If we have a living faith in the claim, then it is a duty to preach the gospel of science far and wide. I would like to suggest that the time is ripe for the giving of life to that old subject summed up under the term Natural Science. I would like to see a department of natural science as a whole in every university and school in the land, and the growth of the idea that no man—classic, historian, linguist, or chemist—could claim to be educated who had not passed through its curriculum. I am aware that in name such departments do exist, but they cover only a number of specialist courses. The natural science for which I plead should be organised to give wide-flung views of the aims, ideals, and methods of science. They would train the individual to think and act in a scientific manner. The professorial staff should be men who, in the words of your article, could "address a public or any other audience in a manner which will command attention or stimulate interest." The research they would undertake would be the investigation of how best use, not necessarily in the material sense, could be made of scientific advances among the masses of the community.

The matter is urgent, for one has only to read the headlines of a daily paper, watch the hoarding of the kinemas, or the reading matter bought by the general public, to realise that the affairs of the world are receiving "quiet, calm deliberation" very much along Gilbert and Sullivan lines. W. F. F. SHEARCROFT.

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The Arc Spectrum of Phosphorus.

KIESS (Jour. Opt. Soc. Am., July 1925) has recently shown that the arc spectrum of nitrogen consists of doublets and quartets, one very particular feature being that the lines lie either in the extreme ultra-violet or in the infra-red. There are some lines in the visible range, but they are excited only under very special circumstances.

The spectrum of the next homologue, viz. phosphorus, has been investigated by Miss Saltmarsh in Prof. A. Fowler's laboratory (*Phil. Mag.* xlvii. 874, 1924). Miss Saltmarsh has shown that the arc spectrum of phosphorus consists of doublets, and has also pointed out certain constant frequency differences.

It appears from an inspection of Miss Saltmarsh's data that the following pairs of lines having the constant frequency difference 25·0 form a sharp series of the type $2\pi_{1 \text{ or } 2} - m\sigma$, where $2\pi_1 = 53614{\cdot}8$ and $2\pi_2 = 53639{\cdot}8$ approximately.

λ (I.A.), Intensity.	ν.	Δν.	m.	mσ.	Difference between Calculated and Observed Values of mσ.
2536·38 (10)	39426·3	25·4	2	14188·2	+2·8
2534·75 (8)	39451·6				
2154·77 (7)	46408·7	24·5	3	7206·6	+5·3
2153·63 (6)	46433·2				
2034·02 (7)	49163·7	25·2	4	4450·9	+8·0
2032·98 (6)	49188·9				

The more refrangible components of the pairs are fairly well represented by the formula

$$\nu = 53639{\cdot}8 - \frac{R}{\left(m + 1{\cdot}13909 - \frac{0{\cdot}718054}{m}\right)^2}$$

where $m = 2, 3, 4$ consecutively. Closer agreement with the observed values of ν and those calculated from the formula is obtained by taking $2\pi_2 = 53645{\cdot}0$.

The difference between the terms 2σ and $3\sigma = 6982$, and this difference repeats itself in the combination of two pairs of lines having the frequency difference of 14·9 as follows:

	(8)		(6)	
	2136·79		1859·36	
$x_1 - 2\sigma$	46799·2	6982·8	53782·0	$x_1 - 3\sigma$
	15·0		14·7	
	(6)		(8)	
	2136·10		1858·85	
$x_2 - 2\sigma$	46814·2	6982·5	53796·7	$x_2 - 3\sigma$

whence $x_1 = 60987{\cdot}4$ and $x_2 = 61002{\cdot}4$.

Miss Saltmarsh has pointed out frequency differences of 7281 and 298, and it is seen here that 7281 is the sum of 6983 and 298, the differences being within the limits of experimental error.

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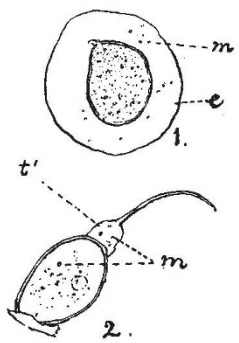
August 15.

Formation of the Spore Tails in *Haplosporidium chitonis*.

IN *Haplosporidium chitonis* the method of formation of the spore tails, which grow to a great length after the completion of the spore coat, has always been rather difficult to understand; it seemed unlikely that the material for these tails could be provided from the interior of the spore, owing to the thickness of the spore wall, at least toward the end of their growth. On a recent *intra vitam* examination of some of these spores in Janus green, I discovered that, in the younger stages, each is surrounded by a very distinct thick cytoplasmic envelope (Fig. 1, *e*). The appearance at this stage gives the impression that the spore is being formed inside a cell, but the absence of nucleus outside the spore shows, of course, that this is not the case.

Certain granules can be seen in the envelope, and these appear to be similar to granules inside the spore, which I believe to be mitochondrial in nature (Figs. 1



and 2, *m*). Both sets of granules stain slightly in Janus green. At a later stage, when the spore tails are forming, the cytoplasmic envelope, as such, has disappeared, but it has evidently gone to the formation of the tails, which are now thick and bulging at the proximal end (Fig. 2, *e*).

Spore formation in this protozoan has been studied by Dr. Pixell Goodrich (Proc. Zool. Soc. Lond., 1915) and Prof. Debaisieux (*La Cellule*, t. xxx., 1920), and by myself in a paper still in press, but the cyto-