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INTERNATIONALE
DES SCIENCES
BIOLOGIQUES

INTERNATIONAL
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of
ZOOLOGICAL
NOMENCLATURE
THIRD EDITION

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XX
GENERAL ASSEMBLY
of the INTERNATIONAL
UNION
OF BIOLOGICAL
SCIENCES

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an animal, a number of directly related individuals mounted in one or more preparations or a suite of preparations of directly related individuals representing differing stages in the life cycle (hapantotype);

- (1) type slides and hapantotypes are deemed to be indivisible and cannot be restricted by lectotype selection; however, if a type slide or a hapantotype is found to contain individuals of more than one species, components may be eliminated until it contains individuals of only one species;

Recommendation 72C. Marking of important individuals.—Whenever possible, in light microscope preparations, the author establishing a new nominal species-group taxon should distinctly mark the locations of individuals considered to be of crucial importance in demonstrating his concept.

- (v) in the case of a nominal species-group taxon based on an illustration or description or on a bibliographic reference to an illustration or description, the specimen illustrated or described and not the illustration or the description.
- (d) **Specimens that are already name-bearing types.**—The fact that a specimen is already the name-bearing type of one nominal species-group taxon does not prevent its being the name-bearing type, or part of the name-bearing type, of another.
- (e) **Name-bearing types of nominal species-group taxa bearing replacement names.**—If an author proposes a new species-group name expressly as a replacement for a prior one, both have the same name-bearing type, despite any simultaneous application of the replacement name to particular specimens or any contrary designation of type, or any different taxonomic usage of the replacement name.
- (f) **Name-bearing types of nominotypical subspecies.**—A nominal species and its nominotypical subspecies have the same name-bearing type [Arts 47a, 61b].
- (g) **Value of name-bearing types.**—Holotypes, syntypes, lectotypes, and neotypes are the bearers of the scientific names of all animal taxa. They are the international standards of reference

that provide objectivity in zoological nomenclature. They are held in trust for science by all zoologists and by persons responsible for their safe keeping.

Recommendation 72D. Deposition in museums.—An author who designates a holotype or lectotype should deposit it in a museum or similar institution where it will be safely preserved and will be accessible for purposes of research; syntypes should also be so deposited. (Deposit of neotypes in a museum or other institution is mandatory [Art. 75d (6)]).

Recommendation 72E. Labelling of name-bearing types.—Holotypes, syntypes, lectotypes, and neotypes should be labelled in a way that will unmistakably denote their status.

Recommendation 72F. Publication of information on labels.—An author who designates a holotype, lectotype, neotype, or syntypes should publish all information that appears on the labels accompanying the specimens, so as to facilitate the future recognition of the specimens.

Recommendation 72G. Institutional responsibility.—Every institution in which name-bearing types are deposited should

- (1) ensure that all are clearly marked so that they will be unmistakably recognized as name-bearing types;
- (2) take all necessary steps for their safe preservation;
- (3) make them accessible for study;
- (4) publish lists of name-bearing types in its possession or custody; and
- (5) so far as possible, communicate information concerning name-bearing types when requested.

(h) **Type localities.**—The geographical (and, where relevant, stratigraphical) place of capture or collection of the name-bearing type of a nominal species or subspecies is the type locality.

- (i) If captured or collected after being transported by boat, vehicle, aircraft, or other human or mechanical means, the type locality is the place from which the name-bearing type, or its wild progenitor, began its unnatural journey.

Recommendation 72H. Type localities.—

- (a) In ascertaining or clarifying a type locality (and type horizon, type host, and similar terms), an author should take into account
 - (1) data accompanying the original material;
 - (2) collector's notes, itineraries, or personal communications;
 - (3) the original description of the taxon; and

- (4) as a last resort, and without prejudice to other clarification, localities within the known range of the taxon or from which specimens referred to the taxon had been taken.
- (b) A statement of a type locality that is found to be erroneous should be corrected.

Article 73. Name-bearing types fixed in the original publication (holotypes and syntypes).—

- (a) **Holotypes.**—A holotype is the single specimen upon which a new nominal species-group taxon is based in the original publication (for specimens eligible to be holotypes in colonial animals and protozoa, see Article 72c (ii, iv)).
- (i) If an author when establishing a new nominal species-group taxon states in the original publication that one specimen, and only one, is the holotype, or “the type”, or uses some equivalent expression, that specimen is the holotype by original designation.
 - (ii) If the nominal species-group taxon is based on a single specimen, either so stated or inferred in the original publication or demonstrated from evidence derived from outside the work itself, that specimen is the holotype by monotypy (see Recommendation 73F).
 - (iii) The holotype of a new nominal species-group taxon can only be designated in the original publication and by the original author (for a misuse of the term “holotype” see Article 74b).
 - (iv) Designation of an illustration of a single specimen as a holotype is to be treated as designation of the specimen illustrated; the fact that the specimen cannot be traced does not of itself invalidate the designation.
 - (v) The place of origin of the holotype [Art. 72h] is the type locality of the nominal species or subspecies, or, if no holotype is known to exist and a neotype has been designated, the type locality is the place of origin of the neotype [Art. 75f] (see Recommendations 72H, 73C).

Recommendation 73A. Designation of holotype.—An author who establishes a new nominal species-group taxon should clearly designate its holotype.

Recommendation 73B. Preference for specimens seen by author.—The holotype of a new nominal species-group taxon should be designated from the

specimens studied by the author, not from specimens known to the author only from descriptions or illustrations in the literature.

Recommendation 73C. Data on the holotype.—An author who establishes a new nominal species-group taxon should publish at least the following data concerning the holotype, if they are relevant and known to the author:

- (1) its size [App. E 18], or the size of one of more relevant organs or parts;
- (2) the full locality, date, and other data on the labels accompanying it;
- (3) its sex, if the sexes are separate;
- (4) its developmental stage, and its caste, if the taxon includes more than one caste;
- (5) the name of the collector;
- (6) the collection in which it is situated and any collection number or register number assigned to it;
- (7) in the case of a parasite, the name of the host species;
- (8) in the case of an extant terrestrial taxon, the elevation in metres above sea level at which the holotype was taken;
- (9) in the case of an extant aquatic taxon, the depth in metres below water level at which the holotype was taken;
- (10) in the case of a fossil taxon, the geological age and stratigraphical position of the holotype, stated, if possible, in metres above or below a well-established plane.

Recommendation 73D. Paratypes.—After the holotype has been labelled, any remaining specimens of the type series should be labelled “paratype”, in order to identify the components of the original type series.

Recommendation 73E. Avoidance of the term “cotype”.—To avoid misunderstandings, an author should not use the term “cotype”.

Recommendation 73F. Avoidance of assumption of holotype.—Where no holotype was designated and where it is possible that a nominal species-group taxon was based on more than one specimen, an author should proceed as though syntypes may exist and, where appropriate, should designate a lectotype rather than assume a holotype (see also Article 74b).

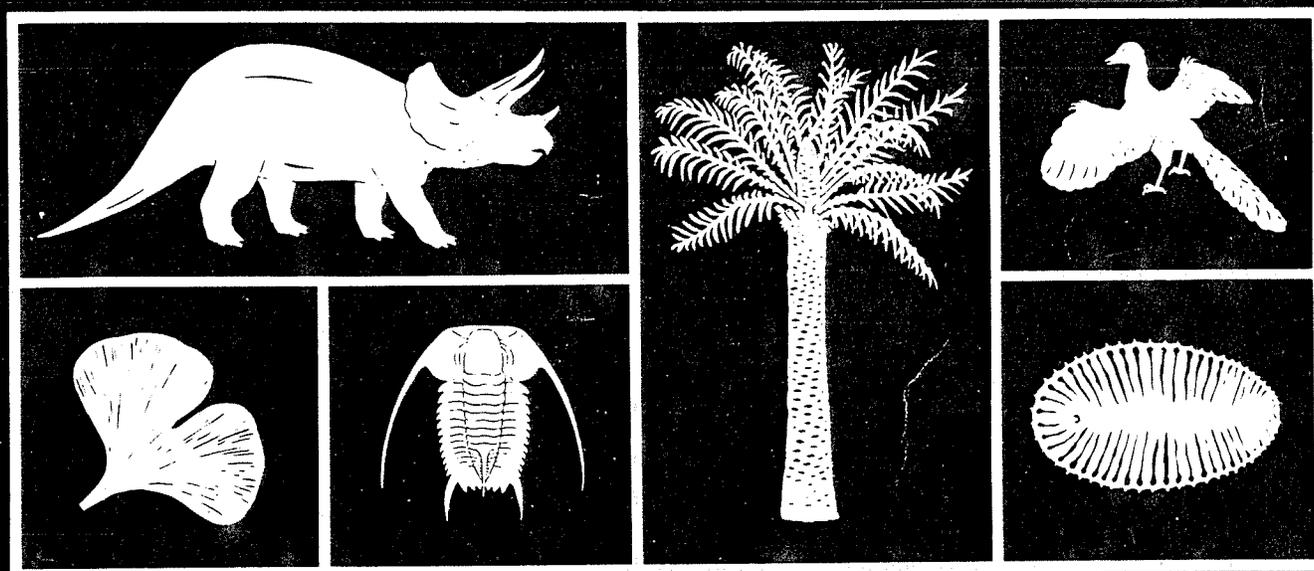
- (b) **Syntypes.**—If a nominal species-group taxon has neither holotype [Sect. a] nor lectotype [Art. 74], all the specimens of the type series are syntypes of equal value in nomenclature and collectively constitute the name-bearing type.

- (i) Syntypes may include specimens labelled “cotype” or “type” (both in the meaning of syntype), specimens with no identifying label, and specimens not seen by the author but which form the bases of previously published descriptions or illustrations upon which the author founded the new nominal species-group taxon in whole or in part [Art. 72c (v)].

FOSSIL COLLECTIONS OF THE WORLD:

An International Guide

FIRST EDITION 1989



Compiled by B.D.WEBBY



International
Palaeontological Association

CANADA

At least 5.5 million fossils are held by the twenty-two organizations reporting herein. The largest collection, comprising some 2.5 million specimens, is housed by the Geological Survey of Canada; more than two million form the collections of the Department of Geology and Botany at the University of Alberta and 300,000 by the Departments of Invertebrate and Vertebrate Paleontology, Royal Ontario Museum. Other large holdings (between 30,000 and 70,000 specimens) are in the Redpath Museum, National Museum of Natural Sciences, Saskatchewan Museum of Natural History and the University of Waterloo Entomology Laboratories. Smaller collections are maintained by several museums and universities; unfortunately many of the teaching collections used in universities have not been included in this survey.

Only five organizations have the collection data computerized (Atlantic Geoscience Centre, Royal Ontario Museum (Invertebrate Paleontology), and the Universities of Waterloo, Alberta and British Columbia. The earliest catalogues of type specimens were prepared by M.A. FRITZ from 1941 to 1946 listing the Invertebrate Paleontology, Royal Ontario Museum, specimens. Since 1960 catalogues have been published detailing the type collections of the Geological Survey of Canada, Redpath Museum and University College of Cape Breton, with the most recent (1988) by the New Brunswick Museum. Institutions vary in their policy of lending type specimens, but most are available to responsible researchers. Maintenance within the institutions is not consistent, both in housing facilities and value, but the usefulness of the collections both in paleontological research, teaching and heritage is gradually being realized. Fulltime curators are still few.

T.E. Bolton

I. MUSEUMS

BRITISH COLUMBIA PROVINCIAL MUSEUM
Victoria, British Columbia V8V 1X4

Tel. (604) 387 3701

YEAR OF FOUNDING: 1893.
PERSON-IN-CHARGE: R.Y. Edwards (Director).
PERMANENT STAFF: No curators or other paleontological staff.

ESTIMATED NUMBER OF SPECIMENS (PERCENTAGES CATALOGUED IN BRACKETS): Invertebrates +3,000 (33%); Vertebrates 100 (75%); Plants +100 (60%).
EMPHASES: Historical and regional with special emphasis on Jurassic-Cretaceous material from the British Columbia coast.

CURATION: Material is just stored and maintained, not curated. The collection was made by a number of individuals, but no types are included.

INSTITUTIONAL ACRONYM: B.C.P.M.

SERVICES - POLICIES AND FACILITIES FOR VISITING SPECIALISTS: No loans or exchanges, and no facilities such as library, equipment or technical support.

MANITOBA MUSEUM OF MAN AND NATURE
190 Rupert Avenue
Winnipeg, Manitoba R3B ON2

Tel. (204) 956 2830

YEAR OF FOUNDING: 1950.

PERSON-IN-CHARGE: G.E. Lammers.

PERMANENT STAFF: Paleontologist 1; Curator 1; Preparator 1.

ESTIMATED NUMBER OF SPECIMENS (PERCENTAGES CATALOGUED IN BRACKETS): Invertebrates 900 (85%); Vertebrates 1,500 (80%); Plants 125 (95%).
EMPHASES: Mainly Cenozoic vertebrates, insects and plants from the Province of Manitoba.

USES: Research 40%; Teaching 10%; Exhibit 50%.

CURATION: Locality based register system is used for accessioning material; also filed stratigraphically and taxonomically. Collection is arranged stratigraphically and taxonomically for each period. The bulk of the collection including the few types is adequately curated.

PUBLISHED TYPE CATALOGUE: None.

INSTITUTIONAL ACRONYM: MMM&N. Additional letter symbols denote major groups, for instance V = Vertebrates, B = Botany, I = Insects.

SERVICES - POLICIES AND FACILITIES FOR VISITING SPECIALISTS: Loans to accredited workers. Institutional exchanges. A good geology/paleontology library and a range of equipment for preparation of specimens, microscope study and photography. Limited technical support for preparation of material and photography.

USES: Research 85%; Teaching 5%; Exhibit 10%.

CURATION: Presently though specimens in the collection have been assigned a preliminary registration number, they have yet to be fully curated. Only Eocene and Oligocene mammals are adequately curated. Repository currently being rearranged.

PUBLISHED TYPE CATALOGUE: None. Some 25 type specimens of Eocene-Oligocene amphibians, reptiles and mammals held in the collection. A type list will be published later.

INSTITUTIONAL ACRONYM: SMNH.

IN-HOUSE PUBLICATION OUTLETS: Natural History Publications.

SERVICES - POLICIES AND FACILITIES FOR VISITING SPECIALISTS: Type and figured material normally available only if borrowed and returned by hand. No institutional exchanges. Library and equipment for microscope study available.

TYRRELL MUSEUM OF PALEONTOLOGY

P.O.Box 7500

Drumheller, Alberta T0J 0Y0

Tel. (403) 823 7707

YEAR OF FOUNDING: 1981.

PERSON-IN-CHARGE: P.J. Currie.

EMPHASES: Mesozoic vertebrates of Alberta Badlands (dinosaurs, fishes); palynology of western and northern Canada; collection, research and presentation of paleontological resources relevant to Alberta's natural history.

USES: Research 70%; Exhibit 30%.

CURATION: Systematic and stratigraphic arranged collections.

PUBLISHED TYPE CATALOGUE: None.

INSTITUTIONAL ACRONYM: TMP.

SERVICES - POLICIES AND FACILITIES FOR VISITING SPECIALISTS: Institutional exchanges. Full range of research equipment. Museum library available.

II. GEOLOGICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

601 Booth Street

Ottawa, Ontario K1A 0E8

Tel. (613) 996 6403

YEAR OF FOUNDING: 1842.

PERSONS-IN-CHARGE: T.E. Bolton and G.P. Martin.

PERMANENT STAFF: Paleontologists 7; Curator 1;

Preparator 1.

ESTIMATED NUMBER OF SPECIMENS (PERCENTAGES CATALOGUED IN BRACKETS): Invertebrates 1,047,000 (20%); Plants 133,500 (6%).

EMPHASES: This major repository contains representative Canada-wide collections arranged stratigraphically, geographically and biologically, including historically important collections, a comprehensive collection of Precambrian fossils, substantial holdings of Paleozoic and Mesozoic material from eastern Canada, and the National Type Collection of Fossil Invertebrates and Plants.

USES: Research 100%.

CURATION: The main collection has a locality based register, and is divided first by geological period and then by geographical province and finer subdivisions for each period. Large collections may be further divided into phyla. The type collection (20% of the total number of invertebrates and 6% of the plants) is similarly arranged first by geological period, then region by region from east to west and north across Canada, and finally by phyla. All the type material is adequately curated.

PUBLISHED TYPE CATALOGUE: BOLTON, T.E., *Catalogue of Type Invertebrate Fossils of the Geological Survey of Canada. Vols. I (1960), II (1965), III (1966), IV (1968), V (1974), VI (1977), VII (1982)*. BELL, W.A., *Catalogue of Types and Figured Specimens of Fossil Plants in the Geological Survey of Canada Collections (1962)*, with *Megaplant Supplement (1969)*.

INSTITUTIONAL ACRONYM: GSC.

IN-HOUSE PUBLICATION OUTLETS: Memoirs, Bulletins and Papers of the Geological Survey of Canada. SERVICES - POLICIES AND FACILITIES FOR VISITING SPECIALISTS: Short term loans to established workers. No institutional exchanges. The most extensive geological library in Canada. Full range of equipment for mechanical and acid preparation of microfossils and macrofossils, and or photography including SEM. Technical support staff and services of well equipped laboratories. No grants-in-aid.

GEOLOGICAL SURVEY OF CANADA, ATLANTIC GEOSCIENCE CENTRE

Dartmouth, Nova Scotia B2Y 4A2

Tel. (902) 426 3413

YEAR OF FOUNDING: 1972.

PERSON-IN-CHARGE: M.S. Barss.

PERMANENT STAFF: Paleontologists 10; Curators 2; Preparators 5.

ESTIMATED NUMBER OF SPECIMENS (PERCENTAGES CATALOGUED IN BRACKETS): Invertebrates

1,600 (90%); Plants 2,000 (100%).

EMPHASES: Circum-Atlantic stratigraphical and geographical biases, especially of offshore eastern Canada.

USES: Research 100%.

CURATION: Material from offshore wells and marine geology samples, mainly micropaleontological (palynomorphs, foraminiferans and ostracodes). Separate type collection adequately curated.

PUBLISHED TYPE CATALOGUE: None.

INSTITUTIONAL ACRONYM: GSC.

IN-HOUSE PUBLICATION OUTLETS: Memoirs, Bulletins and Papers of the Geological Survey of Canada.

SERVICES - POLICIES AND FACILITIES FOR VISITING SPECIALISTS: No type material available for loan. Institutional exchanges. Examination room and library available; also some microscopes and cameras.

**GEOLOGICAL SURVEY OF CANADA,
INSTITUTE OF SEDIMENTARY AND
PETROLEUM GEOLOGY**

3303 - 33rd Street, N.W.

Calgary, Alberta T2L 2A7

Tel. (403) 284 0110

YEAR OF FOUNDING: 1967.

PERSONS-IN-CHARGE: G.S. Nowlan and M.A. Halkett.

PERMANENT STAFF: Paleontologists 11; Curator 1; Preparators 5.

ESTIMATED NUMBER OF SPECIMENS: 1,300,000 (total number is likely to be much greater because each microslide was counted as one specimen but it may contain a very large number of individual microfossils).

EMPHASES: Ordovician to Tertiary microfossils (palynomorphs, foraminiferans, conodonts) and macroinvertebrates of western and northern Canada.

USES: Research 100%.

CURATION: Most collections except the older ones are adequately curated. They are stored by year and collector, with further subdivision stratigraphically. A locality based register is used for accessioning of new material, and a computer based data processing and retrieval system is presently being established.

PUBLISHED TYPE CATALOGUE: None; type collection is maintained in Ottawa.

INSTITUTIONAL ACRONYM: GSC; collections catalogued by locality in Calgary are cited as GSC Loc.C-(number).

IN-HOUSE PUBLICATION OUTLETS: Memoirs, Bulletins and Papers of the Geological Survey of Canada.

SERVICES - POLICIES AND FACILITIES FOR VISITING SPECIALISTS: Loans to accredited workers. No

institutional exchanges. General geology library with large paleontology component. Fully equipped and staffed paleontology and photography laboratories.

III. UNIVERSITIES

UNIVERSITY OF ALBERTA (I)

Department of Botany (Paleobotanical Collection)
Edmonton, Alberta T6G 2E9

Tel. (403) 432 5518

YEAR OF FOUNDING: 1967.

PERSON-IN-CHARGE: R.A. Stockey.

PERMANENT STAFF: Curator 1.

ESTIMATED NUMBER OF SPECIMENS (PERCENTAGES CATALOGUED IN BRACKETS): Plants 22,000 (98%).

EMPHASES: Large collection of coal balls from British Columbia and mid west U.S.A.; also good representation of Devonian, Cretaceous, Palaeocene and Eocene plant material compressions, especially fossil woods from Canada and the United States (especially western Canada). Special emphasis is on the well preserved floras of the Paleocene of Alberta and the Eocene of British Columbia; these include permineralized plants with preservation of soft tissues, rare fossil seedlings and some petrified flowers.

USES: Research 80%; Teaching 18%; Exhibit 2%.

CURATION: Based on biological cataloguing system with separate numbering for slides (SL numbers and 27% of the total collection), permineralizations (P numbers and 16%), compressions (S numbers and 54% and coal balls (CB numbers and 3%). Type collection is more-or-less adequately curated; housed in 10 drawers. About 6,000 figured slides in the collection.

PUBLISHED TYPE CATALOGUE: None.

INSTITUTIONAL ACRONYM: UAPC - ALTA.

POLICIES - POLICIES AND FACILITIES FOR VISITING SPECIALISTS: Loan and exchanges available. Library of the Curator is available; also microscopes, Aristophot, other photographic and slide making equipment; support of a one-third time curatorial assistant.

UNIVERSITY OF ALBERTA (II)

Department of Geology (Paleontological Collections)
Edmonton, Alberta T6G 2E3

Tel. (403) 432 2608

YEAR OF FOUNDING: 1974.

PERSON-IN-CHARGE: B. Jones.