(1) between quadrilateral and hexagonal
(2) between hexagonal and hexagonal
(3) between hexagonal and quadrilateral
(4) between quadrilateral and hexagonal
(5) between hexagonal and hexagonal
(6) between hexagonal and quadrilateral faces.

It will be seen further that there are two angles of type A (between hexagonal and hexagonal faces) and four angles of type B (between hexagonal and quadrilateral faces) and these angles of the polygon (a hexagon) sum up to 720 degrees. It follows then that:

$$A + 2B = 360 \text{ degrees.}$$

It must be evident that the volume is stackable if the dihedral angles around any and every line at the intersection of planes can be shown to be three in number, one of which is of type A and two of which are of type B. Perhaps at this stage it would be well to heed Millis's advice and construct a model. This can be rather easily done by paper-folding, or by taking a fairly stiff copper wire and a pair of pliers and weaving the desired pattern. It is then quite easily shown that, when stacked, any line of intersection in the mass is at once the side of an equilateral quadrilateral and of two adjacent equilateral hexagons. The dihedral angles are therefore: one of type A (hexagon-hexagon) and two of type B (hexagon-quadrilateral).

It should be pointed out that the octahedron should truncate the cube in such a way that equilateral hexagons result, *i.e.*, all sides of quadrilaterals and hexagons are equal. If this is not done, the 1, 3, 5 sides of a hexagon will not be the same length as the 2, 4, 6 sides. Experimentation will show that in stacking the volumes the 1, 3, 5 sides of a hexagon in one figure must coincide with the 2, 4, 6 sides of a hexagon in a second figure, etc. Obviously, if they are of unequal length, this becomes an impossibility and therein may lie a meager basis for Millis's error.

There is no doubt that the figure mentioned by Lewis is stackable.[2]

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[2] When the letter from Colonel Millis was brought to the attention of Professor W. C. Graustein, he wrote out a brief mathematical demonstration that Lord Kelvin was right; tetrakaidecahedrons are space-filling. Meanwhile Colonel Millis, quite independently, had arrived at the same conclusions. The publication of their letters was not requested. A further treatment of the same subject may be found in the *Bulletin of the Torrey Botanical Club,* 1927, Vol. 54, pp. 341–348.—EDITOR.

EARTHWORMS AND LIGHT

IN a previous note printed in SCIENCE I have mentioned the effect that ordinary light, such as that emitted by a three-celled electric flashlight, has on earthworms. When such a light is thrown at close range on the anterior or pigmented portion of the worm's body it usually causes instant withdrawal of the creature into its burrow. It seems quite possible that sensitivity to light in the earthworms is associated with this pigment, which is of a purplish hue and in sunlight glistens with iridescent color. It occurs most densely on the anterior fourth of the body, which region quite obviously is most sensitive to light.

Recently I have experimented with lights of various colors to determine the reaction of the worms (*Lumbricus terrestris* Linn.), to them and was much interested to discover that light transmitted through a red glass of the sort commonly used for photographic dark-room lamps had no visible effect on them, as apparently they did not perceive it. A 40-watt electric light bulb was used in the red lamp and even when this was brought within four inches of the worms they continued undisturbed in their ordinary occupations of feeding and dragging various objects into their burrows. Quite a different reaction was caused by rays from the opposite end of the spectrum, as when a blue light of a dark shade was flashed upon them they withdrew rapidly to the earth. By use of a suitable red light it is possible to observe accurately the behavior of such worms, and I am publishing this information for the benefit of those investigators who are interested in the problem of the origin of the sounds recently discovered to be emitted by earthworms.

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RESPIRATION OF INSECTS

IN SCIENCE for May 6, 1927, appeared a note under the above title by D. A. MacKay. The general conclusions drawn in this note would not seem to be warranted by the data presented, especially in view of the fact that contrary results have been reported previously.[1] In reference to the idea that in the grasshopper air is alternately inhaled and exhaled through all of the spiracles, the statement is made that "the same thing is probably true of all insects." As a matter of fact in a number of species of insects (the blowfly, Dytiscus and Cybister beetles), in which the mechanics of respiration have been studied, certain spiracles have been shown to be inspiratory and others expiratory.

[1] Lee, M. O., *Jour. Exp. Zool.,* 1925, XLI, 125.