tionable data to other explorers. We have not space now to quote from this part of the report except so far as relates to the age of the mound at Silver Spring, a large shell heap of from two to twenty feet in height and said to cover an area of about twenty acres. This heap is made up almost entirely of the small fresh water shells of the genera Ampullaria and Paludina, and, as Prof. Wyman remarks, it seems incredible to conceive that such vast numbers of small shells could have been brought together by man from the waters about, and the immense size of the mound must be regarded as the work of many years and probably of centuries.

"There is to be seen at Silver Spring a grove of live oaks, a few survivors of a race of giants once common in the forests near the river, and to which my attention was called by my friend G. A. Peabody, Esq. Six of these at five feet from the ground measured as follows: one thirteen feet, three fifteen, one nineteen, and one between twenty-six and twenty-seven feet in circumference. This last has been partially destroyed by fire, an act of vandalism committed for the purpose of collecting the moss hanging from its branches. The circumference was estimated from one-half of the trunk, all that now remains, but agrees closely with measurements made several years before by Mr. Peabody, when the trunk was still whole. These trees are not on the highest part of the mound, but on the slope farthest from the water. Excavations made beneath the largest of them showed that the tree was of more recent origin than the mound itself. If at the beginning of the second century of the life of the live oak there are twelve rings at least to the inch, then the above mentioned tree, having a semidiameter of fifty inches, would have an age of not less than six hundred years, and was near the beginning of the second century of its existence at the landing of Columbus. On the same basis of calculation, the least age of the mounds near Blue Spring, and at Old Town, would be about four hundred years. Though these estimates are to be regarded only as approximations to the truth, they, without doubt, carry back the origin of the mounds beyond the reach of history or tradition, and certainly one or two centuries before the discovery of America. Although they cannot be more recent than the trees growing upon them, they may have been, and probably were, finished long before the life of the trees above mentioned began."

Revision of the American or Tyrant Flycatchers.*— This revision of the *Myiarchi* is based upon all the accessible material

*Studies of the Tyrannidæ.— Part I. Revision of the species of Myiarchus. By Elliott Coues. Proc. Acad. Nat. Sci. Phila. 1872, pp. 56-81. July, 1872.

in this country, numbering over two hundred specimens, and comprising the entire suites of the Smithsonian Institution, Museum of Comparative Zoology, and Mr. Lawrence's collection, and an examination of the types in the collections of the Boston Society of Natural History and the Academy of Natural Sciences of Philadelphia, together with numerous specimens from other sources. In this paper Dr. Coues has adopted the "synthetic" method of investigation instead of the "analytic" which, up to the present time, has been so generally followed, especially by American ornithologists. It is hence a paper of unusual interest as fairly initiating a "new departure" in American ornithology. Dr. Coues here takes the "arbitrary" but apparently justifiable basis of predicating "'species'† upon specimens presenting any definite, constant, tangible characters whatsoever, that do not, so far as it appears, grade into the characters of other species;" of predicating "'varieties' upon specimens presenting indefinite and inconstant yet tangible characters that are seen to grade into the characters of other specimens;" of predicating "'synonymes' upon specimens presenting indefinite, inconstant, and intangible characters, due to individual peculiarities, or to age, sex, season or locality; as well as upon specimens presenting no special characters at all." His investigation of the genus has led him to the belief "that there are only four forms (*sic*) of Myiarchus that do not intergrade, and that are differentiated from a common original stock to such degree, or in such manner, that we cannot account for their respective peculiarities according to highly probable laws of geographical variation depending upon differences in food, climate, etc." He finds that the specimens examined by him "represent nine species, two of which present each three tangible varieties." These results are somewhat different from those reached by other investigators of the group, and in allusion thereto he observes: "though in the following pages I may appear to have 'unnecessarily,' if not unwarrantably, reduced the number of species, yet I am persuaded that no unprejudiced ornithologist could have reached different conclusions upon study of the same material. It may be well to remember that two hundred specimens of Myiarchus have never before been examined by one person at a *coup d'œil;* and I think that with two thousand

† Compare Bull. Mus. Comp. Zool., III, p. 127, July, 1872.

specimens instead of two hundred, I should not be able to establish as many species as are here allowed."

The species and varieties recognized are the following: 1. *Myiarchus validus*, known only from Jamaica. 2. *M. crinitus*, with three localized varieties, viz., *crinitus*, which ranges throughout the eastern portion of the United States and retires to Central America to winter; *irritans* (including *Mexicanus* and *Yucatanensis* Lawr.), inhabiting Central and South America to Paraguay and distinguished with difficulty from var. *crinitus; Cooperi* (*Tyrannula Mexicanus* Kaup) confined chiefly to southern and southwestern Mexico. 3. *M. cinerascens* (*Mexicanus* Baird), "one of the better marked species of this difficult group" inhabiting southwestern United States and Mexico. 4. *M. tyrannulus* (*ferox*, *Swainsonii*, *Panamensis*, etc. auct.) a homogeneous type, ranging over Central America and southwest to southern Brazil. 5. *M. phæocephalus* of Ecuador, suspected to be a local race of the preceding. 6. *M. Lawrencei* of Mexico and Central America. 7. *M. nigriceps*, of Central and northern South America; though a tangible species, regarded as "simply a geographical representative of *M. Lawrencei*." 8. *M. stolidus*, a flexible species, with three insular varieties or local races: viz., *stolidus*, Jamaica, St. Domingo and Hayti; *Phœbe*, Cuba and Bahamas; *Antillarum*, Porto Rico and Tobago, the Porto Rican form being very strongly marked. 9. *M. tristis*, Jamaica. Not only have all these "varieties" ranked hitherto as species, but others reduced in this paper to synonymes have currently held similar rank.

Preliminary to a revision of the species, the leading features of the genus are clearly sketched, as distinguishing it among allied genera. It proves to be a not sharply defined group, "the genus so called" resting "upon no structural characters, while its synonymes are among the vagaries of ornithology." A few species usually relegated to other genera are shown properly to belong here, and the genus as thus defined is susceptible of a tolerably definite diagnosis. Before proceeding to an analysis of the species our author discusses other general matters relating to the subject, especially individual and geographical variation, and announces several propositions to which he invites serious consideration. The importance of some of these will warrant their repetition here as being an exposition of important facts and principles at present engaging the attention of ornithologists, and capable of wide application.