numbers, and, I was told, might even decline to let an old subscriber have a copy of the new edition unless the old one was returned —to be destroyed. If this statement was correct, the rarity of the old volumes would be to some extent at least accounted for.

The discovery of the new volume is interesting chiefly from a historical or bibliographical point of view. The only essential change it will entail is the dating back of the first descriptions of seven species, viz., *Crotalus oreganus* (so spelled), *Coluber couperi, Coluber quadrivittatus, Coluber rhombomaculata, Bufo quercicus, Salamandra quadrimaculata* and *Salamandra haldemani.*

In my biographical memoir I did not consider it necessary to correct or notice numerous misstatements respecting Holbrook's works, but perhaps it may be advisable to refer to one here.

In Engelmann's 'Bibliotheca Historico-naturalis' (p. 172) and in Carus and Engelmann's 'Bibliotheca Zoologica' (p. 134) to 'Holbrook, John Edw.,' is accredited a publication entitled 'Scientific Tracts. 3 Vols. in-12. *Boston* 1831–33 (*London, Wiley and Putnam.*) 18s.'*

John Edwards Holbrook had nothing to do with that serial, the series having been commenced by one Josiah Holbrook in company with other writers. I have been able to see the volumes, which are in the library of congress. The three volumes are composed each of 24 tracts of a monographic nature, the 'terms' being '24 numbers a year, at one dollar and fifty cents, payable in advance.' Volume 1 has such contents as 'The Atmosphere' (numbers 1 and 3), 'Geology' (2), 'Gravitation' (4), 'Animal Mechanism' (5) and the like; one of the coauthors was J. V. C. Smith.

This series was succeeded by a 'new series,' 'conducted by Jerome V. C. Smith, M.D.,' issued in numbers of 32 pages each on the 1st and 15th of each month, miscellaneous in their character, and paged to form two volumes each year. Smith gave up and in 1836 a new volume (apparently the last) of the 'Scientific Tracts' was published by others in 12 semi-monthly numbers of 32 or 24 pages, and, at last, of 16 pages each. Those were the years of tracts, religious, temperance, political, and even 'scientific.'

My thanks for information respecting the volume in question are due and given to Mr. William J. Fox, as well as to Mr. Witmer Stone.

THEO. GILL.

COSMOS CLUB,
April 28.

* The words are quoted from Engelmann (p. 172) and differ slightly from those in Carus and Engelmann.

RECENT ZOOPALEONTOLOGY.

CONCERNING THE ANCESTRY OF THE DOGS.

MR. J. B. HATCHER, in a recent memoir on Oligocene Canidæ, distinguishes three closely allied genera from the White River formation and proposes some very interesting changes in the phylogeny of the family. His observations are based on the very fine specimens of these rare fossils collected by Mr. O. A. Peterson for the Carnegie Museum. These include one complete and three incomplete skeletons, the skulls all well preserved. The thorough and clear description of the skeleton of *Daphœnus felinus* is especially valuable as based on a single and very complete specimen. The resemblance of this primitive dog to the contemporary ancestors of sabre-tooth cats has been strongly urged by Professor Scott in his previous description of *Daphœnus;* Mr. Hatcher, on the contrary, is impressed less by its feline than by its creodont characters, which he points out at some length.

He distinguishes three closely allied genera among these specimens:

1. *Daphœnus,* with elongate skull, high sagittal crests, robust premolars, etc.

2. *Protemnocyon,* gen. nov., with short skull, low sagittal crest and small premolars.

3. *Proamphicyon,* gen nov., with elongate skull, high sagittal crest, small premolars and serrate canines.

(The distinctions between the first two genera are better displayed in the referred species, *D. felinus* Scott and *P. inflatus* Hatcher, than in the typical species *D. vetus* Leidy and *P. hartshornianus* Cope, which, as

shown by skulls in the American Museum, are intermediate forms and quite closely allied. The height of sagittal crest, assigned as one of the distinctive generic features of *Daphænus*, is a highly variable character in most carnivora, dependent on sex, age and individual robustness. A series of opossum skulls will well illustrate analogous variations, as recently described by Allen. Serrations are to be found on the unworn canines of all daphænoid dogs that I have examined, but disappear very quickly with wear. Canines of old animals are smooth and more rounded in section from wear.)

As the names indicate, Mr. Hatcher believes that *Protemnocyon* is ancestral to *Temnocyon* of the John Day formation, and *Proamphicyon* to *Amphicyon* of the Loup Fork, while *Daphænus* left no descendant. Scott, Eyerman, and Wortman and Matthew had, on the contrary, derived *Temnocyon* from *Daphænus*, and all previous authors have regarded *Amphicyon* as a distinctively European type which found its way to America only in the later Miocene.

Mr. Hatcher does not recognize *Mesocyon* Scott (=*Hypotemnodon* Eyerman, type *Temnocyon coryphæus* Cope) as a valid genus, and bases his comparison of *Protemnocyon* with *Temnocyon* upon *T. coryphæus*, and not upon the typical species (*T. altigenis* and *T. ferox*). The authors above mentioned had derived the typical Temnocyons from *Daphænus* but threw out *Mesocyon coryphæus* from this line of descent.

(Mr. Hatcher can hardly have seen Dr. Eyerman's paper of May, 1896, for he could not fail to observe that the characters assigned to separate *Temnocyon* and *Mesocyon* are identical with those by which he separates *Daphænus* and *Protemnocyon*, only they are even more marked and certain differences in the teeth are superadded. In the White River there are intermediate species between the two extremes; in the John Day these have not been found. If then *Protemnocyon* is a good genus, *Mesocyon* must certainly be held. If we can assume that the John Day formation is of later age than the White River, it appears probable that *Mesocyon* and *Temnocyon* represent the further progress of the differentiation between the large-skulled robust *Daphænus* and the small-skulled, more slender *Protemnocyon*. The extremes have become more divergent and the intermediate forms weeded out. The *Daphænus-Temnocyon* line appears to lead into a type such as *Cyon*, or the dholes, and evidences of an intermediate stage from the Loup Fork Miocene were described by Matthew about a year ago. The *Protemnocyon-Mesocyon* line leads into much more typical dogs, but can not be considered as a direct ancestor of any living species which I have examined.

Mr. Hatcher's derivation of *Amphicyon americanus* from *Proamphicyon* is, I think, hardly admissible. *Amphicyon* first occurs in America in the upper Miocene Loup Fork, but in Europe it is found in the oldest Oligocene formations, as old as or older than the White River. The evidence is not at all such as to warrant our affirming the actual convergence of the Miocene Amphicyons of Europe and America, the one derived from one Oligocene stock, the other from a widely different one. We might, perhaps, believe that *Proamphicyon* and the European Oligocene Amphicyons had a common Eocene ancestor; but as *Proamphicyon* is in fact very much nearer to *Daphænus* than to *Amphicyon* it seems more reasonable to suppose that the latter is, as Wortman believes, derived from a distinct group of short-jawed dogs of the Middle Eocene.)

Mr. Hatcher makes at the close of his memoir some good-natured criticisms of the views expressed by Wortman and Matthew in 1899 as to the ancestry of certain Canidæ. That such phylogenies are to a high degree hypothetical, and seldom, if ever, more than approximations to the truth, I am most ready to admit—and have always regarded such a saving clause as implied in any phylogenetic remarks. But the new evidence brought forward since then by Wortman and myself, and now by Mr. Hatcher, serves to confirm in most points the very lines of descent which we suggested at that time.

W. D. MATTHEW.