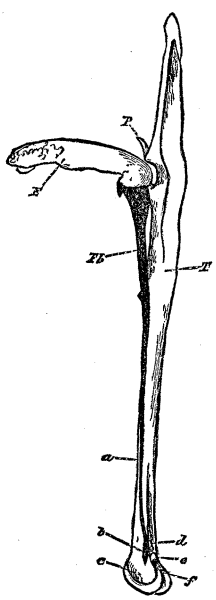
A complete fibula in an adult living carinate-bird.

In reference to the important anatomical point contained in the letter of Dr. G. Baur to *Science* (No. 118) in regard to the fibula of Pandion, I would like to invite your correspondent's attention to the condition of the fibula in the adult Colymbus septentrionalis. I have in my temporary possession a complete skeleton of an adult individual of this diver, kindly lent me by the Smithsonian institution (spec. 13,646) for another purpose. In it the fibula is found, as I have drawn the specimen in the accompanying cut, for the right limb, though it is seen equally well in both. The fibula has been drawn in black for its entire length, so that its exact form and relation to the tibio-tarsus may be properly appreciated. From the point *a* to *b* it anchyloses with the shaft of the other leg-bone, though it stands out quite prominently from it, leaving no doubt as to its identity. Knowing as we do that the part indicated in the cut by *c* represents one of the tarsal elements, it is no more than we should expect to have a complete fibula terminate, as it does in this bird, at *b*; and this part, in common with Pandion, is found upon the antero-lateral aspect rather than in front of the tibio-tarsus, as in the Jurassic Archaeopteryx.



BONES OF RIGHT THIGH AND LEG OF ADULT COLYMBUS SEPTENTRIONALIS. REDUCED ONE-HALF.

F, femur; *P*, patella; *Fb*, fibula (in black); *T*, tibio-tarsus; *a*, point where anchylosis commences; *b*, distal extremity of fibula; *c*, the united tarsal element; *d*, a fibrous loop for tendon; *e*, the large oblique fibrous loop for extensor tendons; *f* indicates the position of the bony bridge that confines the deep extensors.

Dr. R. W. SHUFELDT.

Fort Wingate, N. Mex., June 8.

The classification and paleontology of the U.S. tertiary deposits.

Under this head a note was published in the number of June 12 of this journal, on the first part of my article, 'The genealogy and the age of the species in the southern old tertiary,' in the *American journal of science* for June. I refer those readers of *Science* who are interested in this matter to the second part of this article, which will appear in the July number of the same journal. DR. OTTO MEYER.

New Haven, Conn., June 15.

HOW TO REACH THE GRAND CAÑON.

ALTHOUGH the Grand Cañon of the Colorado was a good while ago made famous as to its lower part by Ives and Newberry, and the upper by Powell, and although most interesting parts of it are nearly approached by one of the great transcontinental railways, yet very few people seem to know how easy it is to visit it, — easy, that is, to one who is crossing the continent by the Atlantic and Pacific railroad. It was almost by accident that we came to know of this accessibility, and to take advantage of it.

We know not what facilities there may be for reaching the lower end of the cañon from 'The Needles,' where the road crosses the Rio Colorado; but the Peach-Spring station, where this road approaches within twenty-three miles of the river, at its strong southern bend, is about six hours east of 'The Needles,' and on the plateau about five thousand feet higher. From this point a rapid and easily traversed descent leads down to the river, and into as majestic and peculiar cañon scenery as is anywhere to be seen. Unfortunately the trains, both from the east and the west, at present arrive at this little watering-station between two and three o'clock in the morning; and intending visitors will find it well, if not exactly necessary, to notify the station-master or the 'stage proprietor' in advance, so as to secure lodgings for the remainder of the night. Mr. Farlee, the stage proprietor, into whose hands they will fall, provides three or four comfortable beds; the restaurant of the station, which supplies the employees of the railroad, will furnish a tolerable breakfast; and a three-seated wagon, upon the buckboard principle, drawn by four experienced horses, makes a really comfortable conveyance. All that the traveller needs to provide is a sun-umbrella, — an article which will probably be needed at any season. A quick descent of four thousand feet into a narrow ravine is sure to be attended by a corresponding rise in temperature; and shade during the journey is not abundant.

Dr. Newberry and his exploring party were the first white people to make this trip, in April, 1858; and his account of it in Ives's report upon the Colorado River of the west, along with the woodcut on p. 99 and the annexed plate vi., and plate i. of the geological part, opposite p. 54, will give a fair idea of what is to be seen. Nothing is changed, except that the Indian trail, over which his pack-mules made their way with much difficulty, is now replaced with a passable wagon-road of Mr. Farlee's making. Very enterprising and hurried people make the trip in a single day, especially in the long days of spring, and so resume the railroad by the next (daily) train, the journey back and forth being made in the early morning and in the evening hours. But, indeed, two days should be given to it, even by the transient sight-seer, lodging in the

'hotel' in the bottom of the cañon. This is a board shanty of a single room below, with a kitchen attached, and two bedrooms under the roof above. Primitive as the accommodations are, and although, when there is no press of company expected, the functions of stage proprietor, road-owner, driver, guide, landlord, and cook are all merged in one person, we found that person adequate to all those duties; and even the lady of our party was comfortably cared for, both as to bed and board. When this extraordinary place comes to be better known and more largely visited, ampler accommodations will doubtless be provided, both in the cañon and at the railway-station. The 'hotel' stands at the junction of the Peach-Spring Cañon and that of the Diamond River, close to the refreshing stream of pure water. The Diamond-River Cañon, of which Dr. Newberry gives two good illustrations, was explored upward for two or three miles on the afternoon of the first day. The following morning suffices for the junction of this cañon with the Colorado, which is near by, and for the views up and down the river, which are to be had for less than an hour of climbing. Altogether, there is nothing like this cañon. The far-famed Yosemite is more beautiful and more varied, but not more magnificent, nor half so strange and weird.

I may be allowed to add the remark that the botany of these lateral cañons is very interesting, and inviting to a longer stay. It had been so well explored by Mr. and Mrs. Lemmon a year before, that we could not expect our hurried visit to be rewarded with any thing absolutely new. But here we saw an abundance of the singular and striking Fouquieria in flower, and that alone well repaid the toils of the excursion.

This is the only accessible point at which a descent can be made into the bed of the Grand Cañon. But from Flagstaff — a station about nine hours farther east, and at considerably greater elevation, in a district of pine-forests, and close to the beautiful and snow-clad San Francisco mountains — a wagon-journey of two days over the mesa will take a party to the Marble Cañon, described and illustrated by Powell, where the Colorado flows twenty-five hundred feet below, between unbroken vertical walls of many-colored marbles. Moreover, the neighborhood of Flagstaff abounds in cliff-dwellings and cave-dwellings, the latter comparatively little known; and altogether this seems to us a most inviting place of summer resort.

Journeying eastward, the traveller passes one of the most interesting of the Indian pueblos, that of Laguna; and that of Zuñi is well within reach from Fort Wingate.

A. G.

THE WASHINGTON MONUMENT, AND THE LIGHTNING STROKE OF JUNE 5.

THE recent injury to the Washington monument by lightning has attracted attention throughout the country to such a degree that a short statement of the facts in the case will doubtless be of interest to the readers of *Science*. On the afternoon of June 5 a thunder-storm of no unusual character passed over Washington. At about fifteen minutes past three there was a single burst of thunder of some violence, which was about the only notable electrical disturbance of the afternoon. Although it had successfully passed through disturbances apparently much more violent on one or two previous occasions, this time the monument was 'struck,' and some damage done to one of the stones near the apex. Two men who were inside of the structure, at the base, describe the sound produced as resembling the simultaneous discharge of a great number of cannon, and declare that the 'whole monument trembled.' Two others were in a small wooden building, used as an office, near by. One of them was looking out of the window, away from the monument, toward the north. He affirms, in the most positive manner, that he saw a ball of fire, which he says was as large as his fist, coming directly towards the window out of which he was looking. Both he and his companion (who was not looking out of the window, and who did not see the ball of fire) seem to have felt something of the usual effect of a shock. Those who were within the monument say they felt no unusual sensations except those produced by the noise.

When the monument was examined from the ground with the unaided eye, no injury could be detected. On applying a good telescope, however, it was seen that one of the stones just below the capstone was split from top to bottom, the crack produced being about four feet long, and it was open to the extent of about two inches. A small corner of the lower corresponding angle of the capstone had also been carried away, this doubtless resulting from the opening of the crack in the stone upon which it rested.

The appearance of the apex is fairly represented in the sketch, in which (*a*) represents the aluminum tip, (*b*) the capstone, and (*c*)