hydrogenation or incomplete cracking an asphalt-like material. As natural asphalt or material like jet, the proto product gives on complete cracking or complete hydrogenation a mixture of aliphatic, hydroaromatic and aromatic hydrocarbons. This mixture is very much like natural oil. Asphalts and jets are therefore intermediate stages of the transformation of the proto product into oil and are not formed from hydrocarbons through the reaction with oxygen.

Humic acids formed from carbohydrates yield also on coalification proto products. Identical results can be obtained by coalification of saccharinic and lactic acids, which, in turn, can be formed from carbohydrates through alkaline treatment.

Lignin, on the other hand, and its derivatives, the so-called lignin-humic acids, do not yield by any treatment whatever material which on hydrogenation is changed into asphalt-like material or into a mixture resembling natural oil.

Fats and waxes do not yield hydrocarbons under the above-mentioned conditions of coalification.

Carbohydrates form on coalification gases containing low hydrocarbons and much CO_2.

Bituminous coals, giving excellent hard coke, can be produced by the coalification of carbohydrates, such as cellulose, with weakly alkaline water. They can not be obtained through coalification of lignin and its derivatives.

Natural gas, asphalts, oils and bituminous coals may therefore be derived from the same substances or their derivatives—the carbohydrates formed by nature on such a great scale.

The so-called animal theory, which explains the formation of oil by the heat decomposition of fish, and the lignin theory, which assumes that bituminous coals are derivatives of lignin, can not be substantiated by experiments.

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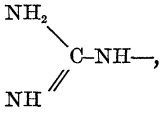
APRIL 23, 1934

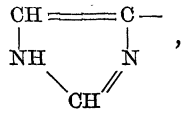
THE IONIZATION OF ARGININE AND HISTIDINE

CERTAIN anomalies in the behavior of the amino-acids arginine and histidine can be explained by the resonance theory.

The anomalies are as follows: The guanidine group of arginine is powerfully basic. The group does not react in the formaldehyde titration for the determination of amino groups. Yet its formula is usually written as

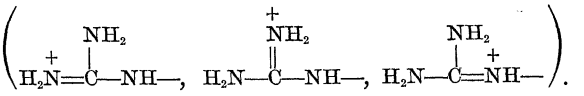


showing the presence of no powerfully basic radicals and revealing an amino group which should react in the formaldehyde titration. The imidazole group of histidine is definitely basic ($pK' = 6.0$). Its formula is written



showing no detectable basicity.

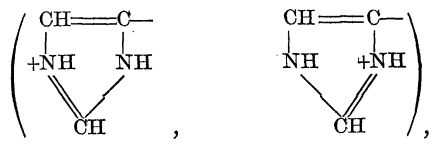
These anomalies may be explained by the assumption that the guanidine group adds H^+ not to the amino- but to the imino-group. The resulting ion has strong molecular resonance, and may be represented by the formula



This ion lacks the $-\overset{+}{N}H_3$ group which is necessary to the formaldehyde reaction

$$-\overset{+}{N}H_3 + HCHO \rightarrow -N{=}CH_2 + H^+ + H_2O$$

The imidazole group may be assumed to add hydrogen ion to form



the resonant condition of which accounts for the definite basicity of the group.

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CAUSE OF MORTALITY OF YOUNG GROUSE

FIELD studies in Algonquin Park, Ontario, during the present summer have shown the disappearance of young grouse (*Bonasa umbellus togata*) to be associated with a very high occurrence of a Leukocytozoon, of which the species has not yet been determined. Grouse in this area appear to be decreasing in numbers after having reached a peak of abundance last year. A mortality of at least 60 per cent. among chicks had taken place to mid-July in the area under immediate observation, and in practically all specimens examined, adult and young, the Leukocytozoon was found to be present. In view of the fact that similar parasites are known to be lethal to ducks and turkeys, a connection between its occurrence in grouse

and the high mortality observed is suspected. Field studies are still in progress.

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THE ROUTE OF INFESTATION AND THE SITE OF LOCALIZATION OF LUNGWORMS IN MOLLUSKS

THE proper study of the pathogenesis of the lesions in the lungs of vertebrates infested with lungworms is only possible, if we know the infestive stages of these parasites. From an economic point of view these stages have to be known to enable us to provide means for their control. Previously we demonstrated that a large group of lungworms of ruminants develops in certain pulmonata.[1,2,3,4] In the present work we wish to point out the route of infestation and the final site of localization of the parasites in their intermediate hosts.

The first stage larvae of these nemas, when brought in contact with the proper snails or slugs, bury themselves in the furrows of the sole of these intermediate hosts. A few hours later they may be seen entering the epithelial lining of the sole, after which they disappear in the layers of the muscular connective tissue of the foot. The pores of the foot glands facilitate this invasion, which takes place throughout the field of the furrows of the sole. The longitudinal sulci, if present, are preferred places of entrance. About twenty-four hours later the larvae coil up and the beginning of the formation of a parasitic tubercle is visible. Serial sections in transverse, sagittal and horizontal directions disclose that the nodules are restricted to the muscular connective tissue, which lays between and just above the foot glands. No further migrations can be observed. In the course of a few weeks the enclosed larvae molt twice and grow considerably. These larvae represent the infestive stages. The propagation of the parasites depends upon the ingestion at this stage of the intermediate hosts by the definite host. First stage larvae swallowed by the mollusks perish. Larvae entering the pedal cavity gland are rarely found.

The observations demonstrate that the localization of lungworms infesting mollusks is quite different from that observed for tapeworms or trematodes under similar conditions. They disclose a new type of infestation of mollusks with parasites of vertebrates.

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A SPECIFIC CONTAMINATION FOR THE PRODUCTION OF PSEUDO-RADIOACTIVITY

SOME years ago I was confronted by what seemed artificially produced radioactivity. After the impingement of high velocity electrons on a platinum plate in vacuum, this plate subsequently seemed to emit high velocity electrons. The rate at which this pseudo-emission took place decayed to half value in about five days. The two apparent elements of radioactivity were discharge against high voltage and exponential decay thereof.

The simple experiment warrants reporting only to save others from this false trail. There was formed on the platinum plate a hydrocarbon deposit about 20 molecules in thickness. The impinging electrons became entangled in the hydrocarbon deposit, and of course bound equal positive charges. The apparent releasing of high velocity electrons was only the manifestation of the release of the bound charges, entangled in the hydrocarbon deposit.

F. C. BROWN

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SIMPLE AUTOMATIC PUMP

IN some work with the heart-lung preparation, an automatic pump was necessary in order to circulate a varying flow of blood against a pressure of 100 to 200 mm of mercury, in a system closed to room air. The pump here described meets these requirements and is simple in design and can be constructed without special parts. With the materials listed below, it can be assembled in 45 minutes.

1—6″ length of 1″ glass tubing.
3—Rubber stoppers, No. 7.
1—Small bottle, diameter of mouth 1″.
1—Toy balloon, ¾″ × 3″.
5—3″ lengths of 3 mm glass tubing.
Dental Rubber Dam.

The pump follows conventional design except for the substitution by a rubber balloon for the usual

[1] A. and M. Hobmaier, "Ueber die Entwicklung des Lungenwurmes Synthetocaulus capillaris in Nackt- Weg- und Schnirkelschnecken," *Muenchener tieraerztl. Wochenschrift*, 80: 36, 1929.

[2] A. and M. Hobmaier, "Limax und Succinea, zwei neue Zwischenwirte von Muellerius (Synthetocaulus) capillaris des Schafes und der Ziege," *Muenchener tieraerztl. Wochenschrift*, 80: 23, 1930.

[3] A. and M. Hobmaier, "Life History of Protostrongylus (Synthetocaulus) rufescens," *Proc. Soc. Exper. Biol. and Med.*, 28: pp. 156–158, 1930.

[4] A. and M. Hobmaier, "Elasphostrongylus odocoilei n. sp., a new lungworm in Black Tail deer (Odocoileus columbianus). Description and life history." *Proc. Soc. Exper. Biol. and Med.*, 31: pp. 509–514, 1934.