

Fortunes Offered for Process That Triples Gasoline Yield

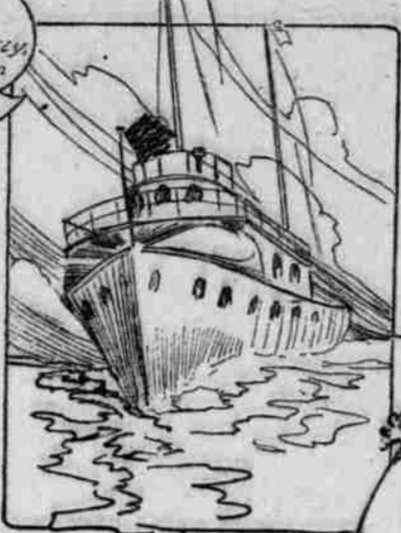
Discovery by Dr. Rittman of Greatest Economic Importance. Problem of Independent Supply of Toluol and Benzol for United States Also Solved.



Dr. Walter F. Rittman



School of Mines Building, Columbia University, Where Dr. Rittman Conducted His Experiments



WASHINGTON, D. C.—On March 1 Secretary Lane, of the Department of the Interior, announced the discovery by Dr. Walter F. Rittman, a chemist of the Federal Bureau of Mines, of a process whereby the product of gasoline from petroleum could be tripled—that is, a process that yielded 200 per cent more gasoline from a given quantity of petroleum, the raw material from which kerosene, gasoline, benzine and similar products are made.

Within 24 hours after the publication of this startling statement by the head of the great Department of the Interior more than 50 telegrams had been received at the Bureau of Mines, asking for detailed information in regard to the discovery, and offering huge sums of money for rights to use it.

The telegrams came from every section of the United States, most of those sending them being independent refiners of petroleum, and in every case the offer was for the strictest Government supervision of plants proposed to be built, the absolute vesting of the patent rights in the Federal Government rather than in any individual or corporation, and the payment of all expenses for building and installation of the plants by private capital.

All that was wanted was the privilege of constructing, equipping and operating the plants for the sake of obtaining the products immediately.

One of these telegrams offered the sum of \$300,000, to be available as a whole immediately the sanction of the Government was given to the plan for constructing and operating a huge plant. This offer came from one of the biggest independent refining concerns in the United States—a concern amply able to meet every obligation it entered into.

These offers illustrate graphically the economic importance of the discovery, announced by the Secretary of the Interior. They do more than this, too; they show as nothing else could do the importance of this one piece of research work that has been completed by the Federal Bureau of Mines, a piece of work that, taken absolutely alone and disregarding anything else which that bureau has done, amply justifies its creation and its existence.

And it is not alone in the vastly more economical production of gasoline that the discovery is of importance. Another phase of the newly discovered process—perfected on a laboratory scale by eight weeks of exhaustive tests and experiment work—is that it has solved the problem of an independent supply of toluol and benzol for the United States.

Toluol and benzol have heretofore been derived, in German and English laboratories, from coal tar, and the two countries, which have been dependent upon the present time enjoyed a practical monopoly of their manufacture. When it is stated that toluol and benzol are the bases from which are manufactured all of the modern high explosives used in the warfare of today, and that until this momentous discovery was made the world's supply of these two materials was in the hands of nations with which it is conceivable that the United States might become involved in war, it is easy to appreciate the tremendous National importance of the discovery.

Circumstances might arise under which the lack of a supply of toluol and benzol by the United States would force this country to enter upon a war in the conduct of which it would be compelled to depend on such explosives as were used at the time of our Civil War. Against nations supplied with modern high explosives, it is claimed, such a condition would mean nothing short of National extinction.

Nor is this all; the discovery has another phase of economic importance which is of far more value than that of making available a domestic supply of the materials from which to manufacture substances for the taking of human lives in untold numbers.

Toluol and benzol, besides being the bases from which lyddite and the other modern high explosives are made, are also the raw materials from which are derived all the so-called coal tar dyes, upon which our textile industries are absolutely dependent. All of the brilliant colors are derived from these two protein substances.

Bearing in mind that as soon as the war in Europe broke out every pound of toluol and benzol was seized to be converted into death-dealing explosives, and the exports of dyes were absolutely cut off, thereby rendering every textile mill in the United States powerless to renew supplies of dyes when stocks on hand were exhausted, the importance to the immense spinning and weaving and dyeing industries of the country of this discovery of a method of making our own dyes cannot be estimated.

of the biggest refining interests of the United States to be permitted immediately to avail themselves of the discovery.

To Dr. Walter R. Rittman, chemical engineer of the bureau of mines, the credit for this great discovery is due. To Dr. Rittman's unceasing and untiring investigations, experiments and laborious research is due the fact that tremendous industries of the United States are to be no longer at the mercy of foreign countries, and that the Nation's power to defend itself against attack or aggression may continue unabated, even though foreign powers hold within their own borders all of the materials they produce for the manufacture of today's terrible agents of destruction.

Dr. Rittman, who is attached to the Pittsburgh laboratories of the bureau of mines, is a young man—perhaps one of the youngest scientists in the service of the Department of the Interior. Rather short, stockily built, with a square, aggressive chin and jaw, he looks like a football player rather than a man who has just completed a labor that is destined to revolutionize a gigantic industry and place the Nation for which he works in a position of independence of any other country in certain tremendously vital lines.

And he does not belie his appearance. Football, baseball and other athletics of a strenuous character are the diversions to which he is devoted and to which he gives a large share of the credit for the physical ability to complete the work which he has just finished.

"To football, baseball and other forms of outdoor athletics," Dr. Rittman says, "I attribute the physical strength without which I should never have been able to complete this work. Athletics of the most strenuous kind, out in the open, have been solely responsible for the physical condition and the vigor necessary to carry on for eight years—since 1907—without interruption, the work that is briefed in the statement issued by Secretary Lane.

"Most of this work has been done in the laboratories of Columbia University, in New York, and at Swarthmore College. The laboratories at these places have been at my disposal, and the time and expense required to bring the work to completion would have been far greater had it not been for this aid and co-operation. The process has been perfected on a laboratory scale; it has not as yet received the test of operation on a commercial scale.

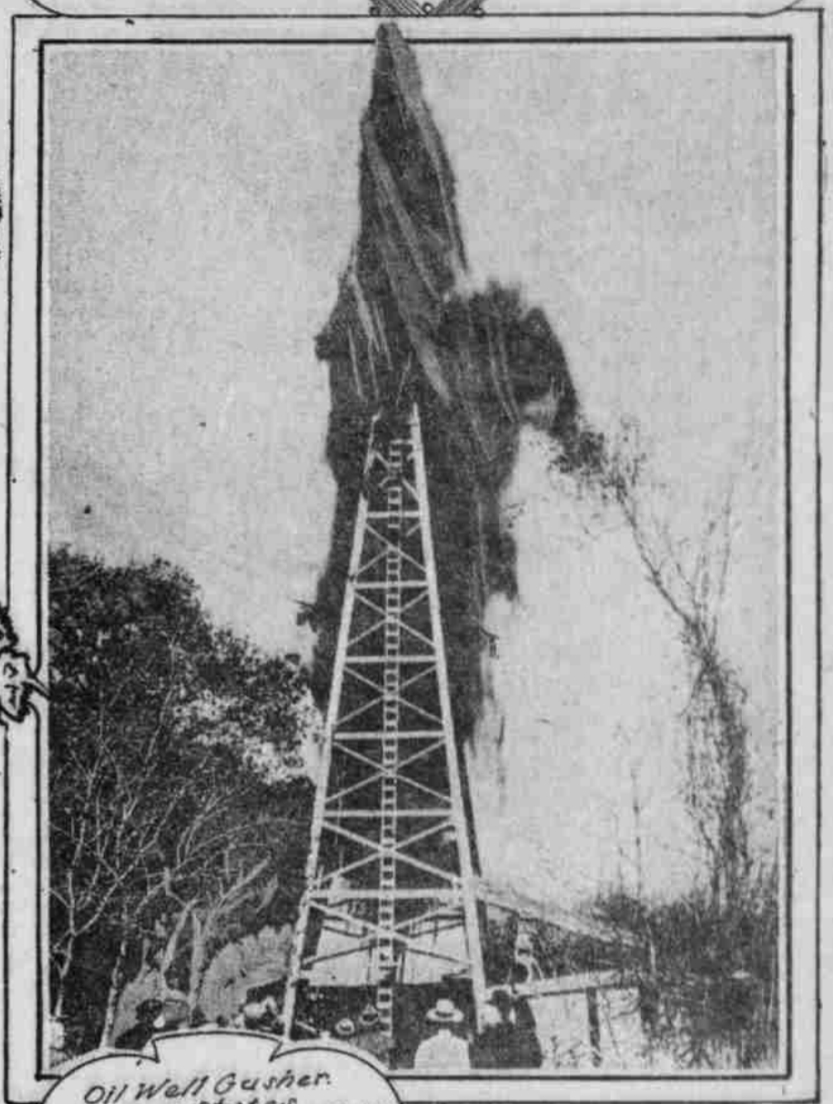
"But the results have been so carefully checked and every step, every phase of the process has been the subject of such minute scrutiny that, even before a single foundation stone has been laid for the first plant that will make use of the new process, it is scientifically safe to say that the process of producing gasoline from petroleum has been revolutionized, and that methods have been found of assuring the United States of its own domestic supply of toluol and benzol for the manufacture of explosives, dyes and the medicines that are also made from the so-called coal tar derivatives.

"These medicines include phenacetin and kindred products; saccharin, all the synthetic products related to phenacetin, such as antipyrin and the like; and the entire list of chemicals used in photography, with the exception of the basic silver salts. These photographic chemicals include all the modern developers, such as hydrochinon, metol and the like, for which the United States has heretofore been dependent upon German chemical works.

"They are all derived, as are the anilines and the high explosives, from coal tar residues, and the new process makes available a supply of the basic materials from which they are made, petroleum residue instead of that of coal tar being the raw material."

Explaining the new process, Dr. Rittman said: "The process is so simple that it may be comprehended even by the layman with no technical training of education whatever. But, simple as it is, eight years of unremitting labor, investigation and experiment work have been required to complete it. In the first place, it exactly reverses methods of distillation that have been followed since the first still was built.

"In every type or form of distilling apparatus in use at the present time the same ancient fundamental principles are followed. The body of the still is some form of vessel for containing the liquid to be distilled. Some kind of tube leads from the upper part of the still to a condensing apparatus, and heat is applied to the liquid from beneath. In this manner the temperature of the liquid is raised to a point where it becomes partly vaporized, the vapor passing out of the tube, or 'worm,' to the condenser.



Oil Well Gusher, United States Produced 248,446,230 Barrels of Crude Petroleum in 1913. Every Barrel of Which, Under New Process, May Be Made to Do Triple Duty

modern developers—developing agents without which photography could never have attained to its present state of perfection.

"The new process, by making available unlimited supplies of the raw or basic materials from which all of these things—explosives, dyes, medicines, chemicals, etc., are made, strikes the shackles from the United States and places this country in a position of independence of any other nation so far as these things are concerned."

placed a number of small iron balls, which are heated to a temperature sufficiently high to vaporize the oil as it flows over them from the inlet tube. The vapor thus formed is forced down into the lower portion of the still by the continual formation of more vapor above.

"A series of wires conveying a powerful electric current wound about the lower portion of the cylindrical still, with resistance coils, furnishes the heat for distilling this vapor. The heat can be regulated to any desired temperature. The fact that the expansion of vapor under heat is a definitely known equation, whereas nobody ever knows what a mixture of vapor and liquid is going to do, illustrates the value of the safety factor of the new process. The vaporized oil, distilled at the proper temperature, passes into the condensing apparatus—and that is all there is to the process."

"But when it comes to discussing the possibilities of this new process, that is another thing. By its use we can utilize material that is absolutely wasted under the old process of distillation. We can obtain a larger volume, therefore, of gasoline from a given quantity of oil, and we can do it in a third of the time required by the old process, and without any of the danger attending the operation of old-fashioned stills.

"There remains the discovery that the new process brings about certain chemical changes by which toluol and benzol may be derived from the tar residue of oil distillation. The importance of this may be summed up briefly. Heretofore the tar residue from the distillation of petroleum has been utilized, practically, only as materials entering into the composition of certain types of paving materials. The United States has been dependent, absolutely, on foreign countries for the toluol and benzol necessary for the manufacture of modern high explosives used in warfare.

"The textile industries of the United States have been just as absolutely dependent upon foreign chemical manufacturers for the dyes used in their mills. Physicians and druggists have been absolutely dependent upon the same foreign chemists for many of the drugs used for the alleviation of human suffering.

"Photographs of this country have been absolutely dependent upon foreign chemical works for many of the best press agents.

Companies which desire to avail themselves of the new process may do so only on license from the Government and under Government supervision. Every safeguard is to surround the granting of such license, so that the development of a monopoly will be impossible.

Already, as has been stated, scores of refining companies and individuals have asked upon what terms the Government will permit them to build and operate refining and manufacturing plants under the patents covering the new process. As yet no plan has been perfected, but it is expected that before the middle of the coming summer not one but a dozen or more big refineries will be in process of construction. It may be that one or more such plants will be in actual operation before half of the summer has passed.

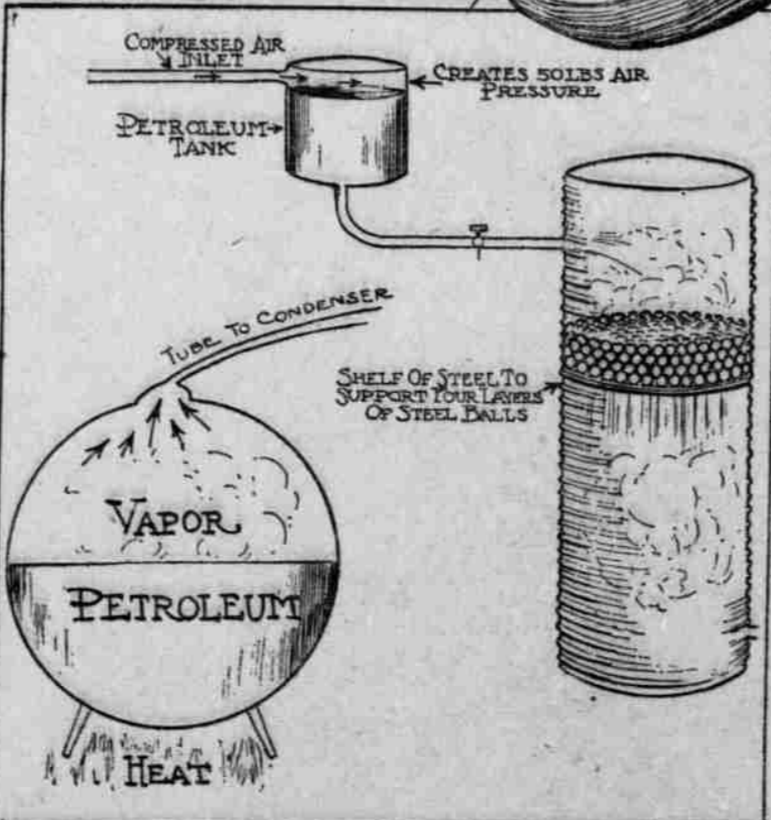
There is no toluol or benzol in the United States—at least, none worth mentioning. Foreign buyers, before the outbreak of the European war, bought practically every available pound, and shipped it back across the Atlantic.

Perhaps a knowledge of this fact, coupled with the knowledge that the Government possessed no materials for making the high explosives used in modern warfare, has been responsible in large measure for the forbearance of the Government in certain recent developments of an international character.

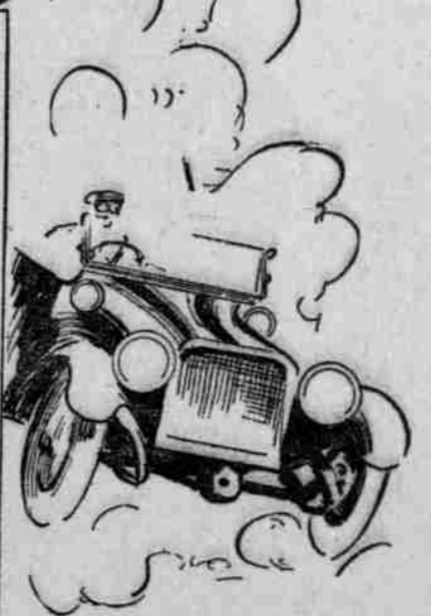
Perhaps, too, certain problems looming grimly dark on the horizon of our international relations will bring about the speedy erection and equipment for operation of refineries using the new process.

In no other way can the Government supply itself with the war materials which, under modern conditions, are absolutely necessary for success in an appeal to arms.

Admission. (Washington Star.) "What do you think of my latest series of observations?" asked one scientist. "Wonderfully interesting," replied the other. "If you had not been a scientist, you would have made a great press agent."



(Lower Left) Cross Section of Old Type Used in Manufacture of Kerosene, Gasoline, etc. From Crude Petroleum. (Upper Right) Cross Section of Dr. Rittman's New Type of Distilling Apparatus.



piled to the liquid itself in the container. The liquid to be distilled—speaking particularly of petroleum—is contained in a feed tank, from which it is fed into the still. There it is vaporized, and the vapor, not the liquid is then distilled.

"The new form of still is, generally speaking, cylindrical in shape. An inlet tube leads into the still from the container holding the liquid. This tube is equipped with a cock by means of which the flow of the liquid—petroleum—is regulated.