from the copper atom from which one K-electron is already missing. These energies correspond to the M-levels for the next element (zinc), for which the following values are known: M_{I} 10·1; M_{II}, M_{III} 6·8; M_{IV}, M_{V} 0·9.

A detailed exact explanation of the observed fine structure is made very difficult by the inaccuracy of the latter numbers and the complexity of the phenomenon in question. Experiments have been started with a spectrograph of much higher dispersion in order to try to settle the unsolved problems.

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The Comma Butterfly in England.

IT may be of interest to put on record the fact that on Sept. 21 I saw a quite fresh-looking specimen of the Comma butterfly (*Polygonia c-album*) feeding at *Sedum spectrabile* in my garden here. My wife and I watched it together for ten minutes—several Tortoiseshells and Red Admirals were feeding also. The Comma butterfly, according to South's "British Butterflies" (published by Warne), p. 65, is "now almost entirely confined to Herefordshire, Worcestershire, and Monmouthshire". I have taken it at Chepstow years ago when I was a keen butterfly collector, but have not met with it in England since, though I have often seen it on the Continent in Corsica, Dauphiny, etc. I should doubt if a specimen of the Comma has been recorded in London for a hundred years.

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Chiswick, W.4, Sept. 21.

DR. DAWE'S observation serves to direct attention to a matter that is of considerable interest to students of the Lepidoptera of the British Isles in connexion with the distribution of *Polygonia c-album*. It is not an isolated one, for in 1928 a single example of the same species was noted in a garden at Twickenham, which is near Chiswick. The two records, however, provide an additional interest in the suggestion they contain that this butterfly may have established itself somewhere in the vicinity. Old records show that at the commencement of the nineteenth century the Comma was, if not actually common, at least widely distributed in England and to be met with in most counties. Its numbers gradually dwindled, however, until, towards the end of the century, it had disappeared from all the southern and eastern counties. By about 1905 it was no longer to be found, with any certainty, outside the area comprised roughly by Monmouthshire, Worcestershire, and Herefordshire, and seemed still to be rather on the wane. Records of its occurrence during the War years are somewhat scarce, but it was recorded from Eastbourne (1915), Kent (1916—last seen in 1899), Shropshire (abundant, 1917 and 1918), and Cheshire (1918). The Kentish and Eastbourne records are interesting as, taken in conjunction with others given below, they seem to suggest that the butterfly had in fact been maintaining itself somewhere in the south-east corner of England in spite of its apparent absence.

The tendency to spread in a northerly direction, that is indicated by the Shropshire and Cheshire records, appears to have given place about 1919 to a southerly and easterly trend, which is best shown chronologically as follows: 1919, Wiltshire, Essex; 1920, Somersetshire (last seen 1892); 1921, Gloucestershire, Warwick, Cotswolds, Berkshire; 1922, Devonshire, Hampshire, Buckinghamshire, Berkshire, Hertfordshire, Staffordshire; 1923, Warwickshire, Staffordshire, Buckinghamshire, Bedfordshire, Somerset, Wiltshire; 1924, Dorset, Hampshire, Sussex (Eastbourne); 1925, Berkshire, Buckinghamshire, Hertfordshire, Bedfordshire, Hampshire, Essex; 1926, Oxfordshire, Dorset, Hampshire, Sussex (Eastbourne); 1927, North Staffordshire, Nottinghamshire, Berkshire, Hertfordshire, Wiltshire, Dorset, Hampshire, Sussex; 1928, Dorset, Isle of Wight, Portsmouth, Twickenham; 1929, Devonshire, Dorset, Hampshire (abundant in New Forest), Sussex (East and West), Surrey (Walton-on-Thames), South Buckinghamshire.

The above records are taken from *The Entomologist*; no doubt supplementary data exist elsewhere. They appear to indicate fairly definitely a radial dispersal of the very attractive butterfly under discussion that commenced sometime between 1910 and 1915, and had the Wye Valley as its centre. Dispersal was primarily in a northern and north-eastern direction, afterwards mainly eastern and southern, the isolated records from Essex (1919) and Eastbourne (1924 and 1926), as already suggested, not forming part of the main phenomenon. In the present year the butterfly has undoubtedly reached the south coast throughout Dorset, Hampshire, and the greater part of Sussex, but on the other hand records from the counties through which it has passed within the last ten years are entirely lacking. Negative evidence of this kind is admittedly untrustworthy, and it would be most interesting to know whether the butterfly is in fact absent from these counties now or merely so well established in them that collectors have ceased to direct attention to its presence.

It may, of course, be argued that the facts recorded above are as readily to be explained by a sudden general increase in population among very small and hitherto overlooked colonies scattered throughout the area under consideration, as upon the hypothesis of a migration from the Wye Valley area, but the evidence in my opinion favours the latter view. In either case, however, no suggestions have been made that would account for it. The principal food-plants of the caterpillar are, in order of preference, hop, nettle, and currant, none of which appears to occur now any more generally or plentifully than formerly.

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Oct. 9.

Electrical Phenomena of Crystals floating on a Saturated Aqueous Solution.

AT the end of 1926 a student under my charge named M. Simizu found that crystals of acetanilide formed a regular arrangement on the surface of the saturated aqueous solution of acetanilide. He had filtered the crystals produced by boiling aniline and acetic acid (J. B. Cohen, "Practical Organic Chemistry", p. 151, 1920), and discovered this after leaving the filtrate for two days.

I have since then undertaken the following experiments. On bringing a glass rod near the crystals these floating crystals were all attracted to the end of the rod; that is to say, they had *free* electric charges. The charge was positive, because they were attracted strongly by a sulphur rod rubbed against wool and were repelled by a glass rod rubbed against silk. The solution was weakly acidic to litmus paper.

Dissolving acetanilide, purified by frequent recrystallisation, in ordinary distilled water, acidifying it