A NEW HYDROCARBON CUPRENE.

It has been recently shown by Messrs. Sabatier and Senderson, of Paris, that acetylene has a marked action upon copper in a finely divided state, and they have obtained a new product in the shape of a solid hydrocarbon. Pure and dry acetylene gas is made to pass through a tube containing a certain quantity of reduced copper in the form of a fine powder. When the copper is heated to about 180° C. it absorbs the gas with great rapidity. In one experiment a current of gas, having a velocity of 20 cubic centimeters per minute, was entirely interrupted for more than 20 minutes, due to its absorption by the copper; after a time the current of gas is re-established, but slowly at first. During the first part of the action a colorless liquid is condensed upon the cold parts of the tube, consisting especially of ethylenic carbides; the microscope shows that the copper has not as yet changed; but as the current of gas re-establishes, the copper begins to swell rapidly, assuming a lighter color, and soon fills the tube entirely, closing off the passage of the gas. At this stage the liquid hydrocarbons condensed in the tube have a greenish color and appear to consist of a mixture of hydrocarbons of the ethylene and the aromatic series. They give with concentrated sulphuric acid an intense red coloration, and become gradually solid upon exposure to air. As to the gases which leave the tube, analysis shows that they are formed of a mixture of hydrogen, ethylene, propylene, etc. The same reactions may be obtained by using copper in the form of foil or wire, this being heated in a current of acetylene to 200-250° C. The copper becomes covered with a layer which is at first brown, then becomes yellow as its thickness increases. If a part of the brown substance is taken and heated in a tube in a current of the gas, it soon begins to swell, and may fill the whole of the tube. This process is recommenced until no further swelling is observed, and a substance is finally obtained which is not modified by the gas. This project is a yellowish solid more or less dark in color, which, under the microscope, appears to consist of an assemblage of very fine filaments intermingled. The mass may become adherent by a slight pressure, like asbestos, which it somewhat resembles in appearance. It burns with a short and smoky flame, giving off an aromatic odor and leaving a slight residue of copper oxide. This body is a hydrocarbon in whose mass is found the small quantity of copper which has contributed to its formation; the proportion of copper is small, being but 2 to 3 per cent. The product has a definite composition, and analysis gives the empirical formula $C_7 H_6$. On account of its origin the experimenters proposed to give the name of cuprene to this new hydrocarbon. It seems to have no appreciable volatility, and when heated it decomposes above 400° C., giving off gases and leaving a carbonaceous residue. This body seems to be almost insoluble; sulphuric acid has no appreciable action upon it, and nitric acid attacks it but slowly. The experimenters propose to continue their investigations upon this singular body.

THE PEANUT INDUSTRY.

The peanut crop of 1899 is nearly a million bushels heavier than the crop of the preceding year. The total crop will, it is thought, reach nearly 4,500,000 bushels of 22 pounds each. The bulk of the crop is produced in Tennessee, Virginia, and North Carolina. It is not generally known that the American yield constitutes but a small proportion of the peanut crop of the world; the exportation from Africa and India to Europe is nearly 400,000,000 pounds annually, half of which goes to Marseilles to be made into oil. The running variety is a typical American peanut, says The Evening Post, from which we derive our information. Its vines are large, with spreading branches growing flat on the ground. The pods are large and white. There are many more varieties grown, some of them being upright bushes instead of vines. The so-called Spanish nuts are used principally by confectioners. They have small, round kernels, and are very fine. The crop averages annually 150,000 bags of 110 pounds each. It is only within the last few years that peanuts have been shelled by machinery. With the increase of their production machines have been taking the place of the old slow-going methods.

To grow peanuts successfully requires a calcareous soil without too much lime, and under such conditions, the yield runs from thirty to forty bushels per acre. There are about twenty peanut factories in America and the capital required for starting a mill is small. One factory handles 5 tons of peanuts daily, producing 235 gallons of refined oil, 175 gallons of crude oil, 3,680 pounds of flour and meal and 3,300 pounds of stock food. An extensive grower does not take the trouble to separate peanuts from the vines and dirt when he has dug his crop but sends everything to the factory. They are put into the mill, vines, dirt and all, and are then placed into a hopper and fed into a revolving cylinder which cleans them by friction, the dirt, leaves and vines being taken out by a suction pipe. The nuts remain in the cylinder and they are fed out upon a revolving slat-table, the slats resting upon canvas from which negro women pick out those of the first grade which are known as "fancy." The selected nuts are fed from the table into chutes and then into bags. The remainder are run over a second revolving slat-table, fed into chutes and packed into bags labeled "extras." Four grades are sorted, the the first three being sold to dealers and the fourth to confectioners for making burnt almonds and cheap candies. America does a heavy export business to Europe in peanuts. Foreigners do not eat them as Americans do, but grind them into meal. They also make oil of them which is resold to Americans as olive oil. The nuts are very rich in oil, 40 per cent of the shelled nut being oil. After the oil is extracted the cake which remains is sold for $30 a ton in Germany and fed to cattle and sheep. Peanut butter is one of the latest uses of the peanut. It is made by grinding the nuts very fine and reducing the mass to a pasty substance, a portion at least of the oil being removed. Salt is added as flavoring.

COTTON'S GREAT FUTURE.

The most remarkable advance in cotton for a quarter of a century has been made this winter, and our Southern cotton belt is in the process of a transformation that can hardly be comprehended by those not directly interested in the business. For the past three years cotton has been selling at 6 and 6½ cents per pound, and at that price there was little profit in the staple crop of the south; but right on top of the pessimistic predictions that cotton would never again prove a paying crop in this country, the price advances to 9 and 10 cents per pound. This advance does not represent a proportionate gain to the grower, for much of the crop was harvested and sold before the high prices were realized. It is estimated, however, that 6,000,000 bales of the crop sold at an average of 7½ cents per pound, or $35 per bale, and 3,000,000 bales at 9 cents, or $45 per bale. This gain represents an enormous amount of wealth that has gone to the Southern cotton farmers this winter.

But the future of this industry is even more promising than the present. The sudden increase in the cotton valuation naturally attracted the attention of thousands of farmers who had decided to give up cotton growing, and it has been feared that the acreage will be so largely increased that there will be a big slump in prices next year, and instead of a great gain, the growers would actually lose. Under the present system of "future" trading, the cotton farmers could sell their new crop for delivery between next October and January at 8 cents, or $40 per bale. This would make the normal yield of 11,000,000 bales sell at $440,000,000, an increase of some $80,000,000 over the present year. The farmer is thus enabled to assure himself of 8-cent cotton even before the crop has been planted, and a profit large enough to make his industry one of the best paying in the agricultural regions of the country.

The new acreage of cotton will undoubtedly be the largest on record. There are safe indications of this in statistics already collected by official authorities, and the amount of land in the South that will be planted with cotton cannot fall far short of 26,000,000 acres. Last season the cotton crop was a small one, amounting to 9,000,000 to 9,500,000 bales, while the two preceding years it reached 11,250,000 bales. But it was not this difference in the yield of the two years alone that caused the unexpected boom. India's crop proved almost a total failure also, while the Egyptian crop has more recently been threatened with a similar fate. In addition to these causes the world's consumption of cotton has increased, and this is likely to continue for some time to come. A combination of such factors is directly responsible for the advance in cotton prices which transform the conditions of the South in a gratifying way.

Co-extensive with the improvement of the cotton field and better has been the development of cotton mills in the South. The mills of North Carolina alone employ 40,000 operatives, who have been raised from a miserable condition of poverty to one of comparative affluence. Ten and fifteen years ago these poor operatives could barely make $180 a year on the average off their small farms. They rarely had any ready money, and they dragged along from year to year with but few of the benefits of modern civilization. To-day in the cotton mill districts there is hardly a family that cannot make from $300 to $400 annually, and, many of them find little difficulty in earning from $500 to $1,000 a year. The advance in the price of cotton distinctly helps and brightens the future of most of these cotton mill settlements in the South, for besides working in the factories nearly every family has a few acres planted with cotton, which some member of the household finds time to cultivate.

There is hardly a crop in this country that distinctly helps general business more than cotton. It almost equals in this respect king corn or wheat. The farmers, the small merchants, the large dealers, shippers, machinest, truckers in cities, operatives in mills, and clerks and assistants from New Orleans to New York and from New York to Liverpool, find a distinct benefit whenever cotton moves upward and prices promise good returns to the grower. If our trade in the cotton goods in the Far East proves as large and remunerative as merchants anticipate now there will be new channels of commerce to feel the quickening impulse of a large crop of 8 and 10 cent cotton. G. E. W.

THE ENTRANCE TO THE PARIS EXPOSITION.

The architects who had charge of the buildings of the Paris Exposition had a unique opportunity offered to them by the splendid location of the monumental entrance to the Paris Exposition. It is too early as yet to criticise the architectural effect of this building, but the plans show a very novel means of handling a large crowd, A considerable proportion of the millions, who will visit the Exposition, will pass through this monumental entrance. The building itself is well known by the many engravings, which have been published of it, and consists of a steel frame which is overlaid with staff, which will be painted in many colors. Its form is that of an equilateral triangle with the angle truncated. Each side is formed by an archway, and the great arches are each 65½ feet wide and 60 feet high and carry a circular crown which forms the base of the flattened dome that covers the space enclosed within the triangle. In the truncated angle of the triangle which forms the inner end of the gateway, there is a door which is exclusively reserved for royalties, so that it is indeed a "Gate of Honor." The crowd is gradually concentrated by the exedra so that they pass through an entrance 66 feet wide, and then the crowd divides up, part going to the right and part to the left. The entrance and ticket-selling booths are arranged in a semi-circle around the dome, so that each division really resembles the rib of a fan. The ticket-selling booths are arranged in pairs. In other words, the ticket-selling booths are placed end to end, instead of being placed back to back. The passage leading the public to the front of the ticket boxes are arranged so that the width is sufficient for only one person to pass at a time. The floor is made with a slight incline so as to check the rate of the movement of the visitors, which will be particularly necessary on special days, when the crowd will be enormous. It is expected that with this arrangement 40,000 persons can pass through the entrances an hour. This may, however, be doubted, and it will be very good work, if 20,000 persons an hour can be accommodated at the main entrance. The plan shows 40 passageways and eighteen pairs of ticket selling booths each accommodating two persons.

DEATH OF FRANK H. CUSHING.

In the death of Frank H. Cushing, one of the most prominent of American ethnologists, American science has suffered a most severe blow. Mr. Cushing had attainments of a high order and he will be much missed; he was never robust, but until a few days ago his scientific researches were conducted with great activity. Mr. Cushing was born in 1857, at Northeast, Pa., and while a boy showed great interest in Indian relics and he made many trips in the neighborhood of his home and in New York State to gather archæological and ethnological specimens. When he was only eighteen years of age his work was brought to the attention of the late Spencer F. Baird, who was then Secretary of the Smithsonian Institution, and in 1875 he went to Washington as an assistant in that institution. He had charge of the ethnological exhibit at the Centennial Exposition of 1876, and in 1879, he accompanied an expedition from the Smithsonian Institution to investigate the Pueblos of New Mexico, and at his request was left at the Pueblo of Zuni, where he lived almost continuously for six years. He became an adopted member of the Zuni tribe; he learned their language and was initiated into the secret order of medicine men, known as the "Priesthood of the Bow." This was a phenomenal achievement and gave him an insight into the inner life and customs of an Indian tribe, more intimate than had ever been gained by anyone up to that time. He returned to Washington in 1884 and began to work up his voluminous notes. Two years later he was made Director of the Hemenway Southwestern Archæological Expedition. Extensive excavations were made in South Arizona and New Mexico, and the large collection of objects of prehistoric art which he gathered is in the Peabody Museum at Cambridge, Mass. This work took up two and one-half years of his time, and then Mr. Cushing returned to the United States Bureau of Ethnology to supervise a memoir on the Zuni myths printed by the Bureau. Three years later he became Director of the expedition fitted out by Mrs. Phœbe A. Hearst and the late Dr. William Pepper, conducted under the auspices of the National Museum, the Bureau of Ethnology and the University of Pennsylvania. Several months were devoted to exploration and excavation of the remains of the dwellings in the Key Islands, on the coast of Florida, which resulted in the collection of many remarkable objects, and in due course followed a preliminary account of Mr. Cushing's researches. Mr. Cushing contributed many papers to magazines and was a most interesting and accomplished lecturer.