bodies than that given by Professor A. Hall in this journal, p. 349, are referred to my article in SCIENCE, N. S., Vol. XIV., pp. 853–855. The experiments by Professor E. H. Hall, recently outlined in this journal, p. 181, are extremely interesting. They seem to indicate a minute southerly deviation. Thus nearly all experimentalists on this subject, from the time of Robert Hooke to the present, have found a small southerly deviation. I believe the only exception is Benzenberg, who in 1804 had, for theoretical reasons, come to disbelieve in the actual existence of this deviation, and who, accordingly, found it absent in his experiments of that year after selecting from the total number of trials those only which, in his judgment, were made under the most favorable conditions. I read Benzenberg's and other papers in *Gilbert's Annalen* two years ago and I can not recall that Benzenberg, or any one else, ever announced a *northerly* deviation. In 1802 Benzenberg reported, as a final result of his experiments in Hamburg, a marked southerly deviation. In the following summary, H = height in m., $S.D.$ = southerly deviation in mm., A = average southerly deviation in mm., per meter of fall.

	H.	S. D.	A.
Hooke, 1680,	8.3	+	
Guglielmini, 1791,	78.3	11.89	.15
Benzenberg, 1802,	76.3	3.4	.044
Benzenberg, 1804,	84.4	0.00	.00
Reich, 1831,	158.5	4.374	.028
Rundell, 1848,	400.	250 to 510	.95
E. H. Hall, 1902,	23.	.05	.002

FLORIAN CAJORI.

COLORADO COLLEGE,
March 3, 1903.

SHORTER ARTICLES.

PYCRAFT'S CLASSIFICATION OF THE FALCONIFORMES.*

PROBABLY no recent paper on the classification of any group of birds is equal in interest or importance to that by Mr. W. P. Pycraft on the osteology and classification of the Falconiformes, a group in which the crudities of earlier systems have been held on to with a persistence most remarkable in these days of advanced knowledge of avian anatomy. Until the appearance of Huxley's celebrated paper, in 1867* all naked-headed carrion-feeding birds of prey were 'Vulturidæ' (vultures), the superficial resemblance between those of the Old World and those of the New being, in those days of anatomical ignorance, far more obvious than the external differences, marked though they be. Although in separating the American vultures as a distinct family, Cathartidæ, Huxley drove the first nail in the burial case of the old systems, he unfortunately went no farther concerning the typical Falconiformes,† and, therefore, ornithologists have continued to recognize the purely artificial and unnatural minor groups of the older authors. All those of largest size, except vultures, are still 'Aquilinæ' (eagles), in the latest arrangements; all those with exceptionally long wings and more or less forked tails‡ are 'Milvinæ' (kites); all short-winged, long-legged and long-tailed forms 'Accipitrinæ' (hawks); those of heavy build, moderate size and alleged 'sluggish' habits 'Buteoninæ' (buzzards); while those with notched bills are 'Falconinæ' (falcons).

Although, as before remarked, Huxley's paper went scarcely beyond the definition of the three primary divisions of the order, he fortunately gave a valuable clue to further

* Pycraft, W. P., F.Z.S., A.L.S., 'Contributions to the Osteology of Birds,' Part V., *Falconiformes*. *Proc. Zool. Soc. Lond.*, 1902, Vol. I., Part ii., August 1, 1902, pp. 277–320, pls. xxxiii.–xxxvii.

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* 'On the Classification of Birds; and on the Taxonomic Value of the Modification of certain of the Cranial Bones observable in that Class,' by Thomas H. Huxley, F.R.S., V.P.Z.S. *Proc. Zool. Soc. Lond.*, 1867, pp. 415–472. (The Ætomorphæ, = Falconiformes + Striges, treated on pp. 462–465.)

† He divided the so-called diurnal raptores into three groups, Cathartidæ, Gypaëtidæ, and Gypogeranidæ, each equivalent to the suborders Cathartæ, Accipitres, and Serpentarii of Pycraft.

‡ All these artificial groups, however, contain forms which do not conform to the diagnoses of said groups, some so-called 'kites,' for example, having a truncated or even rounded tail, and some 'eagles' being no larger than the average hawk.

investigation within the group which he called Gypaëtidæ (*i. e.*, the Accipitres) in certain variations of the coracoid and scapula. Taking up this clue, the present writer published, in 1873–1876, a series of papers on the classification of the Accipitres, and in the first of these* indicated a new grouping of the genera, but without definition of their characters, the salient feature of the new arrangement being the separation of the true falcons (Falcones), laughing falcons (Herpetothereæ), wood falcons (Micrastureæ) and caracaras (Polybori) as a subfamily (Falconinæ), the remaining members of the order being segregated into minor groups under the subfamily heading Buteoninæ. This arrangement was further elaborated, with slight modifications as to some of the minor groups, in 1875 † and again in 1876.‡

This 'new arrangement,' so radically different from any other, found little favor among ornithologists, and had apparently become forgotten; therefore, the author hopes that he may be excused the surprise and gratification which he naturally feels to find in Mr. Pycraft's paper, published nearly thirty years later, a classification so closely identical with his own that differences of nomenclature constitute almost the only points of divergence. No mention of the present writer's papers of 1873–76 on the same subject being made by Mr. Pycraft, it is probable they were unknown to him, or at least that he never saw them, a probability the more gratifying since results which have been independently reached by two widely separated investigators must, necessarily, be sound; and now that the 'stamp of authority' has been given to the present writer's long ignored arrangement, it will be safe for the conservative ones to shake off their adherence to antiquated and obviously unsound classifications of the group and adopt the modern one. The latter, it is hardly necessary to remark, is of course susceptible of much improvement, especially as to the number and limits of the minor groups (called subfamilies by Mr. Pycraft), there being still many forms whose osteology has not yet been studied.

In order to show how very closely the present writer's arrangement of 1873–76 coincides with Mr. Pycraft's of 1902, the two are compared in parallel columns, with a few necessary explanatory notes:

Ridgway (1873–76).	Pycraft (1902).
Falconinæ (1873).	Falconidæ.
Falcones (1873).	Falconinæ, part.
Polybori (1873).	Polyborinæ.
Micrastureæ* (1873).	Falconinæ, part.
Herpetothereæ† (1873).	Falconinæ, part.
Buteoninæ (1873).	Buteonidæ.
Pandiones‡ (1873).	Pandioninæ?
Pernes§ (1873).	Perninæ, part.
Elani‖ 1873).	Elaninæ.
Ictiniæ¶ (1873).	Milvinæ, part?
Elani* (1873).	Circinæ,** part.

* Changed in 1875 to Micrastures.

† Changed 1875 to Herpetotheres.

‡ My Pandiones originally included *Elanoides*, which in 1875 I transferred to Pernes, where it is placed by Mr. Pycraft.

§ My Pernes included the genera *Pernis, Baza, Avicida* '*Cymindis*' (*Odontriorchis*), and *Regerhinus*. To these Pycraft adds, doubtfully, *Pandion*, not being satisfied as to the propriety of separating it as a subfamily. *Elanoides* was added to the group by me in 1875.

‖ My Elani originally included only *Elanus* and *Gampsonyx*, but *Nauclerus* was added in 1876. Mr. Pycraft does not mention the last, but includes *Machærhamphus*, a genus which I had not been able to examine.

¶ This group includes *Ictinia* and *Harpagus*, the former being doubtfully referred by Pycraft to the Milvinæ (where most certainly it does not belong), while the latter is not mentioned by him. *Rostrhamus* is also doubtfully referred by Pycraft to the Milvinæ, a group to which it seems to me to be not at all nearly related.

** Pycraft includes, besides *Circus* and '*Strigiceps*,' the genera *Urotriorchis* and *Geranospizias*,

* 'Catalogue of the Ornithological Collection in the Museum of the Boston Society of Natural History,' II., Falconidæ. *Proc. Boston Soc. Nat. Hist.*, XVI., May 21, 1873, pp. 43–106.

† 'Outlines of a Natural Arrangement of the Falconidæ,' *Bull. U. S. Geol. and Geog. Surv. Terr.*, No. 4, second ser., June 10, 1875, pp. 225–231, pls. xi.–xviii.

‡ 'Studies of the American Falconidæ,' *Bull. U. S. Geol. and Geog. Surv. Terr.*, ii., No. 2, April 1, 1876, pp. 91–182.

Geranospizæ (1873).*	Circinæ, part? (or Circætinæ, part?).
Urubitingæ (1873).	Urubitinginæ,† + Buteoninæ, part.
Buteones (1873).	Buteoninæ,‡ part.
Haliaeti§ (1873).	Milvinæ.
Aquilæ‖ (1873).	Aquilinæ.
Circaëti¶ (1873).	Circaëtinæ.
Archibuteones** (1873).	Buteoninæ, part.
Morphni (1876).	Thrasaëtinæ.

The only group of Mr. Pycraft's classification having no equivalent in my arrangement is his subfamily Vulturinæ (comprising the genera *Gypohierax, Neophron, Gyps, Vultur* and *Otogyps*††). This subfamily he locates though the latter he places *also* in Circætinæ! *Urotriorchis* I have not been able to examine, but *Geranospizias* is certainly not closely related to *Circus*, but seems to come very near to *Polyboroides.*

* My Geranospizæ included *Polyboroides*, a genus not mentioned by Pycraft.

† Whether Pycraft would include more than *Urubitinga* is uncertain. My group contained, in addition to that genus, *Buteogallus, Heterospizias,* and *Parabuteo* (*'Antenor'*), the last of which Pycraft places in his Buteoninæ, the other two not being mentioned by him.

‡ Pycraft's Buteoninæ includes *Archibuteo,* which I had placed by itself, *Parabuteo* (*'Antenor'*), which I placed in Urubitingæ, and *Busarellus,* which I put with Haliaeti.

§ My Haliaeti included *Thalassoaëtus, Haliaeëtus, Polioaëtus, Haliastur, Milvus,* and *Busarellus,* to which I would now add *Gypoictinia.* Pycraft's Milvinæ includes *Haliaeëtus, Polioaëtus, Haliastur,* and *Milvus,* to which are *very doubtfully* added *Ictinia* and *Rostrhamus.*

‖ My Aquilæ at first included, besides the genera comprising Pycraft's Aquilinæ, *Harpyhaliaëtus, Morphnus,* and *Thrasaëtus,* but in 1876 the last two were taken out and designated as a separate group, Morphni, exactly equivalent to Pycraft's Thrasaëtinæ. The correct position of *Harpyhaliaëtus* is, with me, a matter of doubt, but I am now inclined to the opinion that it should either go into the Urubitingæ or constitute a monotypic group.

¶ My Circaëti consisted of *Circaëtus, Spilornis,* and *Helotarsus;* Pycraft's of the first and last, the second not being mentioned by him.

** Consisting of *Archbuteo* only.

†† It would be interesting to know where Mr. Pycraft would place *Gypaëtus.* between the Thrasaëtinæ and Circaëtinæ, a position not far different from that I would have given it had occasion required, as is indicated on page 227 of my 'Outlines.'

That Mr. Pycraft was unable to give the preparation of his paper the amount of time and care which the subject would have justified is obvious from several slips, nomenclatural and otherwise. For example, he places the Polybori (his Polyborinæ) both in the Falconidæ and Buteonidæ (p. 315), and *Geranospizias* in both Circaëtinæ and Circinæ! In different places the terms Accipitridæ and Buteonidæ are used for the same family. There are also some errors in the explanations to the plates, fig. 10, pl. 32, representing *Catharistes,* not *Serpentarius,* Fig. 11 on the same plate being the latter, though not so indicated in the text on p. 320; while Fig. 5, pl. 32, is *Polyborus,* not *Ibycter,* as stated.

On the whole, Mr. Pycraft's paper is an excellent and most important contribution to a very interesting ornithological subject, and it is to be hoped that after extending his investigations to numerous forms not mentioned by him and therefore presumably not examined, he may finally give us the benefit of his studies in a more elaborate treatise.

ROBERT RIDGWAY.

U. S. NATIONAL MUSEUM,
December 11, 1902.

ELEPHAS COLUMBI AND OTHER MAMMALS IN THE SWAMPS OF WHITMAN COUNTY, WASHINGTON.

ON the 27th of November, 1877, on my way down the Columbia River, from the Dalles, Oregon, I met an army surgeon who told me of a deposit of extinct animals, discovered the year before in 'mud-springs,' in the swamps of Pine Creek valley, Whitman County, Washington, about 100 miles north of Walla Walla. Mr. Copeland, in probing one of these springs on his farm with a long pole, thought the end entered the occipital foramen of a large skull. He had a long iron rod with grappling hooks at the end made. With this tool, and with the assistance of his neighbors he was able to dislodge and bring to the surface a very complete skull of the