streams of positive ions would give a direction opposite to that observed, and if the rotation were produced by the changing strength of the magnetic field upon the negative ions, then also would the direction of rotation be opposite to that actually obtained. The viscosity of the gas would tend to annul any sudden twist which the changing magnetic field might give to the cloud of negative ions within the bulb, although the reaction set up between the magnets and the ions under such conditions would be sufficient to cause the negative particles to be thrown forward, and to concentrate in a manner consistent with the experimental results given. It is not clear, however, why the sudden cessation of the magnetic field should also produce such a concentration of negative ions. But we have already seen that under those conditions diselectrification is easily produced; moreover, a luminous ring that has grown dim, can usually be momentarily brightened by suddenly destroying the magnetic field.

A pause was sometimes noticed between the excitation of the magnets and either the formation of the ring or the loss of charge from a positively electrified body.

This result showed that the steady magnetic field itself so modified the paths of moving negative ions within the bulb, that a concentration of them at the strongest part of the field took place for this reason also.

The direction of rotation of the luminous ring can be accounted for in the following manner:—

When the potential difference between the accumulation of negative ions at the centre of the bulb and the layer of electrified gas upon the inner surface of the glass is such that a shower of incoming positive ions occurs and the luminous ring appears, the outer portion of the ring will be more positive than the surrounding negatively electrified cloud of gaseous particles. These will therefore be attracted inwards, and in that way give a rotatory motion to the luminous gas-mass in the direction actually observed.

"The Chemistry of Nerve-degeneration." By F. W. Mott, M.D., F.R.S., and W. D. Halliburton, M.D., F.R.S. Received March 1,—Read March 14, 1901.

(Abstract.)

We have previously shown that in the disease, General Paralysis of the Insane, the marked degeneration that occurs in the brain is accompanied by the passing of the products of degeneration into the cerebro-spinal fluid. Of these, nucleo-proteid and choline are those which can be most readily detected. Choline can also be found in the blood.

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We have continued our work, and we find that this is not peculiar to the disease just mentioned, but that in various other degenerative nervous diseases (combined sclerosis, disseminated sclerosis, alcoholic neuritis, beri-beri) choline can also be detected in the blood. The tests we have employed to detect choline are mainly two: (1) a chemical test, namely, the obtaining of the characteristic octahedral crystals of the platinum double salt from the alcoholic extract of the blood; (2) a physiological test, namely, the lowering of blood pressure (partly cardiac in origin, and partly due to dilatation of peripheral vessels) which a saline solution of the residue of the alcoholic extract produces; this fall is abolished, or even replaced by a rise of arterial pressure, if the animal has been atropinised. It is possible that such tests may be of diagnostic value in the distinction between organic and so-called functional diseases of the nervous system. The chemical test can frequently be obtained with 10 c.c. of blood.

A similar condition was produced artificially in cats by a division of both sciatic nerves, and is most marked in those animals in which the degenerative process is at its height, as tested histologically by the Marchi reaction. A chemical analysis of the nerves themselves was also made. A series of eighteen cats was taken, both sciatic nerves divided, and the animals subsequently killed at intervals varying from 1 to 106 days. The nerves remain practically normal as long as they remain irritable, that is, up to three days after the operation. They then show a progressive increase in the percentage of water, and a progressive decrease in the percentage of phosphorus, until degeneration is complete. When regeneration occurs, the nerves return approximately to their previous chemical condition. The chemical explanation of the Marchi reaction appears to be the replacement of phosphorised by non-phosphorised fat. When the Marchi reaction disappears in the later stages of degeneration, the non-phosphorised fat has been absorbed. This absorption occurs earlier in the peripheral nerves than in the central nervous system.

This confirms previous observations by one of us (M.) in the spinal cord in which unilateral degeneration of the pyramidal tract by brain lesions produced an increase of water and a diminution of phosphorus in the degenerated side of the cord, which stained by the Marchi reaction.

The full paper is illustrated by tracings of the effects on arterial pressure of the choline separated out from the blood of the cases of nervous disease mentioned, and from the blood of the cats operated on.

Tables are also given of the analyses of the nerves, and drawings and photo-micrographs from histological specimens of the nerves.

A summary giving the main results of the experiments on animals is shown in the following table:—

Days after section.	Cats' sciatic nerves.			Condition of blood.	Condition of nerves.
	Water.	Solids.	Percentage of phosphorus in solids.		
Normal ..	65·1	34·9	1·1	Minimal traces of choline present.	Nerves irritable and histologically healthy.
1—3	64·5	35·5	0·9		
4—6	69·3	30·7	0·9	Choline more abundant.	Irritability lost; degeneration beginning.
8	68·2	31·8	0·5	Choline abundant.	Degeneration well shown by Marchi reaction.
10	70·7	29·3	0·3		
13	71·3	28·7	0·2		
25—27 ..	72·1	27·9	traces	Choline much less.	Marchi reaction still seen, but absorption of degenerated fat has set in.
29	72·5	27·5	0·0		
44	72·6	27·4	0·0	Choline almost disappeared.	Absorption of fat practically complete.
100—106..	66·2	33·8	0·9		Return of function; nerves regenerated.

"On the Ionisation of Atmospheric Air." By C. T. R. WILSON, M.A., F.R.S., Fellow of Sidney Sussex College, Cambridge. Received February 1,—Read March 14, 1901.

The present communication contains an account of some of the results of investigations undertaken for the Meteorological Council with the object of throwing light on the phenomena of atmospheric electricity.

In a paper* containing an account of the results arrived at during the earlier stages of the investigation, I described the behaviour of positively and negatively charged ions as nuclei on which water vapour may condense.

The question whether free ions are likely to occur under such conditions as would make these experimental results applicable to the explanation of atmospheric phenomena was left undecided in that paper. My first experiments† on condensation phenomena had, it is true, proved that in ordinary dust-free moist air, a very few nuclei are

* 'Phil. Trans.,' A., vol. 193, pp. 289–308.

† 'Roy. Soc. Proc.,' vol. 59, p. 338, 1896.