its appearance in American teaching. Precisely why these numbers should lie as they do, I was never able to see, although for many years I have been conscious of this arrangement and have wondered what its origin might be.

The letters of the alphabet arrange themselves for me in a visual way which is easily explainable. This is in three rows of eight each with Y, Z and Ampersand together below. The reason for this, I think, is that I learned to read without the preliminary of learning my letters, and after having been reading for several years, in my eighth year, my teacher made the agonizing discovery that while I was reading pretty much anything I pleased I did not know the order of my letters. I was, accordingly, set to work mastering an order which I will admit I have found most useful for every purpose except reading and writing. I learned the alphabet in this summary fashion out of a primer which had the alphabet disposed on its second page at the top of the page in the order which I have mentioned, and in all the manifold use of the alphabet for purposes of classification with which we are all familiar, but which we are apt to forget as a comparatively modern invention, the alphabet always seems to me to be in the three lines I have mentioned.

TALCOTT WILLIAMS.

### COLUMBIAN CONGRESSES ON SCIENCE AND PHILOSOPHY.

AT least eight congresses were held during the week of August 21-26, and six are announced for Aug. 28-Sept. 2. The International Electrical Congress awakened much general interest, Professor Helmholz being a prominent figure. An illustrated lecture was given on the evening of Aug. 25, by Mr. Nikola Tesla, on Mechanical and Electrical Oscillators. This took place within the Exposition grounds, where about 70 per cent of the total horse-power of steam engines is used for electrical purposes. The Chamber of Delegates made their report on the special work entrusted to them.

The Congress on Psychical Science, with suggestions of spiritualism and hypnotism, also awaked some popular interest.

The Congress of Chemistry has been carefully worked up by Dr. H. W. Wiley, and 77 papers were announced. These were arranged in sections, as Analytical, Agricultural, Technological, etc.

Among the foreign chemists present, were Prof. Otto N. Witt, of Berlin; Prof. George Thoms, of Riga; Prof. H. R. Proctor, of Leeds; Prof. E. Engler, of Carlsruhe; and Prof. George Lange, of Zurich. X.

### PALENQUE HIEROGLYPHICS.

IT is gratifying to learn that Dr. Valentini, after a long absence from the field of paleographic investigation, is about to return to it. There is one statement, however, in his communication to *Science*, Aug. 18, which needs correction. He says "Mr. Förstemann's theory of reading double columns is untenable." Now if he will refer to my "Study of the Manuscript Troano," printed in 1882, pp. 199-203, he will find this theory there set forth, as I think, for the first time, and, also, evidence of its correctness, which has apparently satisfied most students who are devoting attention to the Central American inscriptions and codices.

His statement that no month symbol appears on the tablets is made in face of evidence to the contrary, which seems to be conclusive.

I may add here that Dr. Brinton's acceptance (*Science*, Aug. 11) of the rendering given by me of the month name *Kayab*, necessarily forbids its derivation from *Kay* "to sing or warble." A compound of *ak* and *yab* cannot be a derivative of *Kay*. The *ak* may be obtained from the symbol on the rebus method of Aubin, which Dr. Brinton has rechristened by the name "Ikonomatic," but it is difficult to explain the symbol representing the last syllable *yab* by this method. If the name was formed as I suggested, and as admitted, (*Ak-yab*) the signification, with the month determinative added, is "the month when turtles abound."

CYRUS THOMAS.

Frederick, Md., Aug. 31.

### COLOR VISION.

I AM very much surprised to see that Professor Ebbinghaus, in the last number of the *Zeitschrift fur Psychologie*, announces as new a discovery which has a critical bearing upon Hering's theory of color-vision,—the fact, namely, that two greys composed the one of blue and yellow and the other of red and green and made equally bright at one illumination do not continue to be equally bright at a different illumination. If two complementary colors were purely antagonistic, that is, if the color processes simply destroyed each other, as processes of assimilation and dissimilation must do, and if the resulting white was solely due to the residual white which accompanies every color and gives it its brightness, then the relative brightness of two greys composed out of different parts of the spectrum could not change with change of illumination. The fact that they do change is therefore completely subversive of the theory of Hering, or of any other theory in which the complementary color-processes are of a nature to annihilate each other. This consequence of the fact, as well as the fact itself, I stated at the Congress of Psychologists at London in August, 1892, and it was printed in the abstract of my paper which was distributed at the time and also in the Proceedings of the Congress.

Professor Ebbinghaus's discovery is apparently independent of mine, for he supposes that the phenomenon cannot be exhibited upon the color-wheel. This is not the case; with fittingly chosen papers (that is, with a red and green which need no addition of blue or yellow to make a pure grey, and with a corresponding blue and yellow) it is perfectly evident upon the color-wheel. The same paper circles which I used to demonstrate it in Professor König's laboratory, in Berlin, are, at the request of Professor Jastrow now on exhibition at the World's Fair at Chicago. While Professor Ebbinghaus's discovery of the fact is therefore doubtless independent of mine, I allow myself to point out that mine is prior to his in point of time.

CHRISTINE LADD FRANKLIN.

### MYOLOGY OF THE CAT; OR THE M. FLEXOR ACCESSORIUS OF THE HUMAN AND FELINE FOOT.

THE supposed new muscle in the cat's foot (*Science*, Aug. 18, 1893, p. 97,) is, so far as Mr. Thompson's description allows of identification, probably no other than the

> Accessoire du grand flechisseur (Bich.) of the Cat,
> Accessoire du perodactylus (Str.-Dur.) of the Cat,
> Caput plantare flexoris digitorum (Caro quadrata Sylvii) of Man,

or the M. flexor accessorius of human and feline anatomy

The flexor accessorius muscle in man originates by means of a muscular (internal and larger) head from the inner border of the calcaneum, which may be entirely absent, and by a tendinous slip which comes from the outer face of the Os calcis, just in front of the external tubercle, and from the long plantar ligament. As it has two quite constant sources of origin, so it has two insertions, one of which, however, is not constant. The usual insertion is that into the external border and upper surface of the M. flexor longus digitorum pedis, just where it divides into the four branches for the toes. (Most of the fibres of this

tendon pass to the third and fourth toes, some of the fibres go to the second toe, while few, if any, are sent to the fifth.)

But occasionally this muscle inserts entirely into the tendon of the M. flexor longus hallucis. The significance of this condition will be apparent when we examine the arrangement of the parts in the cat. But first let us take a glance at anthropoid anatomy. Among the apes the flexor accessorius is wanting. The flexor longus hallucis, instead of the flexor longus digitorum pedis, supplies the perforating tendons for the third and fourth toes, and in Hylobates, for even the second phalanx as well. In this way it helps out the latter muscle, which supplies, in these cases, only the second and the fifth phalanges, or only the fifth phalanx, while the hallux receives usually only a slender tendon, which, according to Bischoff, is entirely absent in the orang. This muscle (fl. accessorius) seems to be a portion of the primitive M. flexor fibularis, which has given rise to the two muscles, flexor long. hallucis and flexor long. digit. pedis. The accessory portion is not split off in the apes,—it is, in the case of man as well as in the cat, and here its point of origin has grown distad until all connection with the leg has been lost, except in those infrequent cases where it still passes up over the median face of the calcaneum into the region of the leg. In both man and the cat it strengthens the action of the two combined flexors of the digits, and by its lateral pull gives a different direction to their action. Innervation through N. plantaris lateralis (external plantar).

In Felis the accessorius is both less strongly developed and more transverse to the foot axis, in its course, than in man, and it is frequently entirely fibrous without any muscular tissue, *i. e.*, reduced to a mere ligament. When well developed it forms a small flattened plate which arises from the inferior portion of the external faces of the calcaneum and cuboid, from whence it passes inwards and downwards, posterior to the fused tendons of the Mm. flexor longus digitorum pedis and flexor longus hallucis to near where they fuse, at which place it inserts into the internal border of the tendon of the flexor long. hallucis. Usually the insertion is not confined to the internal border of this tenden but involves a greater portion of the broad tendinous plate formed by the fusion of the tendons of the two digital flexors above named. The fusion of their tendons practically makes a single muscle out of these two toe flexors. This is equally true of man. This fact helps to explain the varying insertion in man from a mechanical standpoint.

Briefly summarized.—The accessorius in man usually presents a muscular body, which, however, may be absent, while in the cat it is often absent and normally of much feebler development than in man. In the human subject the insertion is usually into the external border of the flexor longus digitorum pedis, though it may be entirely into that of the flexor longus hallucis, while in the cat the usual and best developed insertion is into the tendon of the latter muscle.

In conclusion, the muscle is an old friend, both in cat and man.

HOWARD AYRES.

The Lake Laboratory, Milwaukee, Aug. 24, 1893.

## DAMAGE TO COTTON BY LIGHTNING.

ON July 26, 1893, during a thunder storm there was one heavy report noticed in the direction of some cotton plats. The bolt seemed to have "struck" near the plats. The next day a spot in the midst of the plats was found where the most succulent parts of the plants were wilting. Examination showed no visible injury as the cause. There had previously been no sign of blight or disease, whatever, which could have caused the cotton to droop.

The rows run north and south, and five were affected; three for nearly a rod, the one on the east half that distance, and the fifth on the west very little, only two or three of the tallest plants being affected.

By common consent of those who saw the cotton it was agreed to be the work of the thunderbolt, and was so noted. No place where violence was done could be found in the soil.

Frequent observation during the first month has failed to see any increase in the blasted circle. In the whole space twenty-five or thirty plants have died, while others have low branches thriving and bearing fruit and flowers. If a fungus has done it some plants have *resisted* in part and succumbed in part, or the fungus has but partially done its work.

My notion of a discharge from an electrified cloud is that the interchange between it and the earth charged with the opposite pole is carried on by every leaf and point not repellant to the fluid; that if any plant from a tender annual up get more of the electric fluid than it can safely carry it will be injured according to the strength of the overcharge, even to total destruction, involving appearance of great physical violence, if the charge is heavy; and that the discharges take the line of least resistance, according to the common explanation of the zigzag course of lightning.

If this notion of lightning discharges is correct, is not the supposition that this particular occurrence is due to lightning based on tenable ground? Might not a bolt of lightning descend obliquely from one side or other, and when near the earth be deflected upward, but yet come near enough to the ground to destroy the life in the tallest of those plants while not destroying the low laterals of the shorter plants? Or may not this discharge be considered as having entered the earth through those plants with the observed effect to destroy so many of the first conductors—the tallest ones—and nearly all of the others nearest at hand; while of those furthest out only the highest points were harmed?

FRANK E. EMERY.

Raleigh, N. C., Aug. 26.

## ON SOME NESTING HABITS OF THE AMERICAN GOLDFINCH.

IT is probably a truth that every ornithologist has some bird which is his particular care to study; and being myself no exception to the rule, I thought perhaps a few notes on the nesting habits of the American Goldfinch, observed while collecting a large series of their nests and eggs, might be acceptable to the readers of *Science*.

Although found in southern Michigan throughout the winter in scattered flocks, it delays nesting until the latter part of July or the first of August. On studying the nests of the Goldfinch all will be found to be at least slightly different, yet there seem to be two distinct patterns in their architecture. The first and most common form is massively built and forms a thick cushioned receptacle for the eggs. An example of this class, which I have before me, has walls about an inch thick, while the distance to the bottom of the crotch in which it is situated is about three inches. The whole mass is composed of very fine fibres and thistle-down; and as this pattern of nest is usually situated where the twigs are thickest, it may easily be seen what a useful purpose it serves in deadening the force of a sudden blow or jar, which might otherwise result disastrously to the eggs. A two-storied nest of this kind I found in a blackberry bush on August 3. The lower