The investigation has now been extended to the organic molecules benzene and cyclohexane. Experiment shows that the depolarisation (*i.e.* the ratio of the weak component to the strong) of the light scattered in a direction perpendicular to the incident beam in benzene vapour is 0·067. Assuming that the six carbon atoms in benzene are arranged in a puckered ring as in diamond, with the distance between two neighbouring carbon atoms of 1·5 Å.U., and that the hydrogen atoms are joined to the carbons at the tetrahedral angle at a distance of 1·42 Å.U. (the sum of the " radius " of a carbon atom and half the distance between the optical centres in a hydrogen molecule as calculated from its optical anisotropy), and assuming that the refractivities of the hydrogen and carbon atoms are those appropriate to the respective atoms in the hydrogen molecule and in diamond, the anisotropy comes out to be 2·63 : 2·63 : 1. This gives a value of 0·074 for the depolarisation of the transversely scattered light.

If the atoms are assumed to lie in a plane with the carbon atoms arranged as in a graphite ring, the depolarisation comes out to be 0·10 Even in the absence of the hydrogens, the six carbon atoms alone would in this case give rise to a depolarisation of 0·083. If, therefore, we are to retain the plane structure for benzene, it will be necessary to assume that the polarisation of the carbon atoms when the field is perpendicular to the plane of the ring is greater than that when it is parallel to the plane of the ring.

Cyclohexane vapour at pressures less than one atmosphere shows a depolarisation of only 1·1 per cent. This small value is what should be expected from the known structure of cyclohexane. The six extra hydrogen atoms place themselves on opposite sides of the mean plane of the carbon atoms on either side alternately, and the mutual action of the induced doublets causes the average polarisation parallel to the mean plane of the carbon atoms to be diminished while the polarisation perpendicular to the plane is increased, both contributing to a diminution of anisotropy. Calculation on the same lines shows the depolarisation to be expected to be 0·8 per cent.

K. R. RAMANATHAN.

Physics Department,
University College, Rangoon,
July 18.

Magnetic Conditions in Tube Railways.

THOSE who have occasion to make frequent use of the tube railways in London can minimise the monotony of such journeys by taking with them a small pocket compass.

Using one day a pocket compass to determine whether my hurried choice of a train was indeed taking me in the westerly direction I desired, I was astonished to find that this old and valued guide was of two minds, if no more, as to where magnetic north really lay. As the train proceeded, the compass needle oscillated, made a sudden 180° turn and pointed south, and in a few moments reversed its direction again.

Repeated observations show the needle to be scarcely ever steady, and this makes it difficult to distinguish the acceleration effect which must be present: such accelerations when nearly at right angles to the magnetic meridian should produce an angular motion of the needle equal to the angle of change of the " apparent vertical " multiplied by the tangent of the angle of dip. I have noticed motions of the right sense and of about the right amount, but it has not been possible to compare the amount of the accelerations so indicated with those determined by other methods.

I do not know whether any one else has noticed the complex magnetic condition of tube railways, but I do know that any visitor who relies for directional advice upon a pocket compass may be led sadly astray.

H. E. WIMPERIS.

August 4.

Fine Structure of Optically Excited Spectrum Lines.

IN the course of investigations on the optical excitation of gases in this laboratory, we noticed the interesting fact that the spectrum lines emitted by mercury vapour illuminated by an intense mercury lamp have a much simpler fine structure than usually. For example, the green line 5461, the complexity of which under ordinary conditions is well known, presents no components besides the central line, which when viewed through a 30 cm. Lummer plate, is resolved in 3 components only. The violet line 4359 exhibits the same features, the intensity of the stronger satellites as compared with that of the central line being very much less than in the arc. The same seems also to be true for the yellow line 5770. On the other hand, the lines 4047 and 5791 show all the strong satellites.

This absence of some of the satellites which are intense in the arc affords an argument in favour of the view that these are not due to isotopy.

E. GROSS.
A. TERENIN.

Optical Institute,
Leningrad,
June.

Science and Intellectual Freedom.

DR. NORMAN R. CAMPBELL (NATURE, August 8, p. 208) writes with a certain lack of charity about the numerous men of science, medical men, publicists, and so forth, who have ventured to inform themselves about birth control. To seek knowledge about the origin of species, he informs us, may be honest and honourable, but " knowledge concerning contraception is sought, either from mere prurience, or from intention to practise it or to teach others to do so." But that is just what a Tennessee Fundamentalist would say about interest in evolution. He would say men wanted to know they were beasts in order to make beasts of themselves. It is impossible to let Dr. Campbell's sweeping indictment pass unchallenged. People in general want to know about this matter in order to judge it; they want to know the nature, the naturalness, the physical good or evil of these practices and what the mental and social reactions of this or that line of action may be. It is no more " prurient " to be intelligently interested in the question than in dietary. No one wants the publicly paid medical man to " propagate " this knowledge where it is not desired. But we do want to see him free to give it, cleanly and discreetly, to people who know already that it exists and who will, failing him, probably seek it in shameful and dangerous ways. We object to any sect or section of the community coming with threats of dismissal and injury between him and those who want to know. That is what is done at the present time. And while this is the case in Britain I decline to line up to sneer at the Fundamentalists of Tennessee.

H. G. WELLS.