# CHEMISTRY AT THE TEXAS CENTENNIAL EXPOSITION

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Although the Texas Centennial Exposition does not have an entire building devoted exclusively to science, there are many scientific exhibits and several of special importance to any one interested in chemistry. Such exhibits may be found in the Transportation Building, the Varied Industries Building and the Ford Building.

In the Transportation Building there are large exhibits of mineral and forest resources, both of which furnish raw materials for the chemist. Here, also, are exhibits of the mining of sulphur by the Frasch process, shown both in diorama and with the actual pipe arrangement; an exhibit of the mining of gypsum and of the various forms into which it is manufactured; and one showing how salt is extracted at Grand Saline, and converted into commercial products.

In the Ford Building a series of dioramas show how aluminum, iron, and copper ores are taken from the ground. A revolving exhibit indicates how Ford, and other automobile manufacturers, use thousands of tons of cotton, mohair, soya beans, and corn in building the various parts of a car. The main room of this exhibit presents in detail the process by which oil is extracted from the soya bean, and also how a meal from this bean is used in making the "button" to the automobile horn and the handle to the gear-shift lever. Many other articles resembling hard rubber are made from soya bean meal.

The DuPont exhibit in the Varied Industries Building is by far the most important chemical display at the Centennial. The company has as its slogan "Better Things for Better Living through Chemistry". The truth of this assertion is proven by the moving-talking picture, "The Wonder World of Chemistry", and also by the many products exhibited, in the making of which chemistry has played a vital part.

Practically all of the eleven thousand products of this company are the result of chemical research and chemical processes. This company spends every year in research the sum of six million dollars and employs eleven hundred chemists.

DuPont uses annually sixteen million pounds of cotton, representing the yield from 60,000 acres, and thirty-six million pounds of cotton linters, the linter yield from more than two million acres. Some of the articles DuPont makes from cotton and linters do not resemble cotton in appearance. An artificial sponge, which will absorb twenty times its own weight of water, can be made with various sized "pores" to adapt it for special uses. It is well known that cotton is use in making explosives like gun-cotton, nitrocellulose and other combustibles, but perhaps few people know that in the four years from 1923 to 1927 the United States alone manufactured more explosives than were used by all the Allies during the four years of the World War. Large construction jobs like the Boulder Dam, large bridges and buildings, road construction, and stump removal use explosives on a large scale. Another product made from cotton is a new kind of glass, which although less than half as heavy, is shatter proof and will transmit ultra violet rays. This artificial glass, a sample of which is on exhibition, is one of the newer DuPont products and is still in the development stage. Other articles made from cotton linters include toilet ware, lamp shades, scuffless heels, fountain pens, household cement, motion picture films, X-ray films, and yarn for high-grade dress fabrics and suit linings.

One of the most interesting products in this exhibit, made from salt, coal, limestone and water, is an artificial rubber that has been given the name Duprene. Articles of it are displayed and some of its superior properties shown by tests. It resists the deteriorating actions of oils and greases better than ordinary rubber and is used for gaskets, washers and packings in various industries. It is not affected greatly by high temperatures, hence is better for automobile tires and tubes, making them practically blow-out proof. As it does not crack like rubber when exposed to sunlight over long periods of time, it is better for garden and fire hose, and for use in places where rubber is exposed to atmospheric conditions. Being less permeable to gases than rubber, Duprene is being used by the United State Government for balloons, especially in stratosphere investigations. It is more resistant to acids and alkalis than rubber, and is better for laboratory aprons and other laboratory uses. While as yet more expensive than rubber, the superior properties of Duprene make it desirable for many uses, and since it is available to all rubber manufacturers, its utilization is increasing rapidly.

Another source of DuPont products is turpentine and rosin, of which the company uses over six and a half million pounds annually, representing the yield from thousands of acres of Southern pine trees and stumps. Turpentine is used in the manufacture of synthetic camphor, taking the place of a product formerly imported. Products from this new camphor include combs, handbags, hair ornaments, motion picture films, paints and varnishes. Of like origin might be mentioned vegetable oils of which DuPont uses 23,000,000 pounds annually, representing the annual yield from 136,000 acres of land. From the oils of flaxseed, soya beans, and tung nuts, all formerly imported but now grown in the South, are manufactured some superior enamels used for refrigerators, automobiles, and boats. The oils are used also in the maintenance of plant machinery.

Corn products, from 36,000,000 bushels of corn, grown on about 1,500,000 acres are used in the manufacture of explosives, and for making solvents for paints and varnishes.

Wood pulp to the amount of 38,000 tons per year, is consumed in the manufacture of rayon yarn for dress fabrics, finished garments, upholstery fabrics, cellophane, drapes, and hats. One of the recent rayon filaments is so fine that a pound of it would reach from New York to San Francisco.

Forty million gallons of molasses, the yield from 200,000 acres of sugar cane is used each year for making several kinds of anti-freeze. A plant disinfectant or insectide and a closely related product used to supply various industries with electroplating and case-hardening compounds are made from salt. Other products from salt include an important bleaching agent, and dentifrices. Lead tetra-ethyl (the "anti-knock" material) produced from salt by chemical processes, has made possible the attainment of the high compressions now used in automobile engines. Salt also is used in the making of chlorinated hydrocarbons which are in turn used for refrigerants, both in refrigerators and in the "air conditioning" of homes, and for various dry-cleaning solvents.

The DuPont exhibit contains many other products in daily use, but the above list shows that chemistry has found new uses for farm products, that can be grown on land recently idle. The new plants bring to the chemist materials for making an ever increasing number of new products that add to the pleasure and efficiency of living.

## SHELL REPAIR IN POLYGYRA TEXASIANA

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It has long been known, on the basis of field observations and laboratory experiments, that snails and clams are able to repair breaks in their shells. However, with the exception of Andrews' ('34, '35) excellent work on shell-repair of West Indian gastropoda, and Daniel's ('12) studies, practically all observations have been made upon European mollusks.

Daniels reported the following instances of shell-repair in species of the genus *Polygyra:* in *Polygyra tridentata* (Say), when the "shell had been broken back of the peristome, the animal, instead of repairing the break, retreated eight mm, and formed a new peristome and parietal tooth"; in *Polygyra elevata* (Say), "the last half of the body-whorl was then broken off and a new peristome and parietal tooth were formed"; in *Polygyra hirsuta* (Say), "a new peristome and tooth were developed a fourth of a whorl behind the original aperture". Binney ('85, p. 282) also figured a *Stenotrema monodon* (Rackett) that had developed a new peristome and parietal tooth.