

effects, if any, could be obtained in dogs with spontaneous tumours. Of several dogs treated or undergoing treatment with colchicine, the changes observed in a spontaneous tumour in the peritonsillar region in one of these animals is sufficiently striking to warrant recording.

Case history: Sealyham, 11 years old. Difficulty in swallowing biscuits observed about August 26, 1934. By September 30 a marked tendency for holding his head on the left side had developed. On November 19 it was difficult and painful to open the mouth. The difficulty in deglutition had increased, and the animal was unable to bark. On examination there was seen an ulcerated tumour on the left side of the bucal mucous membrane just ventral to the anterior pillars of the fauces on the left side, about the size of a walnut. The dog was admitted to the Royal Veterinary College on December 19, 1934, and injections of colchicine were begun, following on the clinical diagnosis of epithelioma. Injections were continued on alternate days and on January 9, 1935, a small portion of the tumour was excised for histological examination. The clinical diagnosis was confirmed. The administration of colchicine was continued and the tumour inspected daily. There was a progressive diminution in the size of the growth, and on January 29 only a small scar remained at the site of the original growth.

These experiments are being continued with various transplantable tumours, and a number of animals with spontaneous tumours are being treated with colchicine.

The significance of these and other facts relating to the effects of colchicine in man and other animals, as well as the effects of such agents as X-rays and radium in combination with colchicine on new growths, will be published and discussed in collaboration with Dr. G. M. Findlay, of the Wellcome Bureau of Scientific Research, to whom I am indebted for facilities and assistance in carrying out this research.

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#### Identity of Vitamin B<sub>2</sub> and Flavine and the Nomenclature of Vitamins

ELVEHJEM and Koehn have stated<sup>1</sup> that vitamin B<sub>2</sub> and flavines are not identical. Now Elvehjem and Koehn work with chicks, while Goldberger and others, who were the first to adopt the notation 'P-P factor', which was afterwards called vitamin B<sub>2</sub>, have used dogs and rats for their experiments. The first symptom that they describe for their rats was "a tendency of the lids of one or both eyes to adhere together with, in some instances, an accumulation of dried secretion on the margins of the lid".

It is precisely this pathological condition which we have been able to cure by lactoflavine. The lactoflavine that we used was prepared from milk, according to the methods devised by Kuhn. Further, Miss Chick and others, who were among the first to use the notation vitamin B<sub>2</sub>, found that a preparation of egg-white is rich in vitamin B<sub>2</sub>. Mr. Tierie, in our laboratory, found, on exposing that extract from egg-white to sunlight, that the vitamin is lost; this suggests that this vitamin, which Miss Chick called vitamin B<sub>2</sub>, is a flavine. Therefore I think that Kuhn is right in calling his lactoflavine vitamin B<sub>2</sub>.

These investigations demonstrate, I think, that

we are adopting the wrong method in our nomenclature of vitamins by denominating them according to the letters of the alphabet. When we isolate more of them—and I am sure there are still several as yet unknown vitamins—we have the trouble of giving them the right letters, and there is again the danger that two investigators may claim the same letter for quite different substances, as is the case with vitamin B<sub>2</sub>. Also, the old system is not at all logical: vitamins B<sub>1</sub> and B<sub>2</sub> are not only quite different substances, but have also very different actions; on the other hand, vitamins D<sub>1</sub> and D<sub>2</sub> probably do not differ very much in structure, and in action differ only quantitatively.

I should like to propose, therefore, to omit all these letters in the denomination of vitamins. The vitamins that are isolated in a pure state should be given their proper names, as has already been done for some of them. So long as they remain unisolated, they may receive a provisional name, just as in the case of hormones. Hence vitamin A may provisionally be called anti-xerophthalmic-vitamin.

Further, I propose to call the present vitamin B<sub>1</sub> in the future aneurin (from a[nti-poly]neur[itis] vitam[in]). I think I have some right to propose this, as Dr. Donath and I were the first to obtain this vitamin in a crystalline state.

Of the other B-vitamins, one is called flavin. Whether this is the specific anti-pellagra vitamin or not may soon be known, when the pure flavin is tested on human pellagra patients.

Vitamin C is already called ascorbic acid by Szent-Györgyi, which name has come into general use.

One preparation of vitamin D is already called calciferol. As soon as the antirachitic factor from cod liver oil, which is certainly a different substance from calciferol, is prepared in a pure state, it will receive a name.

The E vitamins may provisionally be called sex-vitamins or anti-sterility vitamins.

It is a pity that there is no international committee to regulate this nomenclature.

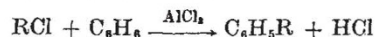
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<sup>1</sup> NATURE, 134, 1007; 1934.

#### Aluminium Chloride as a Catalyst of Hydrogen Interchange

THE Friedel Crafts reaction:



suggests the use of AlCl<sub>3</sub> as a catalyst for the interchange of hydrogen between benzene and hydrogen chloride. We have found this expectation confirmed in the following experiments: 0.5 gm. of AlCl<sub>3</sub> was brought into contact, for three hours, in a vessel of about 100 c.c. capacity, with a mixture of ordinary benzene and hydrogen chloride containing 13.4 per cent D, the temperature in two runs being 25° and 50° respectively:

Temp.	Benzene.	Pressure of hydrogen chloride.	Per cent D in hydrogen chloride after treatment.
25°	0.107 g.	178 mm.	1.23
50°	0.095 g.	297 mm.	1.08



From the analysis of the hydrogen chloride given in column 4, it follows that in both cases more than 90 per cent of the D had passed over from the hydrogen chloride into the benzene. This has been confirmed by analysing the benzene formed. We have found indications that under the above experimental conditions the reaction proceeds to some extent, even when no  $\text{AlCl}_3$  is present; but in this case it goes at a much slower rate.

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### Crystal Structure of Cyanuric Triazide

IN connexion with the discussion on dipole moments held by the Faraday Society at Oxford in April 1934, Sir William Bragg described<sup>1</sup> briefly the results of a research, which I had been making on the structure of cyanuric triazide. A Fourier analysis of the measured X-ray intensities of (*h**k**l*) planes showed the three nitrogen atoms of the azide group to be in a straight line<sup>2</sup>. Details of the research were promised later and were held up for an absolute intensity determination to be made. The calculations are now completed and will, I hope, be published soon.

Mr. E. W. Hughes has now published<sup>3</sup> a structure which resembles mine, but differs from it in certain important features. He shows the azide group as departing from linearity by  $15^\circ$ , while I find that any departure from the straight line could not exceed  $3^\circ$  or  $4^\circ$ . The distances between the centres of the atoms in the cyanuric ring he finds to be all equal, thus indicating an oscillating double bond as in benzene. I find these distances alternately larger and smaller, corresponding with fixed single and double bonds respectively. The inter-atomic distances which I find are not in complete agreement with his. Mr. Hughes's estimates of the intensity of X-ray reflections were made by eye and I cannot think this a sufficiently safe or accurate method for the purpose. My measurements were made by means of a Robinson photometer and put on an absolute scale by the accurate method of the ionisation chamber.

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<sup>1</sup> NATURE, 134, 138; 1934.

<sup>2</sup> Trans. Far. Soc., 30, 826; 1934.

<sup>3</sup> J. Chem. Phys., 1; 1935.

### Spectra and Latent Energy in Flame Gases

IN a recent letter on the above subject, Prof. W. T. David<sup>1</sup> points out that after flame has travelled through an inflammable gaseous mixture, the gases remaining emit luminous (visible and ultra-violet) radiation for a considerable period of time if their temperature is kept up. In an investigation carried out at the United States Bureau of Standards, accounts of which have already appeared<sup>2,3,4</sup>, evidence of prolonged emission in the infra-red was obtained from observations of flame in the cylinder of an engine delivering power.

Infra-red radiation (to about  $11\mu$ ) was recorded from explosions in a small single cylinder L-head engine, through fluorite windows let into the engine head. The fuels used were benzole, and benzole blended with a low-grade petrol. Observations were

made of a small depth of charge perpendicular to the direction of flame travel, so that radiation was successively recorded from unburned charge ahead of the flame front, from the flame front, and from gases remaining behind the flame front. Curves of radiation against crank angle were initially horizontal, rose sharply (at the instant visible flame appeared under the window in use) to a maximum, and then decreased gradually.

From gases under a window adjacent to the sparking plug, radiation from non-knocking explosions reached a maximum slightly before maximum pressure was recorded in the cylinder, and at the same instant visible flame appeared under another window, slightly more than 10 cm. away in the direction of flame travel. (This distance corresponded to  $20^\circ$ – $25^\circ$  of engine crank rotation.)

From gases in the 'knocking zone', radiation from non-knocking explosions continued to rise for  $20^\circ$  of crank angle after the arrival of visible flame: in knocking explosions visible flame arrived earlier, and a higher maximum radiation was reached,  $15^\circ$  later as against  $20^\circ$ . For both non-knocking and knocking explosions, maximum pressure in the cylinder preceded maximum radiation.

Later in the cycle, both radiation and pressure curves for knocking explosions were below those for non-knocking, indicating greater loss of energy from the charge involved in the knock.

The fact that radiation through a given window continued to rise for approximately  $20^\circ$  of crank angle after the arrival of flame under that window was taken as evidence that formation of  $\text{H}_2\text{O}$  and  $\text{CO}_2$  molecules continued for at least this period, and probably longer, after inflammation. Some doubt was consequently expressed concerning the assumption, based on oxygen determinations at successive moments during the cycle, that combustion is completed in a narrow flame front<sup>5</sup>.

It may be that, in an engine cylinder, some metastable  $\text{H}_2\text{O}$  and  $\text{CO}_2$  molecules are formed, which then part with their latent energy, either communicating it to neighbouring molecules or emitting radiation on the wave-lengths characteristic of  $\text{H}_2\text{O}$  and  $\text{CO}_2$ . This would make it easier to reconcile the  $20^\circ$  lag between the appearance of flame and the attainment of maximum radiation in the infra-red, with the shorter period required for combustion to be completed in a narrow flame front. It is also possible that the phenomenon of fuel-knock may be connected with the proportion of metastable molecules formed during combustion.

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7, Sefton Avenue,  
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<sup>1</sup> NATURE, 134, 663; 1934.

<sup>2</sup> Steele, NATURE, 123, 185–6; 1931.

<sup>3</sup> Steele, Ind. Eng. Chem., 25, 388–93; 1933.

<sup>4</sup> Marvin, Caldwell and Steele, National Advisory Committee for Aeronautics, Technical Report No. 486; 1934.

<sup>5</sup> Withrow, Lovell and Boyd, Ind. Eng. Chem., 22, 945; 1930.

### Diamagnetism of Light and Heavy Water

THE molecular diamagnetism of light water, 12.97, has been closely approached in the values hitherto published for heavy water: 12.90<sup>1</sup> and 12.76<sup>2</sup>. A coincidence has been observed in this department by J. H. Cruickshank, using a Curie-Chéneveau magnetic balance: the molecular diamagnetism of heavy water was  $12.96 \pm 0.02$ . Additional measurements