conclusion that the *Ceiba* may very probably be considered as a native of the new world.

C. STUART GAGER,
Secretary.

THE ELISHA MITCHELL SCIENTIFIC SOCIETY OF THE UNIVERSITY OF NORTH CAROLINA.

THE 168th meeting of the society was held in the main lecture hall of the new chemical laboratory on Tuesday evening, November 20, at 7:30 P.M., with the following program:

PROFESSOR A. S. WHEELER: 'Denatured Alcohol.'

PROFESSOR J. E. MILLS: 'The Mutual Absorption of Attraction by the Attracting Particles.'

A. S. WHEELER,
Recording Secretary.

THE ST. LOUIS CHEMICAL SOCIETY.

AT the meeting of the St. Louis Chemical Society on November 12, Dr. H. M. Whelpley presented a paper, entitled 'The United States Pharmacopœia and National Formulary, the Standard Authority of the Food and Drugs Act of June 30, 1906.' The paper was due to the interest in the pharmacopœia developed by the new law. The speaker gave a brief history of pharmacopœias in general and of the United States Pharmacopœia in particular, dwelling especially on the methods pursued by the Pharmacopœial Convention, in the decennial revisions of the national standard.

C. J. BORGMEYER,
Corresponding Secretary.

DISCUSSION AND CORRESPONDENCE.

THE 'ELIMINATION' AND 'FIRST SPECIES' METHODS OF FIXING THE TYPES OF GENERA.

IN a recent number of SCIENCE Mr. Witmer Stone has very ably presented the evidence in favor of the adoption of the 'first species' method of fixing types of composite genera.[1] As a strenuous advocate for many years of the 'elimination' method, I beg space for a few comments on Mr. Stone's paper.

[1] "The Relative Merits of the 'Elimination' and 'First Species' Method in Fixing the Types of Genera—with Special Reference to Ornithology," SCIENCE, N. S., Vol. XXIV., No. 618, pp. 560–565, November 2, 1906.

It must be admitted that he has made a pretty favorable showing for the 'first species' principle. I have always conceded that this would be the ideal method if we were at the threshold of our work, and my opposition to it has always been due to the fact that we did not begin in this way, and that to adopt it now would introduce serious confusion in nomenclature. Mr. Stone's researches in the matter seem to have convinced him that the rigid and uniform enforcement of either principle would result in practically the same number of changes in generic names; while the alleged ease and simplicity in application seems to render the 'first species' method preferable to the 'elimination' process. I regret, however, that in his enthusiasm for his view of the case he has been (doubtless unconsciously) led into a few misleading statements with regard to the ease of its application and to various other matters, only a few of which, owing to the vastness of the subject, can be here noticed. First, he makes the astounding statement that "Elimination has never been practised in Europe and does not seem to be understood by foreign writers, and in the vast majority of cases the first species is taken by them as the type." The implication is that the 'first species' principle not only now prevails abroad, but ever has been the guiding rule in selecting types of composite genera when no type was specified. The truth of the matter is just the reverse! The B. A. Code of 1842 expressly provided that when no type was clearly indicated the author who first subdivided a composite genus might restrict the original name to such part of it as he might deem advisable, and that such assignment should not be subject to subsequent modification. This ruling has been one of the corner-stones of all subsequent codes, down even to the latest, 'The International Code' of 1905. The elimination principle followed as a necessary corollary, and has been used, consciously or unconsciously, with a few individual exceptions, by all subsequent naturalists, in dealing with the question of types, unlimited evidence of which could be cited did space permit. The B. A. Committee suggested, however, that 'in many cases' it might

be 'correctly inferred' that the first species was regarded by the author as the type of his genus, provided that it proved 'accurately to agree' with the definition of the genus. At the same time, the principle of tautonomy, only recently formally adopted, and only by a few authors,[2] was foreshadowed as an important aid in determining types, and whenever in this way a certain species was distinguished from the others, the B. A. Committee ruled that this particular species 'must be regarded as the original type of a genus,' and in case some other species had been taken as the type, 'we are justified in restoring the name of the old genus to its typical signification, even when later authors have done otherwise.' It was recognized also that by invariably taking the first species as type, the author's real intention in establishing a genus might be annulled. While some authors are known to have placed their typical species first on the list, it is known that others gave it a central position.

The method of determining generic types, abroad as well as in America, has not been uniform, but has often been done loosely and without rigid system of any sort: and hence the present confusion. While some authors may have consistently followed the first species principle, and other may have done so occasionally to tide over an emergency, the first species rule has never been incorporated into any code of zoological nomenclature, while the elimination principle has ever been a basic principle in all—not in express terms, but as an inevitable result of the rules for determining types. Consequently, the large number of originally composite genera having the first species as type, shown by Mr. Stone's statistics, is the result of coincidence rather than the conscious application of a 'first species' principle.

It has been claimed that a large number of 'minute rules' are necessary for the application of the principle of elimination, a point emphasized by Mr. Stone in his reference to Dr. Stiles's method, which is by no means so complicated and abstruse as Mr. Stone's passing reference to it would imply. As I have said in another connection:

> The method of fixing generic types by elimination is merely the process of applying the rule of priority to genera formed by the breaking up of comprehensive groups originally designated as genera. It has been objected to as abstruse and difficult of application, even by some who have, but unconsciously, been in the habit of using it. * * *
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> (*a*) An author who first subdivides a genus may restrict the original name to such part of it as he may judge advisable, and such assignment shall not be subject to subsequent modification (=A. O. U. Code, Canon XXI.).
>
> (*b*) When, however, any of the original species of a genus have been removed by subsequent authors, and have become types of, or are strictly congeneric with the types of, other genera, without the designation of any of them as the type of the original genus, the type must be chosen from the remaining species; if, however, all have been removed, the last species thus removed shall be taken as the type of the original genus. If, however, the genus originally contained both exotic and non-exotic species—from the standpoint of the author—and the generic term is one originally applied by the ancient Greeks or Romans, the last of the non-exotic species to be removed shall be taken as the type of the original genus.

This is the elimination method—simple and perfectly easy of comprehension, but liable to give rise to perplexing complications through questions of synonymy, arising from the fact that certain groups that have been separated and named as generic are treated by some authors as genera and by others relegated to synonymy. It necessitates, however, a thorough knowledge of the literature of the cases involved, and of the zoological relationships of all the species concerned in the inquiry. It is, therefore, not a task a novice should meddle with; but there is no prohibitory law against incompetents, to whose meddling in the past our present state of uncertainty in not a few cases is due.

On the other hand, according to Mr. Stone's presentation of the case, it is perfectly easy for anybody able to read to determine the type of a genus. He says: "It is necessary to consult only the original reference to ascertain the type of the genus." "The question

[2] See Science, N. S., Vol. XVI., pp. 114, 115, July 18, 1902.

is settled independently for each genus, the result does not depend upon the fixing of the type of some other genus." Again he says: "That we have in the 'first species' rule a method that can lead to but one result and can be practised by any one, and by which the type of a genus can be ascertained at once by consulting one reference, instead of involving the examination of many works and the expenditure of much time and thought."

Unfortunately, this method is not always so simple and direct as here stated, as the citation of a single instance from among many will show. The case of the Linnæan genus *Vultur,* I find, has given a correspondent of mine some trouble in trying to determine the type by the 'elimination' method, and in despair he fell back on the 'first species' principle as the only way out of the difficulty open to him. This case will also show that an intimate knowledge of the literature of the subject is sometimes necessary, and that more than 'one reference' must be consulted even under the 'first species' rule. *Vultur* is also a genus the currently accepted type of which must be changed in any event, whether the 'first species' or the 'elimination' method be employed.

Vultur,[3] as originally established, contained six species, each of which, in the course of time, became, from the standpoint of current nomenclature, the type of a distinct genus, leaving no species in the original genus *Vultur.* The species now currently recognized as the type was not described till eight years after the genus was founded, and hence under all codes is inadmissible as its type. The species originally included in *Vultur* are:

1. *gryphus,*
2. *harpyja,*
3. *papa,*
4. *aura,*
5. *barbatus,*
6. *percnopterus.*

They were removed to other genera in the following order:

1784, *barbatus,* as type and only species of *Gypaëtus* Storr.

1806, *gryphus* and *papa* to *Sarcorhamphus* Duméril.

1808, *percnopterus,* as type and only species of *Neophron* Savigny.

[3] Linnæus, 'Syst. Nat.,' 10th ed., 1758, p. 86.

1811, *papa* and *aura* to *Carthartes* Illiger.

1816, *papa* and *gryphus* to *Gypagus* Vieillot.

1816, *harpyja,* as type and only species of *Harpia* Illiger (preoccupied), vice *Thrassaëtus* Gray, 1840.

Of the genera formed from *Vultur* three—*Gypaëtus, Neophron,* and *Harpia*—were originally monotypic and require at this point no further consideration. *Sarcorhamphus* consisted originally of three species, indicated by vernacular names, namely:

1. Le condor = *V. gryphus* Linn.
2. Le papa = *V. papa* Linn.
3. Le ouricou = *V. auricularis* Daudin, 1800.

Carthartes originally contained two species:

1. *V. papa* Linn.
2. *V. aura* Linn.

Taking the 'first species' rule, and the assurance that 'It is necessary to consult only the original reference to ascertain the type of the genus,' we arrive at the following results:

The type of *Vultur* must be *gryphus,* the first species.

The type of *Sarcorhamphus* must be *gryphus,* the first species; *Sarcorhamphus* thus becomes a synonym of *Vultur,* it having the same type.

The type of *Cathartes* must be *papa,* the first species.

The type of *Gypagus* must be *papa,* the first species; *Gypagus* thus becomes a synonym of *Cathartes,* it having the same type.

Taking all the species involved in the case of *Vultur,* the nomenclature resulting from the application of the first species rule, compares with that now current, as follows:

First Species Rule.	Current Names.
Vultur gryphus,	*Sarcorhamphus gryphus.*
Cathartes papa,	*Gypagus papa.*
Œnops aura,	*Cathartes aura.*
Ægypius monachus,	*Vultur monachus.*
Otogypus auricularis,	*Otogyps auricularis.*

By this method two genera are reduced to synonymy and the generic designation is changed for four species.

Under the principle of elimination the case works out as follows:

Sarcorhamphus, 1806; species: *gryphus, papa, auricularis.* The species *papa* was removed to *Cathartes* in 1811, *gryphus* to *Gypagus* in 1816, leaving *auricularis* as the type of *Sarcorhamphus.*

Cathartes, 1811; species: *papa, aura.* The species *papa* was removed to *Gypagus* in 1816, leaving *aura* as the type of *Cathartes.*

Gypagus, 1816; species: *papa, gryphus.* The species *gryphus* was removed to the genus *Gryphus* (Bonap.) in 1854, leaving *papa* as the type of *Gypagus.*

Gryphus, 1854; species: *cuntur* Dum. (= *gryphus* Linn.), *californianus.* By both tautonomy and elimination, *gryphus* is the type of the genus *Gryphus,* as *californianus* became the type of *Gymnogyps* Lesson in 1842.

Recapitulation:

1784. *Gypaëtus*—type *barbatus.*

1808. *Neophron*—type *percnopterus.*

1811. *Cathartes*—type *aura.*

1816. *Gypagus*—type *papa.*

1816. *Harpia* (vice *Thrassaëtus*)—type *harpyja.*

1850. *Gryphus*—type *gryphus.*

As *gryphus* was the last species removed from the genus *Vultur* it is its type by elimination, as well as by the 'first species' rule.

The nomenclature resulting from the elimination method for all the species involved in the case of *Vultur* compares with current nomenclature as follows:

By Elimination.	Current Names.
Vultur gryphus,	*Sarcorhamphus gryphus.*
Gypagus papa,	*Gypagus papa.*
Cathartes aura,	*Cathartes aura.*
Ægypius monachus,	*Vultur monachus.*
Sarcorhamphus auricularis,	*Otogyps auricularis.*

The result is, by coincidence, the same as regards the type of *Vultur* by both methods, but two genera long in current use are conserved.

If, in the case of *Vultur,* the first species had been *barbatus* instead of *gryphus,* the 'first species' rule, if enforced, would conflict with the universally accepted rule that a monotypic genus takes its sole species as its type, thus throwing out the genus *Gypaëtus,* based on the first species removed from *Vultur.* In other cases just this state of affairs is undoubtedly to be expected, in some instances.

There are four conditions, any one of which, when present, determines the type of a genus beyond appeal, under current usage:

1. A genus that is monotypic when founded necessarily takes its only species as the type.

2. When the type is designated by its author at the time of founding the genus.

3. When the name of the genus is the same as that of one of its species, or like that of a synonym of one of its species, or is based upon such a name—in other words, by the rule of tautonomy.

4. When some subsequent author has selected one of its species as its type.

As shown by Mr. Stone, nearly 75 per cent. of the bird genera come under one or the other of the first three of these provisions; and this ratio would probably hold good for most of the other classes of animals. This leaves only about one quarter of the names of zoological genera open to more or less doubt, or within the scope of some special rule for the fixation of types. So that whatever rule may be adopted, a comparatively small number of genera will be affected by it. Contrary to all codes of nomenclature, and in defiance of almost universal usage, Mr. Stone ignores the fixing of a type by a later author than the founder of the genus; this needlessly increases the number of open cases by from probably 50 to 75 per cent.

The trouble with elimination is that the manner of its application has never been properly defined, leaving those who attempt to apply the principle largely to their own devices as to the method of its use. Only experts, or those endowed with a natural cleverness in handling such questions, have been able to apply it with proper discretion and success. The A. O. U. Code simply says (Canon XXIV.): "When no type is specified, the only available method of fixing the original name to some part of the genus to which it was originally applied is by the process of elimination, subject to the single modification provided for in Canon XXIII." This is to the effect that if a "genus contains both exotic

and non-exotic species—from the standpoint of the original author—and the generic term is one generally applied by the ancient Greeks or Romans, the process of elimination is to be restricted to the non-exotic species." This provision was intended to prevent the incongruity of applying an ancient Greek or Latin name to species wholly unknown to the ancients, and thus using it in a grossly inapplicable sense. This, however, is an unnecessary provision, inasmuch as one of the fundamental rules of all modern codes is (A. O. U. Code, Canon XXXI.): "Neither generic nor specific names are to be rejected because of barbarous origin, for faulty construction, for inapplicability of meaning, or for *erroneous signification.*" Since under this rule we tolerate all sorts of absurdities and inconsistencies in names, why should we make this single exception to guard against a mild incongruity? Why, in other words, 'strain at a gnat and swallow a camel'? As this provision is open to diversity of construction in regard to what are 'non-exotic species from the standpoint of the author,' it should by all means be eliminated. If enforced in the case of *Vultur, gryphus* could not be its type. If abrogated, the method of elimination is simplicity itself, as is clearly shown in a later paragraph of this paper. The framers of the code were apparently themselves so familiar with the elimination principle that the necessity of prescribing rules regarding the method of its use for those less fortunate in this respect did not occur to them. It is, therefore, not to be wondered at that in inexpert hands dissimilar results follow its faulty application. Dr. Stiles's rules and suggestions, referred to by Mr. Stone, relate only in small part to the method of elimination; they cover the whole field of the determination of generic types, including the 'four conditions' enumerated above, and relate mainly to a single one of them, being suggestions for the selection of types under the prerogative of the 'first reviser.'

Much of the perplexity and uncertainty in determining types by the elimination method is unjustly ascribed to it, being due to the lack of conviction on the part of authors as to just what groups that have been awarded, by one author or another, the rank of genera are or are not entitled to such recognition, and to the complications of synonymy that necessarily result from this uncertainty. The application in such cases of the first species rule instead of the elimination method does not in the least help the matter, as is obvious from the nature of the case. Yet the onus of the trouble has time and again been saddled on elimination.

Elimination, properly applied, is an exceedingly simple and definitive process. We have a genus, composed originally of several species, the type of which it is necessary to determine.

(1) Species added subsequent to the founding of the genus are excluded from consideration. (2) If some or all of the original species have been made the types of other genera, or are strictly congeneric with such types, they can not be taken as the type of the original genus, unless all have been so removed, when the last species thus removed becomes the type. (3) If only a part have been removed, the type is to be selected by the reviser from those that remain. (4) If none have been removed, any one of them may be taken as the type, at the discretion of the reviser—either the first species or any other.

By the first species rule the work of the first reviser is eliminated; hundreds of genera which have had their types thus fixed are in current use, and in many cases have been in current use for decades, and to displace them through the introduction of a new rule would cause great and needless confusion. The tendency has been, during recent years, to preserve old names, whether generic or specific, wherever possible.

By the first species rule, if the first species is unidentifiable in a genus originally containing a number of species, but for which the founder gave no type, the genus is eliminated as having no standing, although the type may have been fixed by some later author, and the genus be in good standing under current rules of nomenclature.

By the first species rule, where the first species happens to be the same in two or more

genera, no matter how differently the genera may be constituted—whether containing two species or a much greater number—all the later genera become pure synonyms of the earliest genus, necessitating the giving of new names to the later genera and the consequent changing of the generic designation for all the species contained in them.

It is thus evident that Mr. Stone's statistics greatly underestimate the number of changes in names that would result from the adoption of the first species rule.

In a footnote (*l. c.*, p. 561) Mr. Stone suggests that in the case of Linnæan genera we may accept them arbitrarily, inasmuch as there is 'practical unanimity of opinion' as to their types. This may be true as regards birds, and possibly some other groups, but it is not true in general. The A. O. U. Committee, if it sees fit, and is so authorized by the A. O. U., can adopt such a rule with reference to the A. O. U. Check List of North American birds, but there is no assurance that such a ruling would be generally adopted by other ornithologists, while the contrary is quite certain as to zoologists at large. The appalling results that would follow the adoption of the first species rule without such a reservation might force its adherents to its adoption, since otherwise its strict enforcement would result in such radical changes as the transference of many Linnæan genera to other families than those with which they are now associated, and entail also the changing of many family names, and bring in endless confusion in nomenclature instead of the stability we all profess to be striving to secure.

Mr. Stone in his endeavor to show "the various ways in which 'elimination' is applied in practise," publishes a series of hypothetical questions sent out by him to various naturalists, with a summary of their replies. These show practical unanimity in only about 50 per cent. of the cases, and that in many others the answers were widely divergent. The real cause of the discrepancy is not difficult to discover. The questions were stated in so ambiguous a manner that they were open, in a number of instances, to diverse interpretations. I have met personally at least one third of those who sent replies, and thus know that in several cases two and sometimes three different interpretations were put upon the same question. If actual cases had been cited, with proper references to the book and page, so that the real conditions could be studied, it might then have been claimed that a real test had been made of how 'elimination' works in practise.

One of the most surprising statements in this remarkable paper is the assertion: "Elimination has never been practised in Europe and does not seem to be understood by foreign writers, and in the majority of cases the first species is taken by them as the type." The history of nomenclature gives no warrant for such a statement. In the first place, the first species rule has never been included in any zoological code. On the contrary, the provisions for determining generic types either expressly prescribe elimination or distinctly involve that method. The 'Proceedings' of the fourth International Zoological Congress, held in London in 1898, includes a report, some 70 pages in length, of an *International* Committee of Entomologists on the 'Nomenclature of Lepidoptera.' The burden of the report is *any method except the first species rule.* One prominent entomologist says: "The selection of the first in the list of those originally included has no justification whatever; we might as well choose the last, and better the middle one. The species placed first is usually not the most typical but the most exceptional."

The first species rule has been tried in the past and found wanting. More than half a century ago it was adopted by prominent leaders in different branches of zoology, particularly in ornithology and ichthyology; they secured a small following, which soon dropped away, leaving only here and there, among the older authors, a disciple who consistently persisted in its use.

'Elimination,' or the rule of priority method, is interwoven throughout the whole fabric of nomenclature. It is practised everywhere in delimiting the 'type form' in a heterotypic species, in which the earliest name is reserved for the form first described. Here,

as in the determination of generic types, elimination is simply the application of the most fundamental of nomenclatural rules, *the law of priority*.

J. A. ALLEN.
AMERICAN MUSEUM OF NATURAL HISTORY,
NEW YORK.

MISREPRESENTATIONS OF NATURE IN POPULAR MAGAZINES.

IN the December number, 1906, of *The Wide World* E. W. G. Wesson claims to have passed by boat on the Colorado River through the Grand Canyon. The greater part of his descriptive matter has been taken, paragraph by paragraph from R. B. Stanton's account of the descent made years ago by Stanton's second party, and of the descriptions which are original with Wesson, some are so original as to be totally outside of the realm of truth.

That he never made the journey which he claims to have made is evident, and the magazine which publishes such falsehoods does much harm and discredits itself.

A. R. CROOK.

SPECIAL ANATOMY AND PHYSIOLOGY OF THE GASTEROPODA OF THE UNITED STATES—LEIDY. A CORRECTION.

TO THE EDITOR OF SCIENCE: Through an oversight when preparing a bibliography of the late Professor Joseph Leidy's contributions to science, published (1904) under the auspices of the Smithsonian Institution and incorporated in a publication under the title 'Researches in Helminthology and Parasitology by Joseph Leidy, M.D., with a bibliography of his contributions to science,' 1904, the writer neglected to incorporate the title to a work on the 'Special Anatomy of the Gasteropoda of the United States,' Boston, 1851, pp. 65, plates 16, published in conjunction with the work of Amos Binney and W. G. Binney, entitled 'Terrestrial Breathing Mollusks of the United States and Adjacent Territory of North America,' edited by A. A. Gould, Boston, 1851–9.

The work of Leidy devoted to the special anatomy and physiology of various gasteropod mollusks may be found in section 11, Vol. I.

The writer regrets the oversight, particularly as it is a work to which frequent reference is made by investigators along similar lines of research, and more so since the publication was well known and special care was taken to see that it appeared in the original bibliography.

JOSEPH LEIDY, JR.

EARLY TYPES OF MAN IN IOWA.

TO THE EDITOR OF SCIENCE: In connection with the article on the discovery of an early type of man in Nebraska, I wish to call attention to what seem to be similar types from mounds in Iowa. In the proceedings of the Davenport Academy, Vol. VI., is a paper by Professor Frederick Starr on a 'Summary of the Archeology of Iowa,' in which are figured two skulls, said to be of the Neanderthal type. One of these was found in a mound in Chickasaw County and the other in Floyd County. While it is difficult to decide from the illustrations, as to whether these skulls are of the Neanderthal type, it is obvious that they bear striking resemblances to it. It is also suggestive that these skulls should be found west of the Mississippi and in a part of the same geographical area from which comes the Nebraska man.

C. W.

MALAY AND FILIPINO BASKETRY.

TO THE EDITOR OF SCIENCE: No doubt this will fall under the eyes of more than one who has examined Malay or Filipino basketry. Everywhere in Malaysia is to be found a knot in coarse or fine splits and stems of tough and pliable plants, used in place of nails, screws, pegs and the like. This knot is practically two round turns and two half hitches. It may be described thus: (1) Pass the free end of the split or other binder toward the right to where the knot is to be tied; (2) then under and around these parts and behind the standing-part; (3) pass the free end again around in the same direction, bringing it this time in front of the standing-part and under the two round turns toward the right; (4) take a half hitch around the standing-part