

COAL GAS RESIDUALS.

Note.—This is the first of a series of articles dealing with the importance, waste and use of coal gas residuals. This subject is of special interest at this time on account of the effect of the war on the industries dependent on aniline dyes and because the English hydrolytic and French melinite explosives are made from carboic acid, a coal gas derivative. A new explosive, triminitrobenzene, is attracting even more attention. It is made from toluene, which is found in the benzol, obtained by distillation from tar or in ordinary coke or coke-oven gas.

Coal gas residuals form the bases of many industries. Owing to the great development of by-product coke ovens and gas plants in Germany and the application of modern chemistry to the utilization of their by-products, these industries have largely been controlled by that country. In the readjustment of industrial and trade conditions after the war, it is desirable that as many of these industries as possible be established in Canada and in other parts of the British Empire.

There are two large by-product coke ovens in Canada which produce 67 per cent of our coke output. These plants are situated at Sault Ste. Marie, Ont., and at Sydney, N.S. Since the outbreak of war, the latter plant has been installing a benzol recovery plant, but, in western Canada, there are numerous beehive coke ovens which do not save any by-products whatsoever. Again, while large quantities of tar are recovered from local gas plants, no industries have been established for the refining, separation and use of the products obtainable from it.

Not only is the saving of the by-products from the coking or carbonization of coal a measure of conservation but the sale of these residuals is the means of reducing the cost of production in a degree corresponding to the efficiency of the recovery methods adopted and the market value of the products.

—W. J. D.

Prohibition of
Sale of Game

An Effective Conservation Measure in
that it Prevents Commercial
Slaughter

During the past fifteen years, many states have gradually been cleaning house in the matter of the commercial slaughter of their game, and many good half-way laws have been enacted. The original rule was for a state to protect its own game, but to permit the sale of game slaughtered in other states. This essentially selfish basis led to an immense amount of mutual poaching and selling, and the results were most disastrous.

In 1911, the state of New York led the way in a sweeping reform. The legislature enacted the now famous Bayne law, which abso-

lutely prohibits the sale in that state of any American wild game, no matter where killed, and strictly limits the sale of all foreign game. It does permit the importation and sale of six species of game birds and mammals that are very commonly killed in Europe on preserves and sold for food; and it also permits the sale, under official state tags, of white-tailed deer, mallard ducks, black ducks and pheasants that have been bred and reared in captivity in New York, and killed and tagged according to law.

This law had the immediate and visible effect of stopping fully one-half of the enormous annual duck and goose slaughter on Currituck sound, North Carolina, and it directly benefited each of the sixteen states in the line of annual flight of about 150,000 unkill-

"Come and let us Save the Kiddies"

The above words, credited to Mr. Alfred G. Vanderbilt in his last hour upon the doomed *Lusitania*, will, as the Bishop of London has said, ring round the world. Many men and women have used the same terms, though probably not under such tragic circumstances. To day, in Canada, we have groups of self-sacrificing men and women, who are devoting both their time and energies to the saving of the children.

The playgrounds movement, which has been taken up by many cities in Canada, is only one of the many ways in which this result is being secured. In Canadian cities and towns, there are still innumerable children who will not be able to have a day in the country this summer—who are confined, for their pleasure and play, to the street or lane. It is on behalf of these children that the appeal of Alfred Vanderbilt rings out as truly as it did to the children on the *Lusitania*. Let Canadian men and women, who are interested in child welfare, organize, and see to it that every child, whether of Canadian or foreign parentage, has the opportunity of the open air, and liberty to develop the young life, that he may grow up to manhood, a credit to Canada and Canadians.

It is in opportunities such as this that the true spirit of conservation is found. Canada is looking to the future, and there is no field in which greater results may be secured than in the conservation of the individual unit—the child.

wild fowl. The action of New York was immediately followed by similar action in Massachusetts; after which, in 1913, the state of California also wheeled into line.—William T. Hornaday, in "Wild Life Conservation."

A supply of wood sufficient for our future needs will be the result of:

1. Reducing the per capita consumption.
2. Protecting the forests from fire.
3. Increasing the annual growth per acre through the practice of forestry.

By greater economy in the use of wood the per capita consumption could easily be reduced from the present figure of 260 cubic feet to 150 or even 100 cubic feet without hardship. We use only half the total volume of the tree and waste the other half.

Nitrogen
from the Air

Rain and Snow Bring Down Small
Quantity and Assist in Pro-
viding Plant Food

It is now a well-established fact that nitrogen forms the principal element in plant food. Other things being equal, the growth of vegetation is determined by the amount of nitrogen in the soil in a form available for plant food. The problem of returning to the soil the nitrogen used up in crop growth is one of the most important in agricultural science.

Experiments conducted for seven years at the Central Experimental Farm, Ottawa, show that

usually rich in nitrogen. Similarly, in the vicinity of cities, rain has a high nitrogen content, and, in some parts of England, a quantity equal to 20 pounds per acre has been observed. Violent storms, particularly thunder-storms, also increase the amount of nitrogen in the rain, probably owing to the stirring up of dust particles, but perhaps also because nitrates may be formed by the electric discharges.

These observations are interesting, but their most important result is to show that rain, though it is of some assistance, does not restore nearly enough nitrogen to the soil. Hence the importance of using nitrogenous fertilizers or of growing leguminous fixing crops to make up the deficiency is emphasized.—P. M. B.

Wild Duck Foods

Water Fowl may be Attracted by
Growing Suitable Food Plants

Sportsmen and naturalists frequently observe that some ponds and sloughs are favourite resorts of water-fowl, while others are seldom visited and then only for short periods. The explanation of this difference is usually to be found in the food supply. Men who have on their estates stretches of water which they would like to see occupied by wild ducks, geese and other aquatic birds, can attract them in large numbers by growing the right kinds of plants.

The plants best suited for duck foods are: wapatow or arrowhead (*Sagittaria latifolia*), which will grow almost anywhere and is relished by all kinds of waterfowl; wild celery (*Vallisneria spiralis*), which is especially loved by the canvas-back; water-cren (*Nasturtium officinale*); wild rice (*Lizania aquatica*); a fine cereal food; blue duck millet (*Echinochloa crus-galli*), a plant of which mallards are particularly fond; several of the numerous species of pondweeds (e.g., *Potamogeton natans*, *louchites* and *pectinatus*); chufa (*Gyperus aculeatus*) and water chickpea (*Nelumbo lutea*).

In gathering and storing the seeds of water plants, it is important that they be kept wet, as if allowed to become dry, their power of germination is lost. It is necessary to study the situation in which they are to be planted, the depth and nature of the water, kind of soil, etc., and to grow plants which are observed to succeed in similar places.

Upon the initiative of the Dominion Parks Branch, the E. B. Eddy Company of Hull, Quebec, is printing notices upon thousands of its match boxes, warning the public against the danger of forest fires resulting from carelessness with matches in the woods. This is an excellent example for all match manufacturers to follow.—C. L.

rain and snow help to restore some, at least, of this nitrogen to the soil. The average annual precipitation in the vicinity is about 34 inches and the average quantity of nitrogen per acre returned to the soil by rain and snow is about 6 pounds, of which about 85 per cent is supplied by rain. Six pounds per acre is not a large amount, but, as it is all in available form, and as for the most part it is supplied at a season when vegetation is active, the action of rain in supplying plants with nitrogen is not without importance.

The nitrogen brought down by rain is, of course, derived from the air, where it is found both in gaseous compounds, such as ammonia, and in dust particles containing nitrogenous matter. The chief source from which these substances are derived is combustion. It has been noted that, after extensive forest fires, rain tends to be un-