 19.

Spring: Non-technical chats on Iron and Steel.

Swank: Our Iron Industry and the Protective Policy.

Iron and Coal Trades Review. January and February numbers, 1918.

Cassier's Magazine, July, 1908.

---

[1] Foreign Tariff Notes No. 27. Reference to Foreign Tariff Notes No. 26, pp. 48–49.

[2] See issues of Iron Age of Nov. 3, 1904, p. 45, and July 6, 1905, p. 22.

Annual Report on Mineral Production of Canada. Published by Department of Mines, 1916.

German Trade and the War, by Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 65, 1918.

ASSOCIATIONS, ESTABLISHMENTS, IMPORTERS, EXPORTERS, TRADE JOURNALS, DIRECTORIES.

Rail manufacturers of the United States.

Companies.	Location of office or plant.	Kinds of rails produced.
United States Steel Corporation (subsidiaries):		
Carnegie Steel Co	Pittsburgh, Pa	Standard section.
Illinois Steel Co	Chicago, Ill	Standard section and light.
Indiana Steel Co.[1]	Gary, Ind	Do.
Minnesota Steel Co	Duluth, Minn	Do.
National Tube Co	Pittsburgh, Pa	Standard section and girder.
The Lorain Steel Co	Johnstown, Pa	Girder.
The National Tube Co	Lorain, Ohio	Standard section and girder.
Tennessee Coal, Iron & Railroad Co.	Birmingham, Ala	Standard section and light.
Independents:		
Bethlehem Steel Co. (Controlled by the Bethlehem Steel Corporation.)	South Bethlehem, Pa	Standard section.
Buckeye Rolling Mill Co	Steubenville, Ohio	Light.
Cambria Steel Co. (Controlled by the Midvale Steel & Ordnance Co.)	Philadelphia, Pa	Standard section, light, and girder.
Colorado Fuel & Iron Co	Denver, Colo	Do.
Gulf States Steel Co	Birmingham, Ala	Light.
Hirsch Rolling Mill Co	St. Louis, Mo	Standard section, light, and girder
Jones and Laughlin Steel Co	Pittsburgh, Pa	Light.
Lackawanna Steel Co	Buffalo, N. Y	Standard section and light.
Maryland Steel Co. (Controlled by the Bethlehem Steel Corporation, through the Penn Mary Steel Co.)	Philadelphia, Pa	Do.
Newhall, Geo. M., Engineering Co	do	Light.
Pacific Coast Steel Co	Seattle, Wash	Do.
Pennsylvania Steel Co. (Controlled by the Bethlehem Steel Corporation, through the Penn Mary Steel Co.)	Philadelphia, Pa	Standard section, light, and girder.
Republic Iron and Steel Co	Youngstown, Ohio	
Sweet's Steel Co	Williamsport, Pa	Do.
United States Rail Co	Cumberland, Md	Light.
West Virginia Steel Co	Huntington, W. Va	Do.

[1] The mills of the Indiana Steel Co., at Gary, Ind., are operated by the Illinois Steel Co., under lease from the United States Steel Corporation.

Rail manufacturers in Canada.

Companies.	Location of office or plant.	Kinds of rails produced.
Algoma Steel Corporation (Ltd.). (Controlled by Lake Superior Corporation.)	Sault Ste. Marie, Ont	Standard section, light and girder.
Dominion Iron & Steel Co. (Ltd.). (Controlled by the Dominion Steel Corporation (Ltd.).)	Sydney, N. S	Standard section.
Nova Scotia Steel & Coal Co. (Ltd.)	New Glasgow, N. S	Light.

Dealers in rails.

Name of firm.	Office.	Nature of trade.
American Steel Export Co	New York	Exporters.
Carey, Geo. H	do	Dealer.
Gaston, Williams & Wigmore (Inc.)	do	Importers and exporters.
Greene-Wolf Co. (Inc.)	do	Mill agents.
United States Steel Products Co. (a subsidiary of the United States Steel Corporation).	New York and San Francisco.	Export trade of the United States Steel Corporation.

Principal trade journals and publications.—Iron Age, New York; Iron Trade Review, Cleveland, Ohio; Annual Statistical Report of the American Iron & Steel Institute, New York.

○