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TERMINOLOGY OF TYPES[1]

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I. INTRODUCTION

A. PURPOSE OF THE PAPER

Recognition of the value of specimens as types of species and nomenclatural units of lesser rank has led to the proposal of many terms, in the hope that systematists in general would recognize the value of the objects thus indicated, and would appreciate their importance as available elements of well cared-for collections. Specialists dealing with generic nomenclature have introduced, in addition, a series of expressions denoting species that are to be regarded as types of genera. Disregard or ignorance of existing literature has led to the proposal of many terms that are, unfortunately, either homonyms or synonyms of terms already in existence, or that do not conform to the accepted rules of nomenclature. In other instances this disregard has resulted in redefinitions of questionable value.

One does not have to go far afield for examples of lack of uniformity in current type terminology. On the same page of a well-known book one subgenus has a "holotype" and another subgenus a "genoholotype," whereas on another page a subgenus has a "subgenotype." What does "lectotype" mean? In 1905 it meant a "syntype chosen, subsequently to the original description, to take the place which in other cases a holotype occupies." In 1925 it meant a specimen chosen by a later author when no holotype exists. But in 1928 it was proposed—

[1] Read in part before the Paleontological Society, Pacific Coast Branch, April 8, 1933.

in apparent ignorance of prior usage—as a genotype and defined as a "type by subsequent designation." For the term "genotype" alone there are more than thirty synonyms.

In order to forestall any further confusion, a list of nomenclatural type terms has been compiled, with annotations, showing those which may be considered available and those that should be rejected. With these nomenclatural terms are included words compounded with "type" (insofar as they are employed in biology) but which do not denote types in the nomenclatural sense.

B. NATURE OF A NOMENCLATURAL TYPE

There is considerable literature dealing with the type-concept in biology. Since the purpose of this paper is to evaluate the type terms already in existence rather than to treat the question of types in general, a detailed discussion of the nature of a type term is beyond its scope. Reference to the papers listed in the accompanying bibliography is essential to an understanding of the nature of types and the necessity for their use.

A type, in biological nomenclature, has been described as an anchor by which a specific or generic *name* is fixed. It may be a tangible object, as the *type specimen* (or type specimens) of a species, or intangible, as the *type species* of a genus. In either case the type is the final piece of evidence by which a name is evaluated. Moreover, nomenclatural units are distinct from biological units. Every proposed specific *name*, for example, is a nomenclatural *species* and has one or several type *specimens*. Similarly, every adequately defined generic *name* is to be regarded as a nomenclatural *genus* and must have its type *species*. Disposition of these names depends, in the absence of homonymy, upon the biologic elements upon which they are based. Thus, if the type specimens of a number of nomenclatural species fall within the limits of a single biological species (that is, have certain characters in common, occupy the same general ecological position, presumably interbreed, and so on), the specific names are shown to be synonyms and the earliest is given preference. Further, a nomenclatural type is not necessarily "typical" of the biological spe-

cies. An average specimen of a species (a biologically typical form) may differ materially from the specimen that is, through the accident of collection or selection, made the type of the species. Nevertheless, examination of a series of specimens will demonstrate indisputably that the two specimens belong to the same biological unit and must bear the same specific name.

C. CHOICE OF TYPE TERMS

All the terms incorporated in the following list were proposed (some with definition, many without) for use in biology and are, therefore, to be considered by systematists in any field. Which of these terms shall we employ? Should current usage, priority, completeness of definition, or the preference of the individual worker prevail? The present chaotic condition cannot be alleviated unless some logical basis for selection is established. Priority, except where it conflicts radically with usage, is the basis recommended by the writer.

Availability of a term, however, does not imply its recommendation. On the contrary, a limited number of terms is desirable if the goals of uniformity of usage and ease of comprehension are to be attained. Certain groups of organisms, of course, will require types and corresponding terms which would be absurd in other groups. Thus the term "morphotype" for a particular specimen of one generation of a dimorphic foraminifer might be appropriate, or the term "nepionotype" for a selected and designated example of a larval stage of a cephalopod species. On the other hand, any specimen in any collection can be classed as some type or even labelled with a number of type terms. For example, a specimen which any working systematist would regard as a *paratype* might very well be at the same time an *adelfotype*, an *alloparatype*, an *androtype*, a *lipotype*, a *mimotype* and a *paraedoeotype*.

Although the judicious use of hyphens would be a great help in conserving space in publications, as well as the time of authors, it could not reduce the fundamental absurdity of such a term as *para-adelfo-allopara-andro-lipo-mimo-paraedoeotype*. The information conveyed by this formidable set of terms

(that the specimen was included in the original collection; was used as basis for the original description; that it is of the same sex (male) as the allotype; shows the genitalia; is characteristically absent from certain faunas; and is analogous to certain unrelated forms in other countries) would require little more space in a catalogue or publication than is necessary for the terms themselves. Similarly, many equally absurd terms may be avoided simply by writing on the specimen-label the authority for, and date of, the identification.

D. RECOMMENDATIONS

This paper is presented with the full realization that there will always be two points of view in regard to type terminology. One group of workers will advocate the use of but few terms, whereas another group will feel that a large number of precise terms implies precision of method. Consideration of these views in a symposium on procedure in the description of a new species, recently held in the paleontological division of the Department of Geology at Stanford University, demonstrated the need for a summary of terms such as that presented herein. The consensus of opinion, further, was that the logical course in dealing with nomenclatural types is to reduce the number of terms to the minimum; thus each term becomes genuinely significant and the total bulk is not too great for the average curator or taxonomist. With this idea in mind the writer recommends that the general use of type terms be restricted to *genotype, syntype, holotype, paratype, lectotype, neotype, hypotype, topotype, homoeotype,* and *plastotype,* as hereafter defined.

E. ACKNOWLEDGMENTS

To Professor M. H. Hatch, of the University of Washington (Seattle), the writer is indebted for pointing out to him the useful paper by Horn,[2] which has aided materially in this compilation. Thanks are due to Miss Helena M. Nye, of the Department of Germanic Languages at Stanford University, for assistance in translation. Professor Siemon W. Muller

[2] See bibliography.

and Professor LeRoy Abrams, of Stanford University, Dr. George S. Myers, of the U. S. National Museum, and Dr. J. Clausen of the Carnegie Laboratory, Stanford University, kindly pointed out terms which would otherwise have escaped the writer's notice. Mr. Edward T. Schenk has given the various terms practical consideration during a cataloguing of the Stanford type collection of fossils. Finally, Professors Hubert G. Schenck and Gordon Ferris, of Stanford University, have offered suggestions for the improvement of the manuscript.

F. SELECTED BIBLIOGRAPHY

Bather, F. A.—A postscript on the terminology of types. *Science*, (n. s.), vol. 5, pp. 843-844, 1897.

Cook, O. F.—The method of types. *Science*, (n. s.), vol. 8, p. 513, 1898.

The method of types in botanical nomenclature. *Science*, (n. s.), vol. 12, p. 475, 1900.

Types and synonyms. *Science*, (n. s.), vol. 15, pp. 646-656, 1902.

Terms relating to generic types. *American Naturalist*, vol. 48, pp. 308-314, 1914.

Holland, W. J.—Forum on problems of taxonomy: Types. *Trans. 4th Inter. Congress of Entomology, Ithaca, August, 1928*, vol. 2, pp. 688-693, (1929).

Horn, W.—Über den musealen Missbrauch mit Insekten— <Typen>. *X^e Congrès International de Zoologie*, Sect. 6—Athropodes, pp. 1022-1042, 1929.

Howell, B. F.—Third report of special committee on marking of type specimens. *Bull. Geol. Soc. Am.*, vol. 40, pp. 215-220, 1929.

Lindholm, W. A.—Vorschläge zur genaueren Bezeichnung der Genotypen. *Zoologischer Anzeiger*, Bd. 63, s. 161-165, 1925.

Eine weitere Kategorie von Genotypen. *Zoologischer Anzeiger*, Bd. 63, s. 245-247, 1925.

On the designation of genotypes. *Nautilus*, vol. 41, pp. 97-98, 1928.

Marsh, O. C.—The value of type specimens and importance of their preservation. *American Journal of Science*, vol. 6, pp. 401-405, 1898.

Merriam, C. H.—Type specimens in natural history. *Science*, (n. s.), vol. 5, pp. 731-732, 1897.

Thomas, O.—Suggestions for the more definite use of the word "type" and its compounds as denoting specimens of a greater or less degree of authenticity. *Proc. Zoological Society*, pp. 241-242, 1893.

Types in natural history and nomenclature of rodents. *Science*, (n. s.), vol. 6, pp. 485-487, 1897.

Schuchert, C.—What is a type in natural history? *Science*, (n. s.), vol. 5, pp. 636-640, 1897.

(and S. S. Buckman)—The nomenclature of types in natural history. *Annals annd Magazine of Natural History*, (ser. 7), vol. 16, pp. 102-104, 1905.

(and S. S. Buckman)—La nomenclature des types d'histoire naturelle. *Archives de Zoologie expérimentale et générale*, vol. 4, pp. 14-16, 1905.

Catalogue of the type and figured specimens of fossils, minerals, rocks, and ores. Pt. I. Fossil Invertebrates. *Bull. U. S. National Museum*, No. 53, pp. 9-18, 1905.

Swingle, W. T.—Types of species in botanical taxonomy. *Science*, (n. s.), vol. 37, p. 864, 1913.

Waterston, J.—Forum on problems of taxonomy: Discussion on types. *Trans. 4th Inter. Congress of Entomology, Ithaca, August, 1923*, vol. 2, pp. 695-699, (1929).

II. ANNOTATED LIST OF TERMS

A. EXPLANATION OF ANNOTATIONS

In the following list, symbols have been employed to indicate the status of the various terms. Terms printed in boldface type are recommended by the writer (for example, **genotype**); large capitals indicate terms which, although not recommended, are available for use (as AEDOEOTYPUS); homonyms are shown in large and small capitals (LECTOTYPE); and synonyms are in italics (as *adelfotype*). If a term is both a homonym and a synonym, it is printed as the former but with its equivalent expression within parentheses. The "equals" sign (=) indicates terms considered by the writer absolutely or partially equivalent. Brackets ([ ]) inclose those terms which seem objectionable or are not nomenclatural. An asterisk (*) preceding a term indicates that the definition and reference are taken directly from Horn,[3] the only change being in translation.

The following definitions, unless otherwise indicated, are the work of the writer and represent either abstracts of original definitions or interpretations of usage. In either case the source is indicated by the appended reference.

[3] See bibliography.

B. LIST OF TERMS

1. **Adelfotype* (= topotype?) — a topotype obtained by the original collector of the species.
   Dallas: *Rev. Chil. Hist. Nat.*, vol. 31, p. 212, 1927.

2. *AEDOEOTYPUS — the first specimen of a species to have the genitalia studied, together with the genital preparation; useful in entomology. *See* holaedoeotypus, paraedoeotypus.
   Toxopeus: *III. Int. Ent. Kongr. Zürich*, Bd. 2, p. 468, 1925 (1926).

3. [*Agriotype] — a wild form which must be considered the ancestor of a domestic form. Not a nomenclatural type.
   Dallas: *Rev. Chil. Hist. Nat.*, vol. 31, p. 213, 1927.

4. **Allohomoiotype* (= homoeotype) — a homoeotype of the same sex as the allo- or lectoallotype.
   Betrem: *Treubia*, vol. 9, Suppl., pp. 3, 246, 1928.

5. **Allolectotype* (= lectoallotype).
   Alexander (briefly).[4] Betrem: *Treubia*, vol. 9, Suppl., pp. 3, 223, 272, 290, 1928.

6. *ALLOPARALECTOTYPE — a specimen from the original material, of another sex than the holotype, and designated later than the original publication of the species.
   Betrem: *Treubia*, vol. 9, Suppl., p. 3, 1928.

7. **Alloparatype* (= paratype) — a paratype of the same sex as the allotype.
   Betrem: *Treubia*, vol. 9, Suppl., p. 3, 1928.

8. **Alloplesiotype* (= hypotype) — a hypotype of the same sex as the allotype.
   Betrem: *Treubia*, vol. 9, Suppl., p. 3, 1928.

9. **Allotopotype* (= allotype + topotype) — an allotype from the same locality as the holotype.
   Alexander: *Ann. Ent. Soc. Amer.*, vol. 12, p. 328, 1919.

[4] The reference is taken from Horn (see bibliography). Alexander apparently was the original proposer of the term.

10. ALLOTYPE I — a paratype of the opposite sex to the holotype. *See* allotopotype, neallotype.
    Banks & Caudell: *Entomological Code*, Washington, p. 15, 1912.

11. *ALLOTYPE II — a specimen of the opposite sex to the holotype and selected by a later worker.
    Horn: *X^e Congrès Inter. d. Zool.*, sect. 6, p. 1025, 1929.

12. ALLOTYPE III (= paratype or hypotype) — a specimen chosen by the original author of a species to show morphologic features not exhibited by the holotype. For example, the holotype of a fossil brachiopod might be a dorsal valve, the "allotype" would then be a specimen showing the ventral valve.
    Burling: *Journ. Wash. Acad. Sci.*, vol. 2, p. 519, 1912.
    Howell: *Bull. Geol. Soc. Am.*, vol. 40, p. 219, 1929.

13. ANDROTYPE — a designated specimen of the male sex.
    Banks and Caudell: *Entom. Code, Wash.*, p. 15, 1912.

14. **Anirotype* (= chirotype).
    Dallas: *Rev. Chil. Hist. Nat.*, vol. 31, p. 211, 1927.

14a. [Antetype] (= prototype).
    Webster's New International Dictionary, (Springfield, Mass.) p. 94, 1925.

15. *Apogenotyp* (= genotype) — in case a genus is renamed because of homonymy, its type species automatically becomes the apogenotyp of the renamed genus.
    Lindholm: *Zool. Anzeiger*, Bd. 63, s. 162, 1925.

16. *Apogenotype* (= genotype) — defined as "type fixation through substitution." *See* apogenotyp.
    Lindholm: *Nautilus*, vol. 41, p. 98, 1928.

17. *Apotype* I (= hypotype) — "hypotype" was considered preoccupied and "apotype" proposed as a substitute. As the earlier use of "hypotype" was not in biology, the substitution was not necessary.
    Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 103, 1905. Banks & Caudell: *Entom. Code*, Wash., p. 15, 1912.

18. APOTYPE II (= genotype) — defined as "type fixation through substitution."
Baker: *Nautilus*, vol. 41, p. 21, 1928.

19. [Archetype] — the ancestral form of any group of organisms. *See* prototype. Not a nomenclatural term.
Darwin: *Origin of Species*, p. 431; also papers of R. Owen.
Swinnerton: *Outlines of Paleontology*, London, p. 270, 1923.

20. [Archetypal] — *See* archetype.
Swinnerton: *Outlines of Paleontology*, London, p. 270, 1923.

21. [*Architype] — a specimen which formed the basis of publication of a species previous to the modern type-interpretation. Unless such a specimen is included in one of the modern categories (in which it will be so termed) it cannot be included with types. *See* arquetype.
Dallas: *Rev. Chil. Hist. Nat.*, vol. 31, p. 214, 1927.

22. [**Arquetype*] (= architype).
Horn: *X^e Congrès Inter. d. Zool.*, sect. 6, p. 1025, 1929.

23. *Associate-type* (= syntype). *See* associierte type.
Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 11, 1905; *Science*, (n. s.) vol. 5, p. 636, 1897.

24. **Associierte type* (= syntype).— This is a German translation of "associate-type."
Horn: *X^e Congrès Inter. d. Zool.*, sect. 6, p. 1025, 1929.

25. *Autogenotyp* (= genotype) — type by original designation.
Lindholm: *Zool. Anzeiger*, Bd. 63, s. 162, 1925.

26. *Autogenotype* (= genotype) — *See* autogenotyp.
Lindholm: *Nautilus*, vol. 41, p. 98, 1928.

27. *Autogenotypic* (= isogenotypic).
Cook: *Amer. Nat.*, vol. 48, p. 309, 1914.

28. *Autotype* I (= hypotype) — a specimen illustrated by the author of a species after the date of publication.
Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 103, 1905. Banks & Caudell: *Entom. Code*, Wash., p. 15, 1912.

29. AUTOTYPE II (= genotype) — "type by original designation."

Baker: *Nautilus*, vol. 41, p. 21, 1928.

30. *Basic types* (= primary types) — includes holotype, cotype, paratype, lectotype and neotype.

Howell: *Bull. Geol. Soc. Am.*, vol. 40, p. 215, 1929.

31. [Biotype] — Individuals of the same "genotypical" constitution constitute a biotype. The term is used in genetics and is in no sense nomenclatural.

W. Johannsen: *Elemente der exakten Erblichkeitslehre*, 1909.

32. [*Biotypus] — "all individuals of a pure line." Not a nomenclatural term.

Horn: *Xe Congrès Inter. d. Zool.*, sect. 6, p. 1025, 1929.

33. CHIROTYPE — a specimen upon which an unpublished name *(nomen nudum, chironym)* is based. *See* anirotype, quirotype.

Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, pp. 9, 12, 1905. Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 104, 1905.

34. CHOROTYPE — a fossil specimen collected from the same stratum as the type, *but from a neighboring locality.*

Buckman: *Type Ammonites*, vol. 3, p. 11, 1920.

35. CLASTOTYPE — a part or fragment of the type specimen of a species. Proposed for use in botany.

Swingle: *Journ. Wash. Acad. Sci.*, vol. 2, p. 344, 1912.

36. CLONOTYPE — a specimen taken from a vegetatively propagated part of the individual plant from which the type specimen was obtained. Restricted to use in botany.

Swingle: *Journ. Wash. Acad. Sci.*, vol. 2, p. 345, 1912.

37. COLLATERAL-TYPE — any specimen used in the description of a species, with the exception of the primary types.

Schuchert: *Science*, (n. s.), vol. 5, p. 636, 1897.

38. *Cotype* I (= syntype) — any specimen of the author's original material when no holotype was designated.

Cossmann: *Revue Critique de Paléozoologie*, p. 74, 1904.
Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 11, 1905.

39. COTYPE II (= paratype) — any specimen of the original type material except the holotype.

See cotype I for references.

40. *Cyrioplesiotype* (= hypotype) — " . . . the principal or typical specimen among several plesiotypes."

Knight: *Journ. Paleo.*, vol. 4, Suppl. 1, p. 27, 1930.

41. [Description-type] — This applies to a description rather than to a specimen and is, in consequence, not a nomenclatural term.

Schuchert & Buckman: *Arch. de Zool. Exper. et Gen.*, vol. 4, p. 15, 1905.

42. *Deuterogenotypic* (= isogenotypic).

Cook: *Am. Nat.*, vol. 48, p. 309, 1914.

43. [Ecotype] — " . . . the ecological unit, to cover the product arising as a result of the genotypical response of an ecospecies to a particular habitat." That is, a form due to selection by environment as opposed to a direct ecologic response. Not a nomenclatural type.

Turesson: *Hereditas*, vol. 3, p. 345, 1922.

44. [Egg type] — *see* locality type.

Waterston: *Trans. 4th Inter. Congr. Entom., Ithaca, August 1928*, vol. 2, p. 696, 1929.

45. [Electotype] (= ?) — undefined; employed, in the case of a species with a poorly preserved holotype, for a specimen from a locality other than the type locality, but which agrees closely with the original description.

Etherington: *Univ. Calif. Publ., Bull. Dept. Geol. Sci.*, vol. 20, p. 100, 1931.

46. *Espèce-type* (= genotype) — a literal translation into French of "type species."

Cossmann: *Essais de paléoconchologie comparée*, livr. 3, p. 77, 1899.

47. [Figure-type] — A term applied to the original figure. *See* fototype.

Schuchert & Buckman: *Arch. de Zool. Exper. et Gen.*, vol. 4, p. 15, 1905.

48. [**Fototype*] (= iconotype) — a photograph of a type, rather than a type specimen and, consequently, omitted from nomenclatural consideration.

Dallas: *Rev. Chil. Hist. Nat.*, vol. 31, p. 213, 1927.

49. *Generotyp* (= genotype) — undefined; the type species of a genus.

Rutsch: *Eclogae geol. Helvetiae*, Bd. 24, No. 2, p. 252, 1931.

50. *Genoholotype* I (= genotype) — the single species upon which a genus is based; the species called "the type" by the author of the genus.

Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 16, 1905.
Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 104, 1905.

51. [GENOHOLOTYPE II] — used, without definition, for a figure that is regarded as the type of a genus. In the same reference, "genotype" has the conventional meaning. This usage of "genoholotype" conflicts radically with the original definition.

Galloway & Wissler: *Journ. Paleo.*, vol. 1, pp. 50, etc., 1927.

52. *Genolectotype* I (= genotype) — a species chosen from the series of genosyntypes to be the type of a genus.

Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 16, 1905.
Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 104, 1905.

53. [*Genolectotype* II]—a selected "genotype." *See* genotype III.

Buckman: *Type Ammonites*, vol. 6, p. 5, 1926.

54. [*Genoplesiotype*] (=plesiotype I) — an undefined term used to replace "plesiotype" in generic usage.

Cossmann: *Essais de paléoconchologie comparée*, livr. 7, p. 147, 1906.

55. GENOSYNTYPE — one of several species from which the type of a genus must be selected.

Schuchert: *Bull. U. S. Nat. Mus., No.* 53, pt. 1, p. 16, 1905. Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 104, 1905.

56. **Genotype** I — "Genotype," as originally proposed, referred to any *specimen* of the type *species* of a genus. Shortly after proposal it became evident that the type of a genus must be a *species* rather than a *specimen.* "Genoholotype" was then proposed for the type species of a genus. It is current practise to use "genotype" for the type species of a genus and some authors complete the reversal by applying "genoholotype" to a specimen. To avoid such confusion the writer here defines "genotype" (according to current usage) as *the single species upon which a genus is based.* "Genoholotype," in its original sense, is considered a synonym of "genotype."

Some workers wish to use other terms for generic types, depending upon how the type species as such, was determined. All that such terms can do, however, is to tell *why* a certain species is adopted — they cannot tell *where* (in what reference) or *when.* This information must always be added. The advantage gained, for example, by writing "orthotype: *X-us albus* Brown 1817, designated by John Doe, 1846" instead of "genotype: *X-us albus* Brown 1817, by subsequent designation (J. Doe, 1846)" is too slight to justify the retention of thirty or more complicated terms.

See apogenotype, apotype, autogenotype, autotype, espèce-type, generotyp, genoholotype, genolectotype, genoplesiotype, genosyntype, genotype auctorum, genotypi falsi, genotypi genuini, haplotype, idiogenotype, lectogenotype, lectotype, logotype, monogenotype, neogenotype, orthotype, paragenotyp, plesiogenotyp, plésiogénotype, pliogenotype, post-type, pseudogenotyp, pseudotype, standard species, subgenotype, tautogenotype, tautotype, type by absolute tautonymy, type by elimination, type by original designation, type by subsequent

designation, type by virtual tautonymy, type species, typus per indicationem, and type per selection.

Schuchert: *Science*, (n. s.), vol. 5, p. 639, 1897; *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 16, 1905.

57. [GENOTYPE II] — the sum total of the genes in an individual. A term in current use in genetics but not apt to be confused with a nomenclatural genotype.

W. Johannsen: Elemente der exakten Erblichkeitslehre, 1909.

58. [GENOTYPE III] — a short expression of "the genotype standard of reference;" a specimen upon which a genus is based, but not necessarily the holotype of the type-species. This usage conflicts with current practise.

Buckman: *Type Ammonites*, vol. 6. p. 5, 1926.

59. GENOTYPE IV (= ?) — the type species of a section.

Etherington: *Univ. Calif. Publ., Bull. Dept. Geol. Sci.*, vol. 20, p. 85, 1931.

60. [Genotype auctorum] — undefined, but used to designate a *specimen* upon which a subgenus is erected.

Tegland: *Univ. Calif. Publ., Bull. Dept. Geol. Sci.*, vol. 18, p. 280, 1929.

61. [Genotypi falsi] — invalid genotypes. *See* pseudotype.

Lindholm: *Zool. Anzeiger*, Bd. 63, s. 162, 1925.

62. *Genotypi genuini* (= genotypes) — valid genotypes.

Lindholm: *Zool. Anzeiger*, Bd. 63, s. 162, 1925.

63. GRAPHOTYPE — "preoccupied" (*fide* Howell); included here merely for completeness.

Howell: *Bull. Geol. Soc. Am.*, vol. 40, p. 216, 1929.

64. GYNETYPE — a designated type specimen of the female sex of a species.

Banks & Caudell: *Entom. Code*, Wash., p. 15, 1912.

65. *Haplotype* (= genotype) — a single species included within a genus at the time of original description.

Cook: *Amer. Nat.*, vol. 48, p. 314, 1914.

66. *Haplotypic* (= monotypic).

Cook: *Amer. Nat.*, vol. 48, p. 311, 1914.

67. *Heautotype* (= hypotype) — proposed to replace "autotype," which was considered preoccupied.
Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 103, 1905. Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, pp. 9, 14, 1905.

68. HETEROTYPICAL — applied to a genus including several generically unrelated species.
Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 16, 1905.

69. **Heterotypisch* (= heterotypical) — a German translation of the English term.
Horn: *X^e Congrès Inter. d. Zool.*, sect. 6, p. 1027, 1929.

70. **Hipotype* (= hypotype).
Horn: *X^e Congrès Inter. d. Zool.*, sect. 6, p. 1027, 1929.

71. **Holaedoeotypus* (= holotype + aedoeotypus) — an aedoeotypus, the preparation being made from the holotype of the species.
Toxopeus: *III. Int. Ent. Kongr. Zürich*, Bd. 2, s. 468, 1925 (1926).

72. **Holohomoiotype* (= homoeotype) — a homoeotype of the same sex as the holo- or lectotype.
Betrem: *Treubia*, vol. 9, Suppl. p. 3, 1928.

73. **Hololectotype* (= lectotype I).
Alexander: (briefly).[5] Betrem: *Treubia*, vol. 9, Suppl. pp. 3, 1928.

74. *HOLOPARALECTOTYPE — a specimen from the original material, later established as a paratype, that belongs to the sex described by the author.
Betrem: *Treubia*, vol. 9, Suppl., p. 3, 1928.

75. **Holoparatype* (= paratype) — a paratype of the same sex as the holotype.
Betrem: *Treubia*, vol. 9, Suppl., p. 3, 1928.

76. *Holoplastotype* (= plastotype) — undefined, but inferred from the reference to be the cast of a holotype.
Grabau: *Principles of Stratigraphy*, p. 919, 1913.

[5] Reference from Horn (See bibliography). Alexander originally proposed the term.

77. **Holoplesiotype* (= hypotype) — a hypotype of the same sex as the holotype.
Betrem: *Treubia*, vol. 9, Suppl., p. 3, 1928.

78. **Holotype** I — a single *specimen* (or fragment) upon which a *species* is based. *See* holaedoeotypus.
Schuchert: *Science*, (n. s.) vol. 5, p. 637, 1897; *Bull U. S. Nat. Mus.*, No. 53, pt. 1, pp. 9, 10, 1905. Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 103, 1905.

79. HOLOTYPE II (= genotype) — undefined, but used to indicate the type *species* of a subgenus.
Vaughan *in* Cushman: *Cushman Lab. Foram. Research*, sp. publ. No. 1, pp. 351, 352, 1928.

80. HOLOTYPE III (= paratype) — an unfortunate use of holotype due either to a typographical error or to a complete misunderstanding of the term.
McGinty: *Nautilus*, vol. 46, p. 65, 1932.

81. *Homeotype* (=homoeotype).
Banks & Caudell: *Entom. Code*, Wash., p. 15, 1912.

82. **Homoeotype** — a specimen compared by a competent observer with the holotype, lectotype, or other primary type of a species. "Homoeotype" was proposed to replace "homotype," which is preoccupied in biology. *See* allohomoiotype, holohomoiotype, homeotype, homotopotype, homotype, icotype, metatype, and tophomeotype.
Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 104, 1905. Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, pp. 9, 14, 15, 1905.

83. **Homotopotype* (= topotype + homoeotype) — a specimen from the original locality of a species, but not identified by the original author of a species. *See* tophomeotype.
Dallas: *Rev. Chil. Hist. Nat.*, vol. 31, p. 212, 1927.

84. [Homotype I] — that which is constructed on the same plan or type, as metameres of the body. Not a nomenclatural term.
Century Dictionary, vol. 4, p. 2871, 1895.

85. HOMOTYPE II (= homoeotype).
Walsingham & Durrant: *"Merton Rules,"* London, p. 13, 1896. Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 14, 1905.

86. [Host type] — *see* locality type.
Waterston: *Trans. 4th Inter. Congr. Entom., Ithaca, August 1928*, vol. 2, p. 696, (1929).

87. *Hypoplastotype* (= plastotype) — an artificial reproduction of a supplementary type.
Schuchert: *Science*, (n. s.), vol. 5, p. 639, 1897.

88. **Hypotype** — a described or figured specimen, used in publication in extending or correcting the knowledge of a previously defined species. "Plesiotype" is discarded because it is both a synonym and a homonym. *See* allopesiotype, allotype, apotype, autotype, cyrioplesiotype, heautotype, hipotype, holoplesiotype, morphotype, neoparatype, plesiotype, secundäre Typen, Supplementär-type, supplementary type.
Schuchert: *Science*, (n. s.), vol. 5, p. 637, 1897; *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 12, 1905. Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 103, 1905.

89. [*Iconotype] — a drawing or photograph of a type. *See* fototype.
Dallas: *Rev. Chil. Hist. Nat.*, vol. 31, p. 213, 1927.

90. *Icoplastotype* (= plastotype) — undefined; the text implies that this is a cast of an icotype.
Grabau: *Principles of Stratigraphy*, p. 919, 1913.

91. *Icotype* (= topotype + homoeotype + ideotype) — a specimen not necessarily used in literature but nevertheless serving a purpose in identification.
Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 104, 1905. Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, pp. 9, 14, 1905.

92. IDEOTYPE — a specimen examined by the nomenclator himself, but not a topotype. *See* icotype and idiotype.
Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, pp. 9, 15, 1905. Handlirsch: Schröder's *Handbuch der Entomologie*, Bd. 3, s. 89, 1925.

93. *Idiogenotyp* (= genotype) — type by first valid subsequent designation.
Lindholm: *Zool. Anzeiger,* Bd. 63, s. 162, 1925.

94. *Idiogenotype* (= genotype) — *see* idiogenotyp.
Lindholm: *Nautilus,* vol. 41, p. 98, 1928.

95. *Idiotype* (= ideotype).
Schuchert & Buckman: *Ann. Mag. Nat. Hist.,* (ser. 7), vol. 16, p. 104, 1905.

96. **Isocotype* (=topotype?).
Dallas: *Rev. Chil. Hist. Nat.,* vol. 31, p. 212, 1927.

97. ISOGENOTYPIC — applied to all genera based on the same genotype.
Viereck: *Bull. U. S. Nat. Mus.,* No. 83, p. 2, 1914. Cook: *Amer. Nat.,* vol. 48, p. 309, 1914.

98. [Isotype] — one of two or more forms common to different countries. A geographical rather than a nomenclatural type.
Gill: *Ann. Rept. Board Regents Smiths. for 1881,* p. 460, (1883). Schuchert: *Bull. U. S. Nat. Mus.,* vol. 53, pt. 1, p. 16, 1905.

99. ISOTYPICAL — applied to genera based on several congeneric species.
Schuchert: *Bull. U. S. Nat. Mus.,* No. 53, pt. 1, p. 16, 1905.

100. **Isotypisch* (= isotypical).
Horn: *Xe Congrès Inter. d. Zool.,* sect. 6, p. 1030, 1929.

101. [*Larval type*] (= nepionotype) — *see* locality type.
Waterston: *Trans. 4th Inter. Congr. Entom., Ithaca, Aug. 1928,* vol. 2, p. 696, 1929).

102. LECTOALLOTYPE I — a specimen from the original material designated later than the original example, and of the opposite sex to that of the lectotype. *See* allolectotype.
Curran: *Canad. Entom.,* vol. 58, p. 311, 1926.

103. LECTOALLOTYPE II — a selected "allotype"; *see* allotype III.
Burling: *Journ. Wash. Acad. Sci.,* vol. 2, p. 519, 1912.

104. *Lectogenotype* I (= genotype).
Bather *in* Buckman: *Type Ammonites*, vol. 6, p. 5, 1926.

105. [Lectogenotype II] — a selected "genotype"; *see* genotype III.
Buckman: *Type Ammonites*, vol. 6, p. 5, 1926.

106. *Lectoholotype* (= lectotype).
Curran: *Canad. Entom.*, vol. 58, p. 311, 1926.

107. **Lectoparatype* (= paralectotype).
Betrem: *Treubia*, vol. 9, Suppl., pp. 3, 127, 142, 1928.

108. **Lectotype I** — a syntype chosen, subsequently to the original description, to take the place which in other cases a holotype occupies. *See* hololectotype, lectoholotype.
Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 103, 1905. Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, pp. 9, 12, 1905.

109. *LECTOTYPE II — a specimen chosen by a later author when no holotype exists.
Handlirsch: Schröder's *Handbuch der Entomologie*, Bd. 3, s. 89, 1925.

110. LECTOTYPE III (=genotype) — type by subsequent designation.
Baker: *Nautilus*, vol. 41, p. 21, 1928.

111. [*Lipotype] — a form, the absence of which is characteristic of a fauna. Not a nomenclatural term.
Dallas: *Rev. Chil. Hist. Nat.*, vol. 31, p. 213, 1927.

112. [Locality type] — one of a series of expressions proposed to illustrate type terms reduced to absurdity. *See* seasonal type, sexual type, larval type, pupal type, egg type, host type, and mimetic phase type.
Waterston: *Trans. 4th Inter. Congr. Entom., Ithaca, August 1928*, vol. 2, p. 696, (1929).

113. *Logotype* (= genotype) — type by subsequent designation.
Cook: *Amer. Nat.*, vol. 48, p. 314, 1914.

114. *Logotypic* — refers to genera with types by subsequent designation. *See* logotype.
Cook: *Am. Nat.*, vol. 48, p. 311, 1914.

115. MEROTYPE — a part of an organism that furnished the type specimen of a new species; only applicable in the case of perennial plants or vegetatively propagated lower animals.
Swingle: *Journ. Wash. Acad. Sci.*, vol. 2, p. 212, 1912.

116. *Metatype* I (= topotype) — a topotype determined by the original author subsequent to publication of the species.
Thomas: *Proc. Zool. Soc.*, London, p. 242, 1893. Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, pp. 9, 14, 1905. Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 104, 1905.

117. METATYPE II (= homoeotype) — a specimen compared by the author of a species with the holotype subsequent to publication.
Walsingham & Durrant: *"Merton Rules,"* London, p. 13, 1896. Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 16, 1905.

118. [Mimetic phase type] — *see* locality type.
Waterston: *Trans. 4th Inter. Congr. Entom., Ithaca, August 1928*, vol. 2, p. 696, (1929).

119. [Mimotype] — one of two or more analogous forms (similar forms representing each other in different areas). Not a nomenclatural term.
Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 16, 1905.

120. *Monobasic* (= monotypical) — refers to a genus with a single included species at the time of publication.
Cook: *Amer. Nat.*, vol. 48, p. 311, 1914.

121. *Monogenotyp* (= genotype) — the single species included in a monotypical genus at time of publication.
Lindholm: *Zool. Anzeiger*, Bd. 63, s. 162, 1925.

122. *Monogenotype* (= genotype) — defined as a "type by original fixation." *See* monogenotyp.
Lindholm: *Nautilus*, vol. 41, p. 98, 1928.

123. MONOTYPE I — the holotype of a species which was described from a single specimen.
Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 16, 1905.

124. MONOTYPE II (= genotype) — defined as a "type by original fixation."
Baker: *Nautilus*, vol. 41, p. 21, 1928.

125. MONOTYPE III (= genotype) — the type of a monotypical genus.
Whitley: *Australian Zoologist*, vol. 7, pt. 3, p. 260, 1932.

126. *Monotypic* — *see* monotypical.

127. MONOTYPICAL — applied to a genus including only a single species at the time of publication.
Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 16, 1905.

128. **Monotypisch* (= monotypical).
Horn: *X^e Congrès Inter. d. Zool.*, sect. 6, p. 1031, 1929.

129. MONOTYPY — refers to monotypical genera; *see* monotypical.
Grant & Gale: *Mem. San Diego Soc. Nat. Hist.*, vol. 1, p. 502, etc., 1931.

130. MORPHOTYPE I — the type specimen of a different form of a dimorphic or polymorphic species.
Banks & Caudell: *Entom. Code*, Wash., p. 15, 1912.

131. MORPHOTYPE II (= hypotype) — a figured specimen not adding to knowledge of the morphology of a species.
Howell: *Bull. Geol. Soc. Am.*, vol. 40, p. 219, 1929.

132. **Neallotype* (= allotype?).
J. H. Durrant, Joicey & Talbot: *Bull. Hill Museum*, vol. 1, p. 7, 1921.

133. *NEANOTYPE — type of the pupa (in entomology).
Alexander: *Cornell Univ.*, Mem. 38, p. 743, 1920.

134. [Necrotype] — a form extinct in a locality. Not a nomenclatural term.
Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 17, 1905.

135. *Neocotype* (= neotype) — a new syntype, selected by a subsequent author, in the event of loss of the original type material.

Howell: *Bull. Geol. Soc. Am.*, vol. 40, p. 219, 1929.

136. [Neogenotype] — a new genotype chosen because the original genotype is to be considered unrecognizable. This practice is contrary to the International Rules of Zoological Nomenclature.

Cossmann: *Ann. d. Paleont.*, t. 7, p. 6, 1912. Marwick: *Rec. Cant. Mus.*, vol. 3, p. 506, 1932.

137. *Neoholotype* (= neotype) — a new holotype selected by a subsequent worker in the event of loss of the original type material.

Howell: *Bull. Geol. Soc. Am.*, vol. 40, p. 219, 1929.

138. *Neoparatype* (= hypotype) — a figured specimen used in addition to a type in redefinition of a species whose original types have been lost.

Plummer & Howell: *Bull. Geol. Soc. Am.*, vol. 43, p. 266, 1932.

139. *Neosyntype* (= neotype) — undefined, but presumably a new syntype selected by a later worker in the absence of any original type material.

Howell: *Bull. Geol. Soc. Am.*, vol. 40, p. 218, 1929.

140. [*Neotype* I] (= genotype) — type by subsequent designation or elimination.

Cossmann: *Essais de Paléoconchologie comparée*, livr. 2, p. 2, 1896. Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 13, 1905.

141. **Neotype** II—a later selected type of a species necessitated by loss of the original type material; the neotype must come from the original locality. Although "neotype" is preoccupied its usage seems so well understood that less confusion would result from the continuation of the term than from its rejection. *See* neocotype, neoholotype, and neosyntype.

Cossmann: *Essais de paléoconchologie comparée*, livr. 2, p. 2, 1896. Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 13, 1905. Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 103, 1905.

142. NEPIONOTYPE — type of the larva of a species.
Alexander: *Cornell Univ., Mem.* 38, p. 743, 1920.

143. ONOMATYPE — a specimen cited in print but not adding to knowledge of the morphology of the species.
Howell: *Bull. Geol. Soc. Am.*, vol. 40, p. 219, 1929.

144. [Oötype] — a genital organ in certain tapeworms. Not a nomenclatural term.
Shull, Larue and Ruthven: *Principles of Animal Biology*, (New York), p. 130, 1920.

145. *Orthotype* (= genotype) — type by original designation.
Cook: *Amer. Nat.*, vol. 48, p. 314, 1914.

146. *Orthotypic* — refers to genera with types by original designation. *See* orthotype.
Cook: *Amer. Nat.*, vol. 48, p. 310, 1914.

147. **Paraallotype* (= paratype) — *see* alloparatype.
Betrem: *Treubia*, vol. 9, Suppl., pp. 3, 208, 1928.

148. **Paraedoeotypus* (= paratype + aedoeotypus) — an aedoeotypus with the preparation made from a paratype.
Toxopeus: *III. Int. Ent. Kongr. Zürich*, Bd. 2, s. 468, 1925 (1926).

149. [Paragenotyp] — a genotype of later designation than that of the first reviser. *See* pseudotype.
Lindholm: *Zool. Anzeiger*, Bd. 63, s. 162, 1925.

150. *PARALECTOTYPE — a specimen from the original material designated subsequently as a paratype; *see* lectoparatype.
Alexander: (briefly).[6] Betrem: *Treubia*, vol. 9, Suppl., pp. 3, 113, 1928.

151. **Paratopotype* (= paratype + topotype) — a paratype from the same locality as the holotype.
Alexander: *Proc. Acad. Nat. Sci. Phila.*, p. 496, 1916.

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[6] Reference from Horn (See bibliography and footnote 4).

152. **Paratype** I — a specimen, other than the holotype, upon which an original specific description is based. *See* alloparatype, allotype, cotype, holoparatype, holotype, paraallotype, paraedoeotypus, paratopotype, syntype II.

Cossmann: *Revue Critique de Paléozoologie*, p. 74, 1904. Schuchert: Science, (n. s.), vol. 5, p. 639, 1897; *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, pp. 9, 11, 1905. Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 103, 1905.

153. [PARATYPE II] — in bacteriological usage, a form possessing the sum of the characters of the normal form but differing in one or more respects. No reference is available and the term is included here only for completeness.

154. *Paratype allotype* (= paratype) — a paratype from a different locality than the holotype.

Silvestri: *Trans. 4th Inter. Congr. Entom., Ithaca, August 1928*, p. 693, (1929).

155. *Paratype omotype* (= paratype) — a paratype from the same locality as the holotype.

Silvestri: *Trans. 4th Inter. Congr. Entom., Ithaca, August 1928*, p. 693, (1929).

156. *[Phaenotype] — a summation of the characters of an individual. Not a nomenclatural term.

Horn: *Xe Congrès Inter. d. Zool.*, sect. 6, p. 1033, 1929.

157. [*Phaenotypus*] — *see* phaenotype.

158. [Phase type] — a type specimen exhibiting a "phase" different from that of the holotype. That is, a specimen of another sex, age, dimorphic form, ecologic response, and so on.

Waterston: *Trans. 4th Inter. Congr. Entom., Ithaca, August 1928*, vol. 2, p. 696, (1929).

159. [*Phenotype*] — *see* phaenotype.

160. [*Photographotype*] (= phototype).

Kellerman: *Journ. Wash. Acad. Sci.*, vol. 2, p. 347, 1912.

161. [Phototype] — a photograph of a type specimen. *See* fototype.

Kellerman: *Journ. Wash. Acad. Sci.*, vol. 2, p. 347, 1912.

162. [Piesmotype] — a picture printed from a plate bearing an imprint made by mechanical means from an authentic merotype. Proposed for use in botany.

Swingle: *Science*, (n. s.), vol. 37, p. 866, 1913.

163. *Plastocotype* (= plastotype) — *see* plastoholotype.

Burling: *Journ. Wash. Acad. Sci.*, vol. 2, p. 519, 1912.

164. *Plastoholotype* (= plastotype) — the terms *"plastoholotype, plastocotype, plastoparatype,* etc., meaning respectively any artificial specimen moulded directly from a holotype, a cotype, a paratype, etc." were proposed for paleontologic use. If the "etc." were taken seriously, it would be possible to duplicate the entire number of previously proposed types by addition of the prefix "plasto-" to each.

Burling: *Journ. Wash. Acad. Sci.*, vol. 2, p. 519, 1912.

165. *Plastoparatype* (= plastotype) — *see* plastoholotype.

Burling: *Journ. Wash. Acad. Sci.*, vol. 2, p. 519, 1912.

166. **Plastotype** — any artificial specimen moulded directly from a type. *See* holoplastotype, hypoplastotype, icoplastotype, plastocotype, plastoholotype, plastoparatype, and protoplastotype.

Schuchert: *Science*, (n. s.), vol. 5, p. 639, 1897; *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 15, 1905.

167. [PLESIOGENOTYP] — any species which, at the time of the description of a genus, was only questionably or conditionally referred to the genus, and which has been since designated as the type. *See* pseudotype.

Lindholm: *Zool. Anzeiger*, Bd. 63, s. 162, 1925.

168. [*Plésiogénotype*] (= plesiotype I).

Cossmann: *Essais de paléoconchologie comparée*, livr. 9, p. 6, 1912.

169. [Plesiotype I] — a species related to the genotype (belonging to the same genus, subgenus and section) but occupying a different geologic formation or zoologic province. *See* genoplesiotype, and plésiogénotype.
Cossmann: *Essais de paléoconchologie comparée*, livr. 2, p. 2, 1896. Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 12, 1905.

170. PLESIOTYPE II (= hypotype + homoeotype) — a figured or described specimen which has been compared with the type specimen or original figure.
Cossmann: *Essais de paléoconchologie comparée*, livr. 2, p. 2, 1896. Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 12, 1905.

171. PLESIOTYPE III — a specimen identified by a later author.
Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 103, 1905.

172. *Pliogenotyp* (= genotype) — the type of a generic name which is a synonym of an earlier generic name.
Lindholm: *Zool. Anzeiger*, Bd. 64, s. 246, 1925.

173. [*Post-type*] (= neotype I + neotype II) — apparently this term was proposed at an early date but was definitely rejected in favor of neotype.
Cossmann: *Essais de paléoconchologie comparée*, livr. 2, p. 2, 1896.

174. **Primär-type* (= primary type).
Horn: *X^e Congrès Inter. d. Zool.*, sect. 6, p. 1033, 1929.

175. PRIMARY TYPE — a specimen upon which the description of a new species is based, wholly or in part. *See* basic types, primär-type, and proterotype.
Schuchert: *Science*, (n. s.), vol. 5, p. 637, 1897; *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 9, 1905.

176. *Proterotype* (= primary type).
Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, p. 9, 1905. Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 103, 1905.

177. *Protoplastotype* (= plastotype) — undefined, but, by inference, a cast of a proterotype.
Grabau: *Principles of Stratigraphy*, p. 919, 1913.

178. [*Prototyp I] — the most primitive representative of a group. *See* archetype.

Horn: *Xe Congrès Inter. d. Zool.*, sect. 6, p. 1034, 1929.

179. *PROTOTYP II (= primary type).

Handlirsch: Schröder's *Handbuch der Entomologie*, Bd. 3, s. 89, 1925.

180. [Prototype] — *See* prototyp.

181. [Protype] — a specimen which, because of its completeness supplants a fragmentary holotype. The proposer recommends that the protype of a species be given a subspecific name different from that of the holotype. The term does not conform to any recognized systematic procedure.

Troxell: *Journ. Geol.*, vol. 29, p. 476, 1921.

182. [*Proxy types*] (= protypes).

Troxell: *Journ. Geol.*, vol. 29, p. 479, 1921.

183. [Pseudogenotyp] — any species absent from an originally described genus and later designated as type of the genus. *See* pseudotype.

Lindholm: *Zool. Anzeiger*, Bd. 63, s. 163, 1925.

184. [Pseudotype] — an invalid genotype; as such it has no place in nomenclature.

Cook: *Amer. Nat.*, vol. 48, p. 314, 1914.

185. [Pseudotypic] — refers to a genus with an invalid type; *see* pseudotype.

Cook: *Amer. Nat.*, vol. 48, p. 312, 1914.

186. [*Pupal type*] (= neanotype) — *see* locality type.

Waterston: *Trans. 4th Inter. Congr. Entom., Ithaca, August 1928*, vol. 2, p. 696, (1929).

187. **Quirotype* (= chirotype).

Dallas: *Rev. Chil. Hist. Nat.*, vol. 31, p. 211, 1927.

188. [Seasonal type] — *see* locality type.

Waterston: *Trans. 4th Inter. Congr. Entom., Ithaca, August 1928*, vol. 2, p. 696, (1928).

189. **Secundäre Typen* (= hypotypes).
Horn: *Xe Congrès Inter. d. Zool.*, sect. 6, p. 1034, 1929

190. [*Sexual type*] (= allotype + androtype + gynetype) — *see* locality type.
Waterston: *Trans. 4th Inter. Congr. Entom., Ithaca, August 1928*, vol. 2, p. 696, (1929).

191. SPERMOTYPE — a specimen taken from a representative plant grown from seed of a type plant. A botanical term.
Swingle: *Journ. Wash. Acad. Sci.*, vol. 2, p. 345, 1912.

192. *Standard species* (= genotype) — practically a genotype by subsequent designation. Proposed for botanical usage.
Sprague: *Bull. Misc. Information, Kew Botanic Gardens*, p. 96, 1926.

193. *Subgenotype* (= genotype) — undefined, but, from the connotation, the type species of a subgenus.
Cushman: *Cushman Lab. Foram. Research*, sp. publ., No. 1, p. 134, 1928.

194. [Substitute types] — species arbitrarily taken as types of genera in the case of any "exceptions to rules for generic types."
Hitchcock: *Journ. of Botany* (London), vol. 60, p. 112, 1922.

194a. [Sub-type] (=subphylum). Not a nomenclatural term.
Grabau: *Bull. Buffalo Soc. Nat. Hist.*, vol. 6, p. 118, 1898-99.

195. **Supplementär-type* (= hypotype). *See* supplementary type.
Horn: *Xe Congrès Inter. d. Zool.*, sect. 6, p. 1034, 1929.

196. *Supplementary type* (= hypotype) — a described or figured specimen used in publication in extending or correcting the knowledge of a previously defined species.
Schuchert: *Science*, (n. s.), vol. 5, p. 637, 1897; *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, pp. 9, 12, 1905.

197. **Syntype I** — any specimen of the author's original material when no holotype was designated; or any of a series of specimens described as "cotypes" of equal rank. *See* associate-type, cotype.

Bather: *Natural Science*, vol. 4, p. 57, 1894. Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, pp. 9, 11, 1905. Schuchert and Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 103, 1905.

198. *Syntype* II (= paratype) — a specimen, other than the holotype of a species, upon which the original description is based.

Lupher & Packard: *Univ. Oregon Publ.*, vol. 1, p. 204, 1930.

199. *Tautogenotype* (= genotype) — *see* monogenotype.

Lindholm: *Nautilus*, vol. 41, p. 98, 1928.

200. [Tautotype I] — "... a name of a genus identical with the specific name of one of its components." Although Jordan defined tautotype as a *name* rather than a *type species*, it is obvious from the text of the publication that his intention was to apply the term to the type species. *See* tautotype II.

Jordan: *Genera of Fishes* (Stanford Univ. Publ.), pt. 2, p. 165, 1919.

201. TAUTOTYPE II (= genotype) — the type species of a genus when chosen because of absolute tautonymy.

Jordan: *Genera of Fishes* (Stanford Univ. Publ.), pt. 2, p. 180, 1919.

202. TAUTOTYPE III (= genotype) — type by original designation.

Baker: *Nautilus*, vol. 41, p. 21, 1928.

203. [*Teratotype] — the type of an abnormality or monstrosity. Since a monstrosity is a chance occurrence and certainly not a taxonomic unit, there is no justification for such a type term.

Dallas: *Rev. Chil. Nat. Hist.*, vol. 31, p. 214, 1927.

204. *Tophomeotype* (= topotype + homoeotype) — a specimen from the original locality identified by an authority. *See* homotopotype.

Howell: *Bull. Geol. Soc. Am.*, vol. 41, p. 199, 1930.

205. **Topotype** — a specimen from the original locality from which a species was described. Topotypes are of great

importance as they are often the only clues to the identity of a "lost" or doubtful species. *See* adelfotype, allotopotype, homotopotype, isocotype, metatype, paratopotype, tophomeotype.

Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, pp. 9, 13, 14, 1905. Schuchert & Buckman: *Ann. Mag. Nat. Hist.*, (ser. 7), vol. 16, p. 104, 1905.

206. *TYPE I — in a narrow sense, the holotype of a species (or genotype of a genus).

Horn: *Xe Congrès Inter. d. Zool.*, sect. 6, p. 1035, 1929.

207. *TYPE II — in the older sense, any of the original type material.

Horn: *Xe Congrès Inter. d. Zool.*, sect. 6, p. 1035, 1929.

208. *TYPE III — in a general sense, for any kind of "type."

Horn: *Xe Congrès Inter. d. Zool.*, sect. 6, p. 1035, 1929.

209. [TYPE IV] — in bacteriological procedure, at least one genus is divided into "types," based upon serological homogeneity, instead of species (as *Pneumococcus* type i, ii, iii or iv). No reference is available and the term is included here only for completeness.

209a. [TYPE V] (= phylum). Not a nomenclatural term.

Grabau: *Bull. Buffalo Soc. Nat. Hist.*, vol. 6, p. 118, 1898-99.

210. *Type by absolute tautonymy* (= genotype).

Int. Rules Zool. Nomen., Art. 30, I, d *(Proc. Biol. Soc. Wash.*, vol. 39, p. 83, 1926).

211. *Type by elimination* (= genotype).

Int. Rules Zool. Nomen., Art. 30, III, k *(Proc. Biol. Soc. Wash.*, vol. 39, p. 84, 1926).

212. *Type by original designation* (= genotype).

Int. Rules Zool. Nomen., Art. 30, I *(Proc. Biol. Soc. Wash.*, vol. 39, p. 83, 1926).

213. *Type by subsequent designation* (= genotype).

Int. Rules Zool. Nomen., Art. 30, II, g *(Proc. Biol. Soc. Wash.*, vol. 39, p. 84, 1926).

214. *Type by virtual tautonymy* (= genotype).

Int. Rules Zool. Nomen., Art. 30, III, i *(Proc. Biol. Soc. Wash.*, vol. 39, p. 84, 1926).

214a. [Type-fossils] (= index fossils). Not a nomenclatural term.

Geikie: *Structural and field geology*, (4th ed.), New York, p. 104, 1920.

215. [Type genus]—the generic name from which a family or subfamily name is formed. At present type fixation does not extend to types of families.

Webster's New International Dictionary, (Springfield, Mass.), p. 2224, 1929.

216. TYPE MATERIAL — all original material used in the description of a species, as well as all material used to supplement the description.

Schuchert: *Science*, (n. s.), vol. 5, p. 637, 1897.

217. **Type per selection* (= genotype).

Dallas: *Rev. Chil. Hist. Nat.*, vol. 31, p. 213, 1927.

218. *Type species* (= genotype).

Stewart: *Acad. Nat. Sci. Phila.*, sp. publ. No. 3, p. 37, etc., 1930.

219. [Typembryo] — an embryonic stage. Not a nomenclatural term.

Beecher: *Studies in Evolution*, p. 247, 1901.

220. **Typen-material* (= type material).

Horn: *X^e Congrès Inter. d. Zool.*, sect. 6, p. 1035, 1929.

221. [Typical] — referring to a specimen with characters corresponding to those of the type material. Although useful, the term is not nomenclatural in nature.

Schuchert: *Bull. U. S. Nat. Mus.*, No. 53, pt. 1, pp. 9, 14, 1905.

222. [**Typisch*] (= typical).

Horn: *X^e Congrès Inter. d. Zool.*, sect. 6, p. 1036, 1929.

223. [Typonym I] — originally defined as: "A name based upon indication of a type species, or of a type specimen." Not a nomenclatural term.

Coues: *Auk*, vol. 1, p. 321, 1884.

229. [TYPONYM II] — a generic name based upon a species which has already been used as the type of a genus.
Cook: *Science*, (n. s.), vol. 15, p. 651, 1902.

225. [TYPONYM III] — a name which is rejected "when there is an older valid name based on the same type. . . ." In botanical usage.
Hitchcock: *Science*, (n. s.), vol. 53, p. 314, 1921.

226. **Typus per designationem originalem* (= genotype). *See* type by original designation.
Horn: *Xe Congrès Inter. d. Zool.*, sect. 6, p. 1035, 1929.

227. **Typus per designationem subsequentem* (= genotype). *See* type by subsequent designation.
Horn: *Xe Congrès Inter. d. Zool.*, sect. 6, p. 1035, 1929.

228. **Typus per eliminationem* (= genotype) — *see* type by elimination.
Horn: *Xe Congrès Inter. d. Zool.*, sect. 6, p. 1036, 1929.

229. **Typus per indicationem* (= genotype) — automatically fixed by the use of the specific name *"typicus"* or *"typus"* at the time of generic proposal.
Horn: *Xe Congrès Inter. d. Zool.*, sect. 6, p. 1035, 1929.

230. **Typus per tautoniam absolutam* (= genotype) — *see* type by virtual tautonymy.
Horn: *Xe Congrès Inter. d. Zool.*, sect. 6, p. 1035, 1929.

232. [*Unessential published types*] (= hypotypes).
Howell: *Bull. Geol. Soc. Am.*, vol. 40, p. 215, 1929.

233. [*Unessential unpublished types*] (= topotype + homoeotype + ideotype).
Howell: *Bull. Geol. Soc. Am.*, vol. 40, p. 215, 1929.

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