

service of books, pictures, films, and phonographic records to 135 county branches. Forty branches are in schools; others are in stores, grange halls, and farm homes. The number of books at a branch varies from 50 to 1,000, changeable monthly.

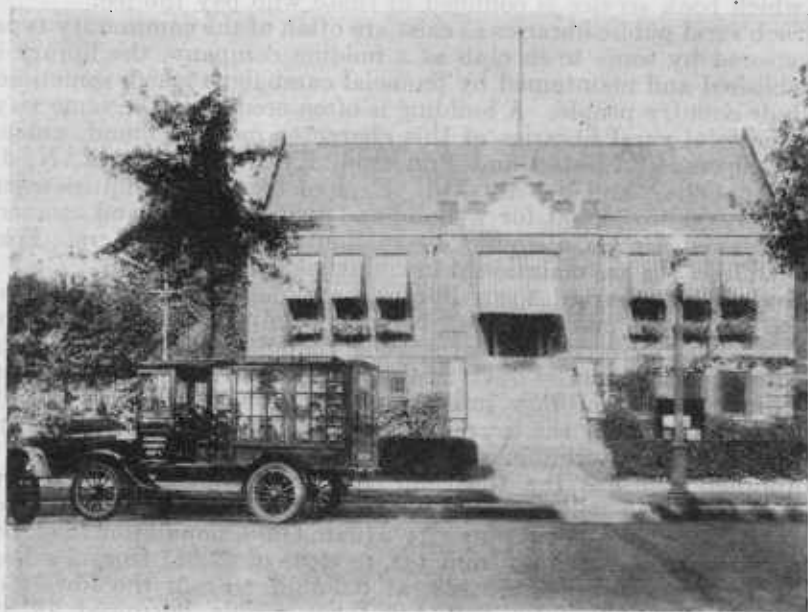


FIG. 141.—Public library at Clarksdale, Miss., and the book automobile of Coahoma County department which serves the rural people

Los Angeles County Library

The library of Los Angeles County, Calif., established by popular vote, excludes Los Angeles and 15 other cities that have libraries. Its 0.4 mill tax in 1926 produced \$237,889.32 to place books in 182 community and 154 school branches serving 408,963 country people. The farthest branch is 116 miles from headquarters. Two book automobiles make daily trips, averaging 100 miles each, exchanging books between the central library and the branches. The branch libraries circulate 1,277,098 books and 153,572 pamphlets, periodicals, films, etc., to 79,864 borrowers yearly.

A county library has a large population and a large finance area which make for economic, efficient, and democratic administration; it has a large book collection, trained extension librarians, numerous rural branches with changing collections and supplementary school-book service.

WAYNE C. NASON.

LIGNIN Experiments In the so-called lignified or woody
 Show Some Uses for portion of plants, such as straw,
 Many Farm By-Products cobs, hulls, and stalks, and in all
 woods there is associated with the
 cellulose a substance or a group of related substances which the
 chemist has designated as lignin. It is an amorphous, resinous mate-

rial ranging from light brown to black, depending on the method used in its isolation. The quantity of lignin in various plant substances varies greatly. In corncobs it may be present to the extent of 20 to 25 per cent of the dry weight of the cobs, and in wood, to the extent of 30 per cent. Lignin is not generally found in the free state in the plant, but is combined with the cellulose and can be separated from it only by suitable chemical treatment.

A lignified plant substance, as, for example, corncobs, consists of three main constituents, namely, cellulose, pentosans, and lignin. Cellulose is the raw material from which all paper is made. It is used also in the making of explosives, rayon (artificial silk), varnishes, and lacquers. As the direct result of work done by the Bureau of Chemistry and Soils, the pentosans of corncobs, oat hulls, and similar materials are now utilized in the manufacture of furfural, a chemical substance used largely in the preparation of synthetic resins. Lignin, on the other hand, is entirely wasted. In spite of much work that has been done here and abroad with the view to its economic utilization, nothing definite has as yet been developed.

Lignin a By-product of Pulp

Commercially, lignin is obtained as a by-product in the preparation of paper pulp from wood. When wood is digested with calcium bisulphite or caustic soda under pressure, the lignin is dissolved, leaving the cellulose in a more or less pure state. The lignin obtained in this operation is discarded, and when one considers the enormous quantity of wood used in the pulp mills of this country, the wastefulness of this operation will be readily realized. Indeed, lignin is now, without doubt, the greatest agricultural waste product. Sporadic attempts have been made to utilize the lignin as a binder in road building, in briquetting, and as a tanning material, but none of these methods has met with any appreciable success.

Because of the great importance of lignin to the agricultural industry the department deemed it advisable to reinvestigate this problem with the view to developing useful products from it. The work was confined to lignin obtained from a sulphite paper mill and to that isolated from corncobs.

Lignin is known to be of phenolic nature, that is, it is chemically related to such substances as carboic acid and naphthol, both of which are used extensively in the preparation of dyes. As a matter of fact, it was found that lignin could be substituted for carboic acid or naphthol and satisfactory dyes obtained. A number of aromatic bases such as aniline, toluidine, benzidine, and alpha- and beta-naphthylamine were diazotized and coupled with sulphite lignin. Dyes were obtained ranging from yellow to brown. These dyed both silk and wool and were not affected by light and washing. The encouraging results obtained in these experiments have indicated the line of research that is to be continued on the utilization of lignin in the preparation of dyes. Furthermore, experiments thus far carried out definitely indicate that besides azo dyes, indophenols may also be obtained.

Lignin from Corncobs

Lignin was obtained from corncobs by digestion with caustic soda, filtering, and precipitating the lignin by the addition of acid.

When dried it was obtained as a brown amorphous powder. Although lignin is quite insoluble in the ordinary organic solvents, it was found that it dissolves very readily in mixtures of these solvents, such as alcohol and benzol, alcohol-benzol and acetone, or alcohol-benzol and furfural. Such solutions containing lignin in suitable concentration were found to be fairly good varnishes, comparing favorably with the cheaper commercial varnishes. The lignin varnish has the advantage of many varnishes on the market, in that it is waterproof and acid proof. It might be used in mixing dark-colored paints and enamels. When subjected to destructive distillation, lignin yielded among other things acetic acid, acetone, wood alcohol, guaiacol, and eugenol. Eugenol is the active principle of oil of cloves and is used extensively in the pharmaceutical industry. The experiments thus far conducted on lignin, although only preliminary, indicate the possibility of developing useful products from this waste material.

MAX PHILLIPS.

LIVESTOCK a Vital Necessity in the Southern States Consumption of pork per capita is considerably higher in the South than it is in the country as a whole. In 1925 the consumption of pork in the United States was 77 pounds per capita, whereas in 7 cities of the South the average consumption was 95 pounds. Over one-third of this pork used in the South was dry salt pork, of which the negro population consumes large quantities. A recent survey of the coastal plain showed that 75 to 80 per cent of the pork consumed in southern cities was produced in the North. Because this area is far from meeting its own needs in pork production such an enterprise might profitably be added to the production program of many southern farmers, especially those in the coastal plain.

About one-half as much beef as pork was consumed per capita in most of the cities studied. Although the South as a whole produces a much larger proportion of the beef than of pork consumed there, the larger cities use only a small percentage of southern-produced beef. Nearly all of the better quality beef is shipped in from the Middle West. Sections in the South especially suited to the production of beef cattle, such as the black prairie belt, can help to meet this need. The required finish can be put on cattle from this belt in the velvet-bean fields of the coastal plain.

It is impossible to make a reliable estimate of poultry and egg consumption in southern cities because of the many channels through which these products reach the consumer, but the study showed that a tremendous quantity of these products is shipped in. In three of the smaller cities from 4 to 10 dozen eggs and a small quantity of live or dressed poultry per capita were shipped in; in larger cities the quantity of poultry shipped in per capita amounted to 5 and 12 pounds and of eggs, 11 and 14 dozen, respectively.

An expansion of the poultry enterprise through farm flocks and specialized poultry plants to meet more fully the deficiency in this area seems desirable. Producers should understand, however, that they will come in direct competition with highly specialized producers in other areas and with the farm flocks of the Corn Belt.