sion, and I quoted from him to this effect. I consider, however, that neither seepage nor positive result of chloroform tests constitutes sufficient grounds on which to discuss "magnitude" of such formation, hence the omission in the quotation of six (not seven) words concerning these tests does not affect my comment. Regarding future prospects of petroleum development in Uganda, I agree with Mr. Wayland that it is wise to hope, since hope (unlike oil) springs eternal, but I still feel that the storehouses of petroleum of which he speaks may prove to be like the famous cupboard of the nursery rhyme, though this may be due to my conceptions of the laws governing distribution of oil within the earth's crust being somewhat different from those of Mr. Wayland. On the other hand, it is to be hoped that those responsible for initiating geological surveys in British dependencies are actuated by wider considerations than the possible chance of finding oil; there are other natural resources in the world besides petroleum, and this, quite apart from an obvious scientific motive, should be adequate economic reason for the governments concerned to follow the good example of Uganda.

THE WRITER OF THE NOTE.

Paramagnetism and the Electronic Configuration of the Atom.

IN a recent note [1] Foëx has directed attention to the fact that two samples of a paramagnetic salt, well defined chemically and placed in identical conditions, can possess very different magnetic properties, apparently corresponding to distinct states of the paramagnetic ion in the salt. This diversity of the magnetic states has been known for some time for the case of solutions of the salts.[2] Thus a concentrated solution of ferrous ammonium sulphate exists in four states: 26 magnetons with a positive molecular field, 26·5 without an appreciable molecular field, 27 and 27·5 with a negative molecular field.

It now appears that the same salt can exist in two distinct magnetic states also for the solid substance, one with 26 magnetons and a positive molecular field,[3] and another with 27·5 magnetons and a scarcely appreciable negative molecular field.[4] Similarly, anhydrous cobalt sulphate can exist in two magnetic states. Thus the measurements of Théodoridés,[5] Ishiwara,[6] and Jackson,[7] all indicate one state with 25 magnetons, while Honda and Ishiwara [8] found a variety with 24 magnetons and a very small positive molecular field.

The differences can scarcely be attributed to experimental errors or to impurities present in the salts. It seems highly probable that these salts can actually exist in two forms which are identical so far as chemical composition is concerned but are different magnetically.

Russell [9] has recently suggested that the active and passive states of iron, nickel, and cobalt may correspond to different structures of the atom. Thus he supposes that, while active iron possesses an electronic configuration of 2, 8, 14, 2 in the 1st, 2nd, 3rd, and 4th quantum orbits respectively, passive iron may correspond to either of the arrangements 2, 8, 13, 3, or 2, 8, 15, 1. Similarly, active nickel may correspond to the configuration 2, 8, 16, 2, and passive nickel to 2, 8, 17, 1.

It is here suggested tentatively that the different magnetic states of the ions of iron (Fe″) and cobalt (Co″) may also correspond to different internal configurations of the electrons. Thus the ordinary ferrous ion would possess the configuration 2, 8, 14, 0, and the other magnetic state might be produced by the transference of one of the fourteen electrons in the incomplete 3rd quantum orbit to the 4th quantum orbit, or by a redistribution of the 3rd quantum orbit electrons among the various levels, 3_1, 3_2, and 3_3, of this orbit.

If this were the case, it would be expected that the solid salt or solutions of the salt would possess different absorption spectra when existing in the different magnetic states. This point could readily be tested, and the results would serve to confirm or refute the suggestion.

L. C. JACKSON.

The Davy-Faraday Laboratory,
The Royal Institution,
London, W.1, May 23.

[1] *Comptes rendus*, 1925, 180, 919.
[2] *Ann. de Phys.*, 1921, 16, 174.
[3] *Ibid.*
[4] Measurements of Kamerlingh Onnes and Oosterhuis and of Jackson. See Jackson, Phil. Trans., 1923, 224, 1.
[5] *J. de Phys.*, 1922, 3, 1.
[6] Sc. Rep. Tohoku, 1914, 3, 303.
[7] *Loc. cit.*
[8] Sc. Rep. Tohoku, 1915, 4, 215.
[9] NATURE, 1925, 115, 455.

A Luminous Spider.

ONE day in Central Burma the trail in the jungle was exceptionally difficult. It was long past noon when I realised that the return journey would be equally long and tiring. Camp lay on the other side of a long range of hills, and there was a short cut from the main trail that would save several miles, but this trail was faint. I reached the supposed cut-off about dusk and followed it upward. Darkness came on swiftly, and my pony began to stumble. Somewhere we had missed the trail, for at intervals I could still glimpse the crest of the hills, and I knew my general direction.

Fireflies sparkled here and there. Presently a few feet away I saw a ball of light as large as one's thumb. It was stationary. Tying the horse, I approached it as carefully as possible, finding it surrounded by thorny bushes. It did not move, and I pressed the brush aside until I was directly over it, and then struck a match. There, in full view, was a spider, its large oval abdomen greyish, with darker markings. Still it did not move, and as the match died out its abdomen again glowed to full power, a completely oval light, similar in quality to that of the fireflies. Remembering native tales of poisonous insects, I wrapped a handkerchief around one hand, parted the brush with the other, and when close enough made a quick grab. Alas! the handkerchief caught on a stick before I could encircle the spider, and my treasure scurried away. I followed as quickly as possible, but the light soon disappeared under stones, brush, or in some burrow, for I never saw it again.

Many nights I searched in the jungle and questioned natives and white officers who had passed through that district, but apparently no one else had reported a luminous spider, nor can I find record of any known elsewhere.

Burmese never leave their houses after dark on account of their fear of spirits, so it is not surprising that the natives had never seen one, but some other traveller may be so fortunate as to capture one of these spiders.

The place where I saw the specimen was between the villages of Kyawdaw and Thitkydaing, Pakkoku District, about one hundred and twenty miles west of Mandalay, Burma, in April 1923.

BARNUM BROWN,
Associate Curator.

Department of Vertebrate Palæontology,
American Museum of Natural History,
New York City, May 29.