meteorological one) : " the mound of earth I fell in with on July 15th was on the ice. . . . There were numerous birds sitting on. There were also a few eggs."

The mud referred to in the whaling ships' log-books was on the surface of the ice under the snow and consequently not visible until the latter melted. A sample I collected in 1887 and showed to the late Sir John Murray, as stated in the *Zoologist*, p. 104, 1889, consisted mostly of minute particles of quartz, mica, etc., the whole, when collected and allowed to dry, cohering into a yellowish brown clay.

Like the tree trunks, mentioned in the log-books, found sometimes frozen into the ice, sometimes floating in the water, the mud obviously came from the Lena and other rivers emptying into the Arctic Ocean, but why it occurred on the surface of the ice was, in 1887, hard to understand. The explanation, which Prof. Gregory of Glasgow has kindly furnished me with, is, however, simple enough ; the particles of quartz, etc., at one time suspended in the water, are incorporated in the ice when the sea freezes and, since three or four years may elapse before the ice enters the Greenland Sea, and in this period its upper surface melts in summer and its under surface is added to in winter, the particles of mineral matter rise and eventually form a layer on the top of the ice.

The quantity of mineral matter that gets transported in this way in the course of years, to be deposited eventually on the floor of the ocean far from its place of origin, seems to be much greater than is generally supposed.

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The CH-Band at λ3143 and a New NH-Band at λ2530.

WITH a condensed spark discharge (10-40 thousand volts transformer with two Minos-jars of 4000 cm. capacity each) between tungsten and carbon electrodes 1 cm. apart in an atmosphere of hydrogen at about 7-10 cm. pressure as a source, a system of CH-bands
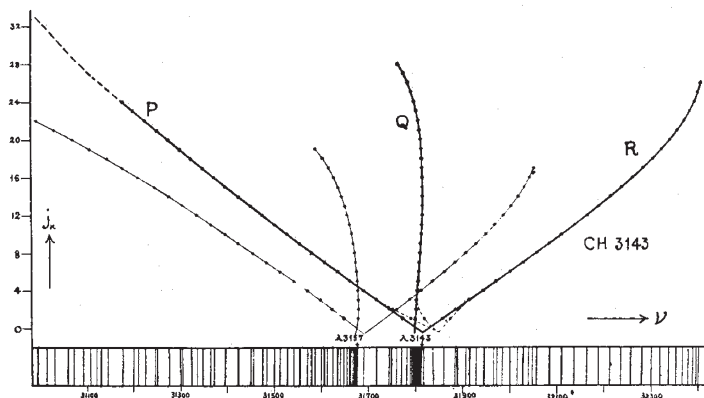

FIG. 1.—CH-band at λ3143. Strong set of branches at 3143 is the 0−0 band. Subsidiary band at 3157 is the 1−1 band.

is observed. The band with its intensity maximum at λ3143, originally reported by Fortrat (*C.R.*, **178**, 1272 ; 1924), appears with strong intensity together with the well-known bands at λ3900 and λ4300. The measurement of the wave-lengths, though not very accurate, and the analysis of the band have been carried out using the spectrogram taken with a Hilger quartz spectrograph E2. Fig. 1 gives the diagrammatical view of the band.

From the general characteristics of the band, it is suggested that it belongs to a $^2\Sigma \longrightarrow {}^2\Pi$ system. In fact, it has a common final level $^2\Pi$ with the bands at λλ3900, 4300, since the combination differences $R(j_k) - P(j_k + 2)$ just coincide with those calculated by Kratzer from the data of the other two bands (*Zs. f. Phys.*, **23**, 298 ; 1924 ; cf. also Mulliken, *Phys. Rev.*, **30**, 781 ; 1927). The upper rotational levels as calculated from the $R(j_k) - P(j_k)$ differences are approximately given by

$$F'(j_k) = 14{\cdot}24_3 j_k(j_k + 1) - 1{\cdot}531_5 \times 10^{-3} j_k{}^2(j_k + 1)^2$$
$$(j_k = 0, 1, 2, \ldots),$$

as it should be for a $^2\Sigma$ term. The doublet structure of the branches, which manifests itself near the origin, gives the approximate measure of the doublet spacing $^2\Pi_{\frac{3}{2}} - {}^2\Pi_{\frac{1}{2}}$. It is again coincident with the values calculated from the formula for the $^2\Pi$-terms :

$$F''(j) = 14{\cdot}2071(\sqrt{(j + \tfrac{1}{2})^2 - \sigma^2} - \rho)$$
$$- 1{\cdot}4465 \times 10^{-3}(\sqrt{(j + \tfrac{1}{2})^2 - \sigma^2} - \rho),$$

where $\sigma = 1$ and $j = j_k + \frac{1}{2}$, $\rho = \frac{1}{2}$ for $^2\Pi_{\frac{3}{2}}$ term, $j = j_k - \frac{1}{2}$, $\rho = -\frac{1}{2}$ for $^2\Pi_{\frac{1}{2}}$ term (Kratzer, loc. cit., p. 306). Moreover, the σ-type doubling in the $^2\Pi$ state gives rise to a ' combination defect ' in the Q-branch, which is actually observed and can well be accounted for by assuming the numerical values given by Kratzer (loc. cit., cf. Table 21). Further evidence is supplied by the study of the missing lines and relative intensities at the beginning of the branches. These are all in accordance with the theory. The nuclear distance in the $^2\Sigma$ state is $r_0' = 1{\cdot}12 \times 10^{-8}$ cm.

With the same type of discharge and a lithium electrode to avoid the contamination of the spectrum due to the tungsten lines—any other element like potassium, which has a small ionisation potential and few lines in the spectrum, answers the same purpose—in a mixture of nitrogen and hydrogen gases at about 5 cm. partial pressure, a new simple band at λ2530 has been obtained. Its intensity is feeble in comparison with the NH-band at λ3360, which appears with an abnormally great intensity together with the N_2-bands. Nevertheless, the analysis could be carried out with ease, which shows that its emitter is the NH-dipole and the corresponding transition is of $^1\Sigma \longrightarrow {}^1\Pi$ type. The nuclear separation of the molecule in its initial and final states are $r_0' = 1{\cdot}03 \times 10^{-8}$ cm. and $r_0'' = 1{\cdot}06 \times 10^{-8}$ cm. respectively. Details will be published elsewhere.

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Isomorphism and Homology.

IT is well known that the law of isomorphism discovered by Mitscherlich is now accepted with considerable limitations. Marignac, for example, showed long ago that the compounds $ZnTiF_6$, $6H_2O$, $ZnCbOF_5,6H_2O$, $ZnWO_2F_4,6H_2O$, though homomorphous and capable of forming mixed crystals, are not identical in chemical formulæ. It is to be assumed that there are not only homologous elements but also homologous radicals. The ability to form mixed crystals, homomorphism, and identity of chemical formulæ are not necessarily co-existent. But when certain elements or radicals can be substituted totally or partially in very different salts, the analogy of these elements or radicals remains undisputable and makes legitimate the parallelism of chemical formulæ.

Dr. Pulin Behary Sarkar, working in the Inorganic