Gas benzol, or light oil, is abstracted from coal gas. Gas benzol comprises nearly 1 per cent. (by weight) of high grade gas coals, say 1½ gallons per ton of coal. One hundred per cent. of gas benzol can be made into dyes and refined preparations.

About 25 per cent. of combined yield of tar and "benzol" may be turned into dyes, drugs and refined chemicals which were heretofore obtained from Germany.

Germany's leadership in production and utilization of these by-products is well instanced by the following comparative figures for 1913:

	Germany.	U. S.
Coal output, tons	295,000,000	475,000,000
Coal-tar, gals.	250,000,000	150,000,000
Benzol, gals.	50,000,000	7,500,000
Coal-tar imported, gals. ...	3,500,000	500,000
Value of exported dye-stuffs	$55,000,000	.....
Value of imported dye-stuffs	.....	*$10,000,000

*Practically entire consumption.

The raw materials "coal-tar" and "benzol" are obtained from by-product coke ovens and gas retorts.

"Benzol" in illuminating gas has so far been a requirement, and until illuminating gas gives way to fuel or heating gas, or until some other illuminant derived from the same sources be substituted, it is unlikely that municipal gas-making plants would strip the "benzol" for other purposes.

The chief coal-tar products with their uses may be summed up as follows:

Creosote oil.—Comprises 15 to 30 per cent. of the coal-tar. Water-gas tar on the other hand yields no true creosote, although this tar is sometimes substituted for creosote. Creosote is largely used for the impregnation and consequent preservation of wood, such as railroad ties, mine and structural timbers, piling, paving, blocks, etc.

Light oils, benzols and solvent naphthas.—The light oil contains benzene, toluene, xylene and small proportions of other compounds. This distillate is the basis of aniline dyes, certain nitrocompounds used in explosives, also medicines, drugs and photographic chemicals.

The light oil is used for solvents, cleansers, pitch-paint thinners, gas enrichment, etc.

Heavy tars and pitch products.—Comprise 50 to 80 per cent. of the tar. They are useful for road binders, road-treatment oil, roofing papers, roofing pitches and protective and waterproofing paints. The hard pitch product is utilized as a binder for briquetting coals, and for certain electrical uses.

Naphthalene and anthracene, useful for certain dye-stuffs, can be extracted from these fractions without detracting from the other uses enumerated.

Aniline dyes.—These are obtained chiefly from benzene, toluene and phenol through the preparation of nitrosubstitution products of these and various complex chemical transformations or combinations with other materials. In the process of manufacture sulphuric, nitric and acetic acids, caustic alkalies, alcohol, zinc dust, sodium nitrate, chlorine and bromine are requisitioned.

Naphthol Dyes.—Obtained through the intermediate products of naphthalene, such as naphthols, naphthylamines and phthalic acid.

The eosin dyes are derived from resorcin (a benzene product), and phthalic acid.

Artificial indigo is a product of naphthalene.

Five to ten per cent. of the tar content is naphthalene.

Alizarin dyes.—Made from anthracene by oxidizing the latter to anthraquinone, and then converting this into various hydroxy-anthraquinones and their derivatives, alizarins, purpurin, etc.

Between 1 and 2 per cent. of crude anthracene is contained in coal-tar.

The dyes enumerated above are the chief ones, although there are others of less importance.

Carbolic acid or phenol.—Is distilled from the light and middle oils. 0.3 to 1.0 per cent. of the crude tar is phenol. Carbolic acid is also produced synthetically from benzene through benzene-sulphonic acid.

Phenol, aside from its antiseptic uses, may be utilized in the manufacture of picric acid for explosives and certain dye-stuffs.

A substance resembling celluloid can be obtained by condensing phenol with formaldehyde.

Miscellaneous chemicals and drugs—such as benzoic and salicylic acids, certain photographic developers, hydroquinone, etc., acetanilid, acetphenetidin (phenacetin), saccharin, antipyrin, acetyl salicylic acid (aspirin), phenolphthalein, and many other drugs.

Explosives.—Mention has been made of the importance of coal-tar products in the manufacture of explosives.

The raw materials are benzene, toluene, naphthalene and phenol (carbolic acid). These are used in the various nitrosubstitution products which form the basis of explosive mixtures so much in demand for rock and other blasting purposes, as well as for purposes of war and sport.

The chief nitrosubstitution products are nitrobenzenes, nitoluenes, nitronaphthalenes, picric acid and picrates.

The pamphlet concludes with a short monograph by Mr. Horace C. Porter upon the "Commercial and Economic Phase of the Coal-tar Situation," which, on the whole, is favorable to the adoption of measures whereby the industry could be encouraged in the United States. One of the considerations which affects them is the validity of certain German patents upon chemical processes involved in the manufacture of some of the products. In Canada these could, and should, be overridden at this time by annulling any rights a German subject may have in so far as every such patent applies to Canada.

GOULD CONSOLIDATED.

According to "Financial Times," Gould shareholders at a meeting in Ottawa endorsed the following proposals: That the present company be re-organized, the capitalization being reduced to $2,000,000 from $3,000,000; that 250,000 shares of the par value of $1.00 be given to parties for two claims in the Porcupine district, which the owners of the claims have accepted; that 751,000 shares be given to a syndicate in Detroit for $75,000; that 750,000 shares be given the present shareholders of the Gould stock, which would be a ratio of one share new to four shares old, and that 249,000 shares of the new stock be left in the Treasury. The company also intends to try and release the property in Cart Lake from the Peterson Lake Company, which lease was cancelled a few months ago. The giving of 751,000 shares to the Detroit syndicate has given them control of the company. If the company can re-lease the Cart Lake property, they intend to actively work it. The same directors as were appointed to manage the old Gould have been appointed to the new company.