

# AMAZING CHEMICAL DISCOVERIES

SECRETARY Lane of the interior department recently announced that Dr. Walter F. Rittman, chemical engineer of the bureau of mines, had made two chemical discoveries of epoch-making importance. One, it was announced, will greatly increase the production of gasoline; the other will make the United States independent of the rest of the world in the production of materials necessary for the dye industry and the manufacture of high explosives. These discoveries have the double importance of being of the highest interest scientifically and probably of the highest value commercially.

The old method of refining petroleum was to heat up the material in a still and condense the vapors coming off. Gasoline is all of the vapor which passes off up to 150 degrees centigrade. This was a simple distillation process. The experimental work of Doctor Rittman has been done at various ranges of pressure from up to nearly 500 pounds per square inch down to partial vacuum and at ranges of temperature from 1,000 degrees centigrade down to the lowest temperature at which the apparatus could be worked.

In his laboratory at Havemeyer hall at Columbia university he has an experimental apparatus which occupies one end of a small room and in which he can make experiments upon any oil under any conditions he chooses. The results are carefully tabulated and the products produced are analyzed. Before carrying out these actual experiments, however, the problem was attacked from the purely theoretical side.

Working from a theoretical standpoint, the expected results were mapped out and then the experiments were tried under the chosen conditions in order to either verify or disprove the prognostications. Using this general method of procedure, the research was carried on and the discovery made of the conditions necessary to produce larger yields of gasoline from petroleum. Later were found the conditions necessary for the production of toluol and benzol from petroleum.

The consumption of gasoline by automobiles, motor cycles, aeroplanes, motor boats, and the various types of internal combustion engines used for power has increased enormously in the last few years. The increase in the number of motor vehicles shows this, for, according to the best estimates, there were, in 1910, 350,000 such vehicles; in 1912 there were 590,000, while at the present time the number has reached 1,500,000. Upon the assumption that each motor vehicle uses ten barrels of gasoline per year, the demand from this source alone would be 15,000,000 barrels of 42 gallons each. The gasoline exported and that used for other purposes makes our annual consumption reach a total of about 25,000,000 gallons, which is the present production.

The supply has not been increasing as fast as the demand, however, and even now it would be inadequate were it not for the fact that in the last three years many new processes have been patented for increasing most of the production. These have had no commercial value, however, except one, the Burton process, which is controlled by the Standard Oil company.

The situation which developed when this process was brought out three years ago was an interesting one. The supply of gasoline was so nearly exceeded by the demand that the situation was very critical and the price was high. There was a real "gasoline problem." It seemed impossible to meet the increasing demand with an adequate supply.

Benzol was also put forward as a substitute. It was found possible to use this material for motor vehicles in Europe to a certain extent by employing special carburetors, although it was not entirely satisfactory.

After all, nothing was really able to take the place of gasoline in being entirely satisfactory, nor was there an adequate supply of any other material. It was at this time that the Standard Oil company solved the "gasoline problem" by utilizing the Burton process, which gave prospect of an abundance of gasoline for some years at least.

However, the independent refiners, who were prevented by the patents from using this superior method of distilling their crude oil, could not materially increase their output



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DR. WALTER F. RITTMAN

of gasoline, and it is in this connection that Doctor Rittman's discovery will be of such great benefit. Not only will it be available to the Standard Oil company, but it will be at the disposal of any reputable company in the United States.

The patents, when they are issued, will be given absolutely to the people of the United States, and measures will be taken to insure that the new process will never be allowed to anyone to use as a monopoly.

The discovery as to gasoline is perhaps exceeded in importance, however, by the discovery of the fact that such products as toluol and benzol, heretofore obtained from coal tar alone, can now be made from petroleum.

In normal times there is produced an enormous quantity of benzol and toluol in Germany, where, as in all Europe, the coke is made in by-product ovens, and the tar and its associated products saved. In the United States only about 25 per cent of the coke is made in such a way as to save the by-products.

Benzol and toluol are raw materials in the manufacture of many medicines, dyestuffs and explosives. The fact that the United States is apparently to have a plentiful source of raw material for the making of these will probably be a stimulus to the building up here of new industries. Up to the time of the present war Americans produced only a small fraction of the dyestuffs actually used in American industries. The fact that since the outbreak of the war the United States has been unable to obtain an adequate supply of dyes has had already an effect in causing effort to be made for launching an industry for the production of dyestuffs.

The Rittman discoveries are also of the utmost importance as to explosives. In case of a war in which the United States would be shut off from an outside supply of benzol and toluol, it would be able to produce for the use of the army and navy from its large supplies of petroleum practically any amount of these materials desired. Many of our modern drugs and medicines are made directly or indirectly from benzol. The production of this latter material at a cheap price would be a great stimulus to the building up of a large synthetic drug industry in this country. At the present time Germany has a monopoly in this business.

The man who has made these notable discoveries was born in Sandusky, Ohio, December 2, 1883.

In 1908 he received a bachelor of arts degree from Swarthmore college, in Pennsylvania, and in 1909 he received his master of arts degree from the same place. During 1909 he served as chemist for the United Gas Improvement company of Philadelphia. He served as lecturer and laboratory instructor in Swarthmore from 1909 to 1912, and continued his studies in engineering, so that he was granted a degree of mechanical engineer in 1911. While at Swarthmore, and especially during the last three years, he was engaged in professional chemical engineering work, both in chemical and mechanical lines.

In the fall of 1912 he came to Columbia university to do the work which got for him, in June, 1914, the degree of doctor of philosophy. The research work for this degree was carried out in the industrial laboratories of Havemeyer hall, Columbia, under the direction of Prof. M. C. Whitaker. The results of these investigations were published in the May and June, 1914, numbers of the Journal of Industrial and Engineering Chemistry, and were upon the subject "Thermo-Reactions in Carbureting Water Gas." In this research work was laid the foundation for the work which led to his discoveries. This piece of research was so much praised that he was asked to take a position with the United States bureau of mines at Pittsburgh as chemical engineer. After accepting this position he continued to study the problem of obtaining larger yields of gasoline in the distillation of crude oil.

He found that at the laboratories in Pittsburgh there was not the kind of apparatus that was required for the work which he had in mind. The work which he had done in studying the thermal reactions in the carbureting of water gas required a special piece of apparatus, and this had been designed and built in the laboratories in Havemeyer hall, so that it was desirable that in the continuance of his researches he be able to use this apparatus. Through the courtesy of the university authorities he was able to take up his investigation for the bureau of mines in one of the private laboratories of the department of chemistry, where he could make use of the apparatus which he had formerly used as a graduate student.

While his experimental distillation apparatus is not large enough to be called factory size, it is much larger than the ordinary laboratory size, and he was enabled to get results which gave indications that the process was feasible on a commercial scale.

Doctor Rittman is modest in his claims and desires to have time to perfect his processes in larger size units before making any statements as to the cost of the production.

The apparatus which has been used in all of the experimental work is practically the same as that used in the research which won for him his Ph. D. from Columbia university last June. The oil, which may be a crude oil, and which by the ordinary process of distillation might yield no gasoline at all, is introduced into the apparatus by a feeding device which controls the rate at which it is led into the furnace. Besides crude oil it is possible to use residues which remain from former distillations by the old process, and even the oils from the California oil fields, which yield practically no gasoline. As the oil enters the top of the furnace it comes in contact with a mass of hot steel balls which vaporizes the oil. The furnace itself, into which the oil vapor next passes, is simply a piece of iron pipe heated by an electric current which passes through a coil of resistance wire surrounding the pipe but separated from it by asbestos.

What actually takes place in the distillation process is no doubt a breaking down of the larger and more complex molecules of the oil used, into the gasoline molecule or the benzol molecule as the case may be. This process is technically known as "cracking" the oil.

The foreign patents which Doctor Rittman is taking out will, of course, be his own personal property. The entire rights of the American patents will be vested in the public, however, and he will receive no compensation except his salary.

(bring the rings in out of the window. "Now slip one on my finger and we'll see," she pouted, and held out the dangerous finger of her left hand, and with considerable curiosity he slipped a ring on it.

"Jack!" she exclaimed. "This is so sudden!"

"Ethel!" he cried.

And, oblivious of the jeweler, of all else save love's young dream, they crashed into each other's arms.

As a matter of fact the chorus girl is merely a matter of form.

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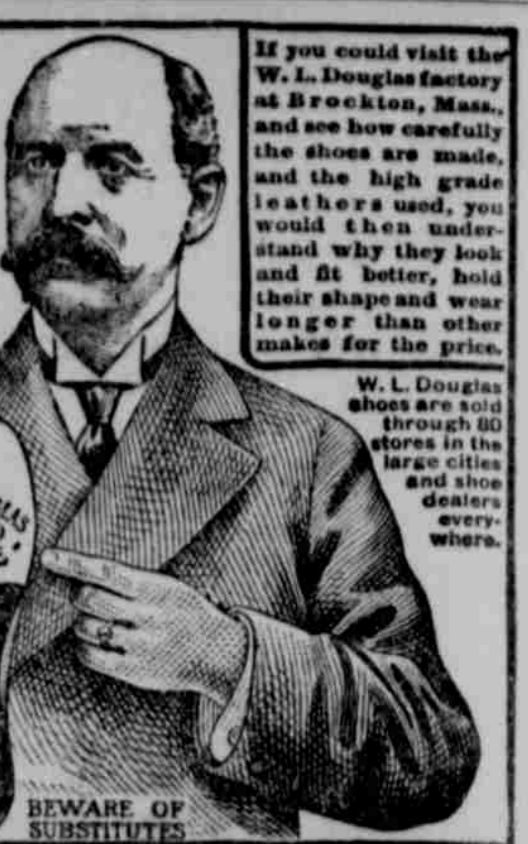
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**Helpless Man.**  
The late Fanny Crosby, author of "Nearer, My God, to Thee" and innumerable other hymns, was blind, but this did not prevent her from seeing straight into the hearts of men.

A Brooklyn friend of the aged hymn writer was repeating some of her epigrams. "A Brooklyn bank clerk," she said, "had stolen a lot of money and run off with a chorus girl. When I told Fanny Crosby about this she sighed and said: 'Every man becomes a fly when a web of lace is spread.'"

**Gives Beauty Advice.**  
Girls, young ladies and misses, it's no use to spend your coin on rouge and powder to make yourself look beautiful. It will not improve your looks. And if you insist upon wearing small, tight shoes with high heels, you can depend upon it that they will bring hard, drawn lines in your face. Another menace to beauty is a four-pound skypiece on your belfry. This is all according to Dr. Ida C. Nahn, who makes a sweeping denunciation of these things. If you want to retain your youthful beauty for ever and ever, follow these dictates, says the doctor: Plenty of soap and warm water, lots of outdoor exercise, especially walking, and drink two quarts of water every day. These will insure health, red cheeks and a slim, youthful figure. Doctor Nahn recommends the water cure and walks especially for ladies with too much embonpoint. She says it's the safest, surest and quickest way to reduce.

**The Case.**  
"Our telephone girl tells me she has broken her engagement."  
"Ah, a case with her of ring off."

**A FOOD DRINK**  
Which Brings Daily Enjoyment.

A lady doctor writes:  
"Though busy hourly with my own affairs, I will not deny myself the pleasure of taking a few minutes to tell of the enjoyment obtained daily from my morning cup of Postum. It is a food beverage, not a stimulant like coffee."  
"I began to use Postum 8 years ago; not because I wanted to, but because coffee, which I dearly loved, made my nights long, weary periods to be dreaded and unfitting me for business during the day."

"On advice of a friend, I first tried Postum, making it carefully as suggested on the package. As I had always used 'cream and no sugar,' I mixed my Postum so. It looked good, was clear and fragrant, and it was a pleasure to see the cream color it as my Kentucky friend always wanted her coffee to look, 'like a new saddle.'"

"Then I tasted it critically, for I had tried many 'substitutes' for coffee. I was pleased, yes, satisfied with my Postum in taste and effect, and am yet, being a constant user of it all these years."

"I continually assure my friends and acquaintances that they will like Postum in place of coffee, and receive benefit from its use. I have gained weight, can sleep and am not nervous."

Name given by Postum Co., Battle Creek, Mich. Read "The Road to Wellville" in pkgs.

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Both kinds are equally delicious and cost per cup about the same.

"There's a Reason" for Postum.—sold by Grocers.

**Bad Language.**  
Thomas A. Edison on his sixty-eighth birthday said to a reporter: "The result of this war will be a German republic that in fifty years will forge ahead of all of us."  
The reporter, impressed by Mr. Edison's war knowledge, asked: "What language do the Belgians use—Walloon, French, German?"  
"Humph," said Mr. Edison, "I know well what language I'd use if I were a Belgian."

**"LIFE, LIBERTY AND PURSUIT OF HAPPINESS"**

A Western Canada Farmer Writes as to Conditions.

A. G. Hansen is a farmer living near Clavet, Sask., and as an old resident of Minnesota, takes strong exception to some of the articles appearing in American papers disparaging the true conditions in Western Canada. The "Cottonwood Current" of Cottonwood, Minn., an important weekly paper in the southwestern part of the state, recently published a letter from Mr. Hansen, which is interesting reading. In his letter Mr. Hansen makes a splendid case for Western Canada against those who seek to deter farmers in the States from settling in Canada. He says:

"The district in which we live is a fair comparison to any other district in the country, made up mostly of settlers from the States. The majority here consists of Americans from Minnesota, Iowa and the Dakotas, with a few Canadians and an odd Englishman. We have been here eleven years, ever since this part of the country was settled, and the majority have done well. If they have not, it is certainly not the fault of the country."

"There has not been a crop failure in this district since settled. This year was the poorest, caused by lack of rain, although a fair estimate of wheat is about twelve bushels per acre, average, and oats about ten. Some farmers got as much as twenty-five bushels of wheat per acre, and we all got good prices."

"The laws of Canada are nearly the same as those of Minnesota, and we enjoy the same privileges."

"So far as the European war is concerned, we suffer to a certain extent as all the world does. Canada is giving a helping hand to her Mother Country, and we American-Canadians firmly believe it is Canada's duty to do so. I have not heard one American-Canadian who has expressed a different opinion. Canada is not compelled to send her soldiers. The service rendered is all voluntary service."

"The accusation that old settlers are considered undesirable citizens and are forced out of business, even in danger of being 'mobbed at their own fireside,' is all false, a mere fabrication in the mind of badly informed correspondents. There are a few who have been discovered carrying letters, others papers and plans to prove them spies, and whose object is to conspire against the government. These have just been arrested. Such a class of people cannot be considered good citizens, whether living in Canada or in the United States."

"Some people are failures wherever they are, and as an excuse for failure in their country it may seem easy to put the blame on the Canadian people and the Canadian government. Fact is, thousands of people from the United States are emigrating to Canada at the present time, which shows they are not afraid of the Canadian government."

"The government is giving away, free of charge, provision through the winter to farmers in certain districts affected by the drought, and is also sending seed grain to those in need of help. This is very different from driving settlers away from their own homes."

"I have always observed that the people who love their Mother Country most are those who make the best citizens of their adopted country. The glorious 'Stars and Stripes' will always stand for what is good and noble to us, though we live in a neighbor country where we also enjoy 'life, liberty and the pursuit of happiness.'—Advertisement.

More.

Cobb—Is it a privilege to know Short?

Webb—Yes; an expense, also.—Judge.

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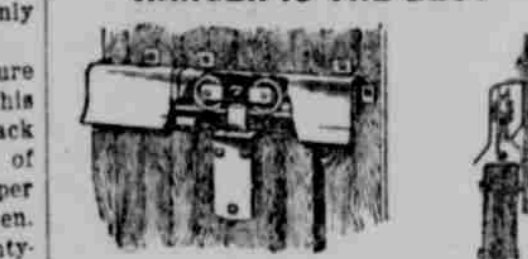
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