1. A DRIED FILM (F) OF SODIUM THYMONUCLEATE DISSOLVED IN EGG ALBUMEN ON WHICH LINES OF ALKALI UREA SOLUTION (A) WERE DRAWN. ARTEFACTS RESEMBLING LAMPBRUSH STRUCTURES ARE FORMED. ACETOCARMIN STAIN.

2. THREE LINES OF CONDENSATION OF STAINABLE GRANULES FORMED ON THE EDGE OF A DROP (A) OF ALKALI UREA SOLUTION DEPOSITED ON A DRY FILM (F) OF SODIUM THYMONUCLEATE DISSOLVED IN EGG ALBUMEN. ACETOCARMIN.

3. MIGRATION OF STAINABLE GRANULES AND FORMATION OF CONDENSATION LINE. A BUNDLE OF FIBRES COLLECTED FROM THE SURFACE OF SODIUM THYMONUCLEATE DISSOLVED IN EGG ALBUMEN TREATED WITH ALKALI UREA SOLUTION. ACETOCARMIN.

When a drop of alkali urea is deposited on a dry film of sodium thymonucleate dissolved in egg albumen, one or several such condensation lines may be formed.

The solution of sodium thymonucleate in egg albumen is capable of forming an organized layer on the surface. This layer when removed on a glass rod, like a folded umbrella, is seen even without staining to consist of wavy fibres. These fibres treated with alkali urea solutions show the same behaviour of the stainable granules as is described above; they emigrate from the fibres into the surrounding alkali urea solution. The migration is in lines perpendicular to the long axis of the fibres and at a certain distance from the fibre a condensation line is formed parallel to it.

The above experiments on the migration of stainable granules seem to indicate that the appearance of longitudinal strings of condensation in salivary gland chromosome after treatment with alkali urea could not, without reservation, be used as an evidence showing that these two condensation strings originally existed in the salivary gland chromosomes.

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Interaction Between Regenerating Limbs

DATA obtained elsewhere¹ appeared to show evidence of competitive interaction between a pair of regenerating Crustacean limbs: the effect was not statistically significant, however. Specific experiments to test this have also failed to yield a significant result. In forty individuals of *Asellus aquaticus* (L.) both limbs of the seventh and one of the eighth thoracic pair (right and left in equal numbers) were amputated at the autotomy plane. The regenerating seventh pair were measured when first visible externally, that is, after regeneration for one instar. The limb on the same side as the regenerating limb of the eighth pair showed a mean excess of 2.6 per cent in length over its partner, but with a probable error of ± 1.2 per cent. The effect is little greater than might be obtained by chance: in a random sample of forty individuals, with only the two limbs of the seventh pair regenerating, the left limb showed a mean excess of 1.7 ± 1.1 per cent over the right (while in a previous sample² an excess of the right over the left had seemed probable).

Paulain³ also observed an insignificant competitive effect between regenerating limbs of Arthropods; the data of von Ubisch⁴ showing mutual stimulation between such limbs do not appear to have been tested statistically. Interaction would seem to be, at the most, slight, and variable in character. Recent work^{5,6} indicates that interaction between a regenerating and a non-regenerating limb is equally slight.

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⁴ von Ubisch, L., *Arch. Ent. Mech. Org.*, 41, 237 (1915).

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A New Electronic Band-System of BaCl

WE have recently had occasion to photograph the emission spectra of the flames from various pyrotechnic compositions containing barium and chlorine compounds. The well-known green and ultra-violet band-systems of BaCl are, of course, strongly developed in these sources, but in addition, a number of bands in the region 7800–9500 Å. are present on our spectrograms. These bands do not appear to have been recorded hitherto: they constitute what is evidently a new system of BaCl.

The spectrograms were taken in a first order of a 2.4 m. grating in an Eagle mounting (linear dispersion about 7.25 Å./mm.): they

show a number of rather close sequences of apparently double-headed bands degraded to longer wave-lengths. The violet edges of the two strongest sequences are at 8420.8 and 9098.0 Å. About fifty-five bands have been arranged into a Deslandres vibrational scheme with the 8421 band as 0,0 band, while some twenty-five bands have been assigned to an array involving the 9098 band as 0,0 band. The data for the less refrangible heads are summarized in the following table: the second heads lie at about 4.1 cm.⁻¹ to the violet.

b	11880.0	ν_e	255.25	ω_e	0.83
a	10995.3		256.35		0.73
$X^2\Sigma$	0	(b)	279.4	ω_e	0.765
		(a)	279.5		0.755

The above values of ω_e'' and of $\omega_e'\omega_e''$ are in satisfactory agreement with those for the ground-state of BaCl determined by Parker¹ from an analysis of the green system, namely, 278.4, 280.5 and 0.80 cm.⁻¹. The closeness of the bands within a given sequence makes it difficult to observe the vibrational isotope effect due to Ba³⁵Cl, Ba³⁷Cl, but for several favourably placed bands, notably the earlier members of the more refrangible 0,1 sequence, heads due to the heavier isotopic molecule have been identified with some certainty.

The evidence that the carrier of the new bands is BaCl is therefore very strong. Perhaps the most likely interpretation of the results is that the transition involved is $^3\Pi \rightarrow X^2\Sigma$, the doublet spacing of the upper state being about 885 cm.⁻¹. It is hoped to settle this point at a later date by extending the observations to longer wave-lengths.

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Ammonia Spectrum in the 1 cm. Wave-length Region

IN 1933 Cleeton and Williams¹ observed a broad absorption band in ammonia at atmospheric pressure in the region of 1 cm. wave-length; this is attributed to the 'inversion' of the pyramidal ammonia molecule which occurs when the nitrogen atom swings through the plane of the three hydrogen atoms. We have re-examined this phenomenon using a new technique, and have found that, as the pressure is reduced from 600 mm. mercury to 0.2 mm., so that the frequency of the collisions becomes small compared with the frequency of the radiation, an elaborate system of absorption lines appears.

The absorption coefficient was determined at high pressure by measuring the decrease in the power transmitted through a length of wave-guide into which the gas could be introduced. The results were in substantial agreement with those of Cleeton and Williams. At pressures below 10 mm. the absorption coefficient was derived from observations of the damping caused in a resonant cavity by admission of the gas; in this way absorptions as small as 2×10^{-6} per cm., which otherwise would require path-lengths of several hundred metres, could be detected.

The accompanying reproduction shows the spectrum observed at a pressure of 1.2 mm. mercury; owing to the low collision frequency numerous lines may be distinguished, their breadth being about 0.001 cm.⁻¹. By further reducing the pressure to 0.2 mm., more of these lines have been resolved.

The extensive fine structure shown is due to the centrifugal distortion of the molecules in the various rotational levels; Hsi-yin Sheng, Barker and Dennison², using a potential energy curve proposed by Manning³, have derived a formula for the fine structure of the inversion frequency of the form

$$\nu = \nu_0 - A(J^2 + J) + BK^2,$$

J and K being the rotational quantum numbers. The frequencies of the lines observed by us are accurately represented by a formula of the same type with the addition of a second-order term from the expansion of an exponential, namely,

$$\nu = 0.7940 - 0.0050(J^2 + J) + 0.0070 K^2 + 0.63 \{-0.0050(J^2 + J) + 0.0070 K^2\}^2 \text{ cm.}^{-1} (\text{vacuo}).$$

Eighteen lines have been examined at a pressure of 0.5 mm. Their intensities agree to within 5 per cent with those calculated from the statistical weights and transition probabilities, thus confirming the