

REPORT ON THE UTILIZATION OF TOBACCO WASTE

Council for Scientific and Industrial Research issues Bulletin on Nicotine and Tobacco Waste

VALUABLE INSECTICIDE

Report No. 4, of the Honorary Advisory Council for Scientific and Industrial Research, issued by the authority of the Sub-Committee of the Privy Council for Scientific and Industrial Research, is on the subject of "Nicotine and Tobacco Waste," and has been prepared by A. D. Hone, M.A. It deals with the question of the manufacture of nicotine and nicotine sulphate for use as an insecticide from the tobacco waste or unused tobacco resulting from the manufacture of cigars, etc., not now utilized.

NICOTINE AS AN INSECTICIDE.

The report describes nicotine as a valuable insecticide. An account of its properties is given, as follows:—

"Nicotine is a colourless liquid alkaloid of specific gravity 1.01, and boiling point 246.7 degrees C. It is very soluble in water, forming a powerfully alkaline solution. It is a non-acid base, and may be titrated against standard acid using lacmoid or iodesin as indicator. It may be separated from a strong solution by the addition of solid caustic soda or potash, which causes the liquid to form two layers. The nicotine may be obtained from the upper layer by distillation in a current of hydrogen or coal gas. As thus obtained from a commercial 40 per cent solution, it is a colourless liquid, which turns yellow on exposure.

DEADLY INSECT POISON.

"Investigation shows that a solution of 1-1½ ounces of 95 per cent nicotine per 100 gallons of water has a deadly effect on many insect pests, such as aphids, thrips, apple-suckers, larvae of winter moths, and most young caterpillars. It does not injure the most tender foliage and may be mixed with other sprays, such as lead arsenate or Bordeaux mixture, without impairing its insecticidal value to any great extent. Mixed with these, or alone, a 0.05 per cent nicotine solution is sufficiently strong to kill plant lice.

"The same strength has also proved effective as a sheep dip. For this purpose it has no equal, destroying the sheep-scab and the mite, and also killing the tick and the louse. It does not affect the wool in any way, beyond a slight discolouration, easily removed by rain or by washing.

"In the proportion of one-fifth ounce of vapour to 2,000 cubic feet of air, free nicotine furnishes a strong fumigator for henhouses, etc.

"Comparative tests show that nicotine sulphate is nearly as effective as insecticide, as a solution of free nicotine of the same strength; but nicotine is cleaner to handle, and free from nauseous or injurious constituents.

"Nicotine is found in the tobacco plant, free and combined with malic and citric acids. Water dissolves both the free and combined nicotine. Though easily extracted, it is difficult to concentrate and purify, and is therefore expensive."

ORIGIN OF INVESTIGATION.

The bulletin explains the origin of the investigation as follows:

The present investigation originated in a recommendation of Dr. Hewitt, Dominion Entomologist, that the Honorary Advisory Council for Scientific and Industrial Research should take up with the tobacco manufacturers of Canada the question of the manufacture of nicotine sulphate from their tobacco waste. In this connection Dr. Hewitt says:—

"Nicotine sulphate has been found to be the most valuable insecticide for the destruction of sucking insects, such

DECLARE ALLIED POWERS WANT PEACE OF MIGHT

Germany's Answer to Conditions laid down at Versailles consists of 60,000 words Protesting that Allies have "Forsaken Peace of Justice."

[Continued from preceding page.]

Germany to fulfil her obligations. No human being, however, could possibly consider that the German people, weakened as they are, could be seduced to the madness of an aggressive war which could only mean utter annihilation. Better guarantees of the fulfilment of the economic and financial obligations could be afforded. Whereas the occupation of the German Rhine territory strikes a particularly hard blow at Germany, it also renders the payment of reparations most difficult. Large sums would have to be spent by Germany for the upkeep of the army and the free economic life within Germany would be broken up. The occupation would deprive the German authorities of the control of the administration, economic life and ways of communication, including the Rhine, and permit the continuance of the right of requisition which is permissible only in war. Moreover an especial customs tariff could be introduced for the occupied territory which might cut off this territory economically from the Motherland and bring it under the influence of Belgium and France.

Germany, therefore, expects that the territory which has been occupied by the terms of the Armistice shall be evacuated not later than six months after the signing of the Peace Treaty, and that during this time the occupation shall be restricted and most exclusively neutral. Up to now the world has failed to give due consideration to the great transformation which has taken place in the national life of Germany. Through the will of her people Germany has become a democracy and a republic. The new Germany is convinced that it deserves the confidence of its neighbours and that it may therefore demand its place in the League of Nations, which in itself would constitute the most inviolable guarantee of good faith. However little Germany is in a position to exercise pressure in bringing about a peace which alone can be permanent, it would be remiss in its duty if it did not once more raise its voice in warning against the consequences of a peace of brute force. The fall of Russia, indeed, speaks in unmistakable terms. The utterly exhausted German people is struggling desperately to preserve the country from the final dissolution of all its constituent elements. The outcome of this battle, which is now being fought with its last remaining strength, will be determined almost exclusively by the form which the Treaty of Peace assumes. A permanent peace can never be established upon the oppression and enslavement of a great nation. Only a return to the immutable principles of morality and civilization and the sanctity of treaties would render it possible for mankind to continue to exist. In the very moment of founding a new com-

monwealth based upon liberty and labour the German people turns to those who have been its enemies and demands in the interests of all nations and of all human beings a peace to which it may give its assent in accordance with the dictates of its conscience.

LEGAL SUPPLEMENT.—A supplement contains comments on special legal questions. These are for the most part of a detailed and technical character and hardly lend themselves to summarizing.

The first section deals with the resumption of diplomatic and consular relations. The second section deals at great length with the treatment of private rights, which the delegates claim to be unfair owing to the lack of reciprocity. The German delegates have no fundamental objection to the proposed clearing-house system, but they insist that it must be applied reciprocally and that the private parties concerned should retain full powers of disposition.

A number of detailed criticisms and demands for fuller explanation are appended.

A protest is entered against the alleged anticipations of the signature of the Peace Treaty by the Allied Powers in France, Belgium, China, and elsewhere, and among the special criticisms which follow is claim that the difference between the property of former German sovereigns and that of any other German is unjustifiable.

Further protests deal in some detail with the articles in the treaty concerning contracts, mixed courts of arbitration, and the protection of industrial property, with regard to which its claim that the restrictions on German industrial property are unbearable owing to their weakening of German economic strength is one of the few fields in which reconstruction might be attempted.

The third section, which is much shorter, deals with the special provisions affecting maritime law and prize courts, which are claimed to be intolerable and unjustifiable.

The fourth and final section deals with criminal law. In this connection the German delegates propose that each power should grant the national of the other party immunity for all criminal acts committed in the course of the war for the benefit of their country, with the exception of acts infringing the laws and customs of war.

FINANCIAL SUPPLEMENT.—Another supplement contains the comments of the finance commission of the German delegation. These cover much the same ground as the corresponding section of the main comments, but at greater length.

Two further short notes have been issued by the German delegation, dealing with special points in Section Nine, finance, of the Peace Treaty, chiefly in reference to Turkey and Brazil.

as aphids or plant lice, and we are recommending its use on all occasions. As these insects are very prevalent and destructive in all parts of Canada and to all kinds of crops, there should be in time a large demand for this product, which has only been on the market for a comparatively few years; and it is only during the last three or four years that we have been recommending its use; but there is undoubtedly a great future for it, if people can only secure it. Its high price prohibits the extensive use it should have. About two years ago, in order to reduce its price to Canadian fruit-growers and others, we had the duty removed; but even when admitted on a duty-free basis its price is still high, being about \$2.50 per two-pound tin of 40 per cent nicotine sulphate. Although it has only been on the market a few years, the quantity of nicotine sulphate imported into Canada during the fiscal

year ending March 31, 1916, was 15,314 pounds, valued at \$13,618. All this came from the United States.

"At the present time thousands of pounds of unused tobacco resulting from the manufacture of cigars, etc., are wasted in Canada.

"I am strongly of the opinion that a very determined effort should be made to induce the tobacco manufacturers to take up the manufacture of nicotine sulphate as a by-product, in view of the growing need of this material in connection with the protection of our crops. Even if they sold it at the same price as the American product, we should at least have the satisfaction of knowing that it was being manufactured in Canada."

TO INTEREST COMPANIES.

Efforts were made to interest large tobacco companies and chemical companies, without definite result, and also

ISSUES BULLETIN ON FISH PRESERVATION

Council for Industrial and Scientific research finds cause of putrefaction

The Honorary Advisory Council for Scientific and Industrial Research has issued Report No. 6, entitled "An investigation into the question of early putrefaction of eviscerated fish in which the gills have been left," by Louis Gross, M.D., Douglas Fellow in Pathology, McGill University (from the laboratories of the Atlantic Biological Station and the pathological laboratories of the Royal Victoria Hospital and McGill University). The bulletin contains an account of an investigation which showed that the moist gills left in fish through carelessness in "dressing down" were the seat of putrefaction.

"An investigation into the method of eviscerating fish by fishermen showed that the viscera are carelessly removed by hand, the intestinal contents are smeared over the gills, and the fish left for hours without proper cleaning before the dealers receive them," says the report.

The bulletin recommends the removal of the gills and a thorough washing of the eviscerated fish in order to prevent, at least some degree, early putrefaction.

APPRECIATION OF THE CHAPLAIN SERVICES

The following is an extract from Adjutant-General's Routine Order, dated June 9, 1919, under the caption "Appreciation of the chaplain services during the war and period of demobilization":—

"The Minister of Militia wishes to place on record his appreciation of the splendid work of the Chaplain Services during the whole of the war, and during the period of demobilization.

"During the latter tedious period, they have devoted their efforts, with great success, to keeping the men entertained and well informed, and to generally keeping them interested.

"The General Officer Commanding the Canadian Corps reports that during the war the Chaplain Services has been a very dependable and helpful organization; that it is difficult to estimate at its proper worth the true value of their services. In the line and out of the line; on the battlefields; in the rest areas; on the lines of communication; and at the rest camps, the Chaplains have at all times most unselfishly performed their duty."

Reference: H.Q. 203-1-57.

Canadian Cattle Breeds.

Among cattle in Canada the principal breed is the Shorthorn, which numbers 53 per cent of the total. Herefords come next, then Holsteins, with Aberdeen-Angus, Ayrshires, and Jerseys following in the order named, as shown by figures compiled by the Dominion Statistician.

to secure information concerning the nicotine contents of tobacco waste and the methods of extraction employed by American companies, which extract nicotine from stalks and waste, but these companies were unwilling to lay bare their processes. It was therefore decided to secure the desired information by investigation.

The bulletin gives an account of the investigation, which was very thorough and dealt with various aspects of the matter as, for example, "the preparation of nicotine extracts on the spot by fruit-growers and farmers who might grow their own crop of tobacco for this purpose," "various methods of nicotine from tobacco, namely, absorption from smoke, water extraction and concentration or removal from extract, extraction with hydrocarbon, steam distillation, etc.," and the value of tobacco waste as a fertilizer and as a source of potash.

The conclusions drawn from the investigation are that the utilization of stems and tobacco waste in the various ways mentioned is quite feasible commercially.