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CONTENTS.

MEMOIRS.

	PAGE
I. On <i>Rachiopteris cylindrica</i> Will. Plate 1. By THOMAS HICK, B.A., B.Sc., A.L.S.	pp. 1-14
II. On the Structure and Contents of <i>Anthoceros tuberosus</i> Taylor. Plate 2. By J. H. ASHWORTH, B.Sc.	pp. 1-6
III. On Methods of Determining the Dryness of Saturated Steam and the Condition of Steam Gas. By OSBORNE REYNOLDS, M.A., LL.D., F.R.S.	pp. 1-14
IV. Hymenoptera Orientalia, or Contributions to a knowledge the Hymenoptera of the Oriental Zoological Region. Part V. Plates 3 and 4. By PETER CAMERON	pp. 1-144
V. On the Ampullæ in some specimens of Millepora in the Manchester Museum. By SYDNEY J. HICKSON, M.A., D.Sc., F.R.S.	pp. 1-4
VI. Descriptions of New Species of Brachiopoda and Mollusca from the Millstone Grit and Lower Coal Measures of Lancashire. Plate 5. By HERBERT BOLTON, F.R.S.E.	pp. 1-7
VII. Descriptions of Thirty-four Species of Marine Mollusca from the Arabian Sea, Persian Gulf, and Gulf of Oman. Plates 6 and 7. By J. COSMO MELVILL, M.A., F.L.S.	pp. 1-25
VIII. Hypoidous Acid and Hypoidites. By R. L. TAYLOR, F.C.S.	pp. 1-20
IX. Some further investigation of Fossil Seeds of the genus <i>Lagenostoma</i> (Williamson) from the Lower Coal Measures, Oldham. Plate 8. By JOHN BUTTERWORTH, F.R.M.S.	pp. 1-4
X. On Continuity. By HORACE LAMB, M.A., F.R.S.	pp. 1-9
XI. The Costs of Sea Transport in proportion to Values of Cargoes. Plates 9 to 12. By A. W. FLUX, M.A.	pp. 1-18
XII. The Fall in Prices during the past Twenty Years. Plates 13 to 15. By A. W. FLUX, M.A.	pp. 1-15

MEMOIRS (*continued*).

	PAGE
XIII. Hymenoptera Orientalia, or Contributions to a knowledge of the Hymenoptera of the Oriental Zoological Region. Part VI. Plate 16. By PETER CAMERON pp. 1-27	
XIV. The Composition of some Ancient Iron Implements and a Bronze found at Thebes. By ARTHUR HARDEN, M.Sc., Ph.D. pp. 1-3	
XV. On the Nature of the Röntgen Rays. (The Wilde Lecture.) By Sir GEORGE G. STOKES, Bart., M.A., LL.D., F.R.S. pp. 1-28	

PROCEEDINGS.

BAILEY, CHARLES, F.R.S.—On so-called Carnivorous Plants .. vii.	
BARNES, C. L., M.A.—On some Errors in Science xv.	
BENNETT, ALFRED R., M.I.E.E.—A Convection Scope and Calorimeter.. .. . xxvii.	
BOWMAN, F. H., D.Sc.—On the Method of Working the Marconi Telegraph Receiver xxxi.	
CHAFFERS, Mr. —Exhibit of "Plankton," and Holothuridae. .. xxxiv.	
CHORLTON, Mr.—On a Swarm of Dung-beetles at King Arthur's Castle xxvi.	
COWARD, T. A.—Exhibit of Eggs of the Cuckoo (<i>Cuculus canorus</i>).. vi.	
CRABTREE, B. H —Exhibit of a Collection of British Clearwings .. xxiv.	
FARADAY, F. J., F.L.S.—On the Pont du Gard, in relation to the Theories of the Erosion of River Valleys xviii.	
— Exhibit of Photograph of the Pont du Gard xx.	
FISHER, H.—Exhibit of a Collection of Arctic Plants from the Franz Josef Archipelago xxii.	
GRIFFITHS, ALBERT, M.Sc.—On the Viscosity and Electrolytic Resistance of a Gelatine Solution ix.	
— On a Mixture whose Electric Resistance depends on the Magnetic Field in which it is placed.. .. . xi.	
GWYTHYR, R. F., M.A.—Exhibit of two Distribution-curves showing the comparative results of Examinations in Mathematics for Three Years xiii.	
HICKSON, SYDNEY J., M.A., D.Sc., F.R.S.—Exhibit of Two Black-bird's Eggs, one without yolk, the other with two yolks .. xviii.	

PROCEEDINGS (*continued*).

	PAGE
HOYLE, W. E., M.A.—Exhibit of the Album of Photographs presented to Dr. John Murray by the contributors to the "Challenger" Reports.	xxiv.
JOHNSON, LINDSAY, M.D., F.R.C.S.—Exhibit of, and Remarks on, a Series of Drawings of the <i>fundus oculi</i> of Animals	xx.
KELVIN, LORD, F.R.S.—Address to, on the occasion of the Jubilee of his Professorship	iii.
— Reply to the Address	iv.
LEES, CHARLES H., D.Sc.—On the Experiments of Wiedemann on the Specific Heats of Vapours	xv.
— An Account of Zeeman's Experiments on the effect of a Magnetic Field on the Vibrations emitted by a Source of Light.	xxxi.
MELVILL, J. COSMO, M.A., F.L.S.—Exhibit of Marine Mollusca from the Loyalty Islands.	v.
— Exhibit of Species of <i>Droseraceæ</i>	vi.
— Exhibit of a Specimen of <i>Calophasia platyptera</i>	xxi.
— Exhibit of Arctic Plants	xxii.
NICHOLSON, FRANCIS, F.Z.S.—Exhibit of pamphlet entitled: "Rules established for the government of the Literary and Philosophical Society of Manchester," &c.	viii.
— Donations of Books to the Society's Library	xviii.
— Exhibit of a copy of Gilbert White's "Naturalist's Calendar" (1795)	xxxii.
PANKHURST, R. M., LL.D.—On the Patent Office	xxx.
REYNOLDS, OSBORNE, M.A., F.R.S.—On the top called "The Devil on Two Sticks"	xii.
ROGERS, THOMAS.—Exhibit of Specimens of <i>Sacoglottis amazonica</i> , with Fruit	xxiv.
— Exhibit of a curious Caterpillar from Rio de Janeiro	xxv.
— Exhibit of the fungus <i>Torrubia gracilis</i> growing out of the Chrysalis of a Moth.	xxxiii.
— Exhibit of slides of Ostracoda.	xxxiv.
SCHILL, C. H.—Exhibit of Elateridæ	xxiv.
SCHILL, P. H.—Exhibit of a Collection of Palæarctic Parnassius	xxiv.
SCHUNCK, EDWARD, Ph.D., F.R.S.—On Carminic Acid, with exhibit of <i>Cactus ofuntia</i>	xiv.
SCOWCROFT, W. R.—Exhibit of New Zealand Ferns	xxiv.

PROCEEDINGS (*continued*).

	PAGE
STIRRUP, MARK, F.G.S.—Exhibit of Diagrams of Fossil Insects found in the Coal Measures of France	xxv.
— Exhibit of a Drawing of <i>Pteridophora Alberti Meyer</i>	xxxiii.
— On the Ostracoda of the Coal Measures.	xxxiv.
WEISS, F.E., B.Sc., F.L.S.—On the Tubers of <i>Anthoceros Tuberosus</i> .. v.	
WILDE, HENRY, F.R.S.—Announcement of his gift of an electric lamp for the lantern	xviii.
General Meetings i., viii., xii., xiii., xiv.,	xxvii.
Special Meeting for the delivery of the Wilde Lecture	xxxvii.
Annual General Meeting	xxxv.
Meetings of the Microscopical and Natural History Section :—	
Ordinary vi., xxi., xxii., xxiv., xxvi., xxxiii.	
Annual	xxxiii.
Report of the Council, April, 1897, with Obituary Notices of E. du Bois-Reymond, Sir Joseph Prestwich, H. A. Réal, J. J. Sylvester, A. A. L. Trécul, Francis Walker, S. Cottam, T. Hick, and J. Parlane	xlii.
Treasurer's Accounts	lxvii.
Report of the Microscopical and Natural History Section and Accounts	lxx.
List of the Council and Members of the Society	lxxii.
Lists of the Awards of the Wilde Medal and the Premium ..	lxxxvii.

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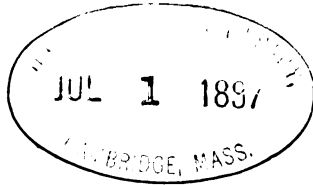
CONTENTS.

Memoirs :—

- VI. Descriptions of New Species of Brachiopoda and Mollusca from the Millstone Grit and Lower Coal Measures of Lancashire. *Plate 5.* By Herbert Bolton, F.R.S.E. - pp. 1-7.
- VII. Descriptions of Thirty-four Species of Marine Mollusca from the Arabian Sea, Persian Gulf, and Gulf of Oman. *Plates 6 and 7.* By J. Cosmo Melvill, M.A., F.L.S. - pp. 1-25.
- VIII. Hypoidous Acid and Hypoidites. By R. L. Taylor, F.C.S. - - - - - pp. 1-20.
- IX. Some further investigation of Fossil Seeds of the genus *Lagenostoma* (Williamson) from the Lower Coal Measures, Oldham. *Plate 8.* By John Butterworth, F.R.M.S. - - - - - pp. 1-4.
- X. On Continuity. By Horace Lamb, M.A., F.R.S. - pp. 1-9.
- XI. The Costs of Sea Transport in proportion to Values of Cargoes. *Plates 9 to 12.* By A. W. Flux, M.A. - pp. 1-18.
- XII. The Fall in Prices during the past Twenty Years. *Plates 13 to 15.* By A. W. Flux, M.A. - - - - - pp. 1-15.
- Proceedings - - - - - pp. xxi.-xxxii.

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The Society

VI. Descriptions of New Species of Brachiopoda and Mollusca from the Millstone Grit and Lower Coal Measures of Lancashire.

By HERBERT BOLTON, F.R.S.E.

Received November 19th. Read December 1st, 1896.

The invertebrate fauna of the millstone-grit and coal-measures of Lancashire has been industriously collected by many local geologists over a considerable number of years, but very little has been done to satisfactorily determine the various collections of fossils. Especially has the group of Mollusca been neglected, and until quite recently it was impossible to decide what forms were clearly recognisable species and what forms were new.

Dr. Hind's recent "Monograph on Carbonicola, Anthracomya, and Naiadites," published by the Palæontographical Society, has placed these three genera upon a more satisfactory basis; but many other genera of the Pelecypoda, and the whole of the Gastropoda yet remain to be dealt with.

The accession by gift of the C. Dugdale collection of millstone-grit and coal-measure fossils from the Rossendale area, of the Kay-Shuttleworth collection of fossils from the Burnley coalfield, and by a similar gift from Mr. Robert Cairns, of Ashton-under-Lyne, has caused the collections of the Manchester Museum, Owens College, to be enriched by several new species from the Lancashire coal-measures. It is very desirable that these species should be named and their generic position determined in order that they may be placed in their true position amongst the geological collections of the Museum,

May 20th, 1897.

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and in order that they may be of use to geologists who make use of these collections.

Three of the species here described are from the shales and "bullion-balls" of the Bullion or upper-foot coal-seam of the lower coal-measures. The seam is by far the most remarkable of all the coal-seams which occur in the Lancashire coal-measures, and has yielded to the palæobotanist and palæontologist more material, and of greater interest, than all the rest.

From it were obtained the "coal-balls," by the cutting up of which the late Professor Williamson, your late member Mr. T. Hick, and others were enabled to determine so much of the original structure of the coal vegetation.

It seems less known that resting upon the roof of the coal are other stone balls, often with an outer crust of pyrites, and usually filled with a great number of *Goniatites*, *Aviculopectens*, &c. The shales are full of crushed shells and the bones, teeth, and scales of fishes. Indeed, it is no exaggeration to say that the Bullion seam, and the few feet of shale which form its roof, contain the most varied and abundant fauna of the coal-measures. The species which I describe as *Tellinomya robusta* is a middle coal-measure fossil, and appears to be of considerable value as a zonal fossil. In every case where it has been brought before my notice and the locality has been known, it has been obtained from the shales immediately over the Cannel mine.

DISCINA (ORBICULOIDEA) ORBICULARIS, *sp. nov.*

(Pl. 5, f. 1 and 2).

Discina, G. Wild, "The Lower Coal Measures of Lancashire" (*Trans. Manch. Geol. Soc.*, Vol. XXI., 1890—92, p. 365, pl. iii., f. 9).

Diagnosis: Shell almost circular, the sides contracted a little posteriorly. Free valve much flattened and slightly

conoidal. Apex halfway between centre and posterior margin. Surface covered with equidistant concentric lines of growth. Ventral valve flat, more circular than free valve, and bearing a narrow slit-like foramen passing from the centre to the posterior margin. Marked with concentric striæ as in the free valve. Shell thin and horny.

Diameter 13 mm.

Localities and Horizons: Carre Heys, Colne; roof of Bullion coal, lower coal-measures.

Ashton Moss Colliery, Ashton-under-Lyne; "Marine-band," middle coal-measures.

Observations: This form has been known for a long time from the Lancashire coal-measures. It is a much less robust species than *Discina nitida*, and less elevated. It approximates somewhat to *Discina Davreuxiana*, but is flatter, smaller, and more circular. The dorsal valve of *D. orbicularis* is extremely low, almost flat.

AVICULOPECTEN CAIRNSII, *sp. nov.* (Pl. 5, f. 3 and 4).

Diagnosis: Valves feebly convex, wider than long, inequilateral and markedly oblique. Surface bearing faint concentric striations, probably lines of growth. Hinge line straight, short, and about half the length of the shell. Anterior ear of right valve small, and gradually merging into anterior border. Posterior ear marked with four or five strong rounded ribs; byssal notch deep. Ears of left valve equal, and concentrically striated.

Locality and Horizon: River Tame, Dukinfield; "Marine-band," middle coal-measures.

Observations: This species is a little larger than *A. fibrillosus*, Salter, with which it is found in association, and presents important differences. It is a much more oblique form, and destitute of the radiating ribs which are so conspicuous a feature in Salter's species. The

valves are also shorter in proportion to their width, and the ears are more nearly equal. It gives me great pleasure to name this species after Mr. Robert Cairns, of Ashton-under-Lyne, who has for many years been a diligent student of Lancashire geology.

ANTHRACOMYA BELLULA, *sp. nov.* (Pl. 5, f. 5).

Modiola Macadami, C. Dugdale, "General Section of the Lower Coal Measures and Millstone Grit Rocks of Rossendale" (*Trans. Manch. Geol. Soc.*, Vol. XIX., 1887, p. 228).

Diagnosis: Shell transversely oblong; narrowest in the region of the umbones; slightly expanded posteriorly, ventral margin sub-parallel to the hinge line. Umbones moderately tumid, almost touching, placed far forwards at anterior fifth of length. Lunule small. Anterior end of valves produced, narrow, acutely rounded. The diagonal ridge almost obsolete, lost on the convexity of the shell before reaching the ventral margin. Ventral margin but slightly rounded. Posterior border sloping obliquely upwards. Surface of shell smooth, marked by faint concentric lines of growth, which broaden out over the posterior third of the shell.

Localities and Horizons: Bonfire Hill, Crawshawbooth; in dark shales immediately under the lower rough-rock of the millstone-grit series.

Bankside Quarry, Bacup; in shales under rough-rock. Not now exposed.

Greens' Clough, on the moorland between Bacup and Portsmouth; in shale under rough-rock.

Observations: Only three specimens of this species have been seen by me, although more have been found. The specimens now in the Manchester Museum are so well preserved that no doubt need exist as to their specific identity.

A small slab in the Dugdale collection bears two whole shells with open valves.

A small slab with a single pair of valves is in the Cairns collection at the Manchester Museum.

This species has a general resemblance to *A. pumila* and *A. minima* var. *carinata*, but differs from the former in being much narrower in proportion to the length, in the more forward position of the umbo and the produced anterior extremity. The latter feature also distinguishes it from *A. minima* var. *carinata*, as also the absence of a strong oblique ridge.

The species occurs much lower than any other of the genus in the English carboniferous.

TELLINOMYA ROBUSTA, *sp. nov.* (Pl. 5, f. 6, 7, 8 and 8a).

Diagnosis : Shell oval, obtuse, surface smooth, marked by faint concentric lines of growth, strongest along anterior border. Valves strongly convex, umbones gibbous. External ligament present and usually well defined. Anterior lunule well marked, and a posterior escutcheon which is bounded by a slight ridge passing backwards from the umbones to the upper posterior border. Anterior border a little produced and well rounded, and gradually merging into the ventral border. Posterior border short, sometimes a little produced and angulated.

Localities and Horizons :

Chequerbent, Tyldesley, Bank Colliery, L. Hulton, Worsley Tunnel, Watergate, Bolton, Hulton Park, Bolton,	}	Cannel mine of the middle coal-measures.
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Mill Hill Bleachworks, Bolton ; horizon not known.

Observations : This species is readily distinguishable by its stout swollen form and smooth surface, together with

the presence of an anterior lunule. In well-preserved specimens the lunule and anterior border meet in an obtuse angle. The species seems restricted to the shales overlying the Cannel mine of the middle coal-measures. For some time I regarded the species as belonging to the genus *Schizodus*, but further consideration has led me to place it in the genus *Tellinomya* (*Nucula*?) by reason of the presence of an external ligament, a lunule, and a feebly marked corselet, and by the absence of the posterior truncation and oblique ridge so characteristic of *Schizodus*.

One cast shows a small anterior adductor impression.

The occurrence of the species in so many localities immediately over the Cannel seam of the middle coal-measures makes it of considerable value as a zonal fossil.

NATICOPSIS GLOBULARIS, *sp. nov.* (Pl. 5, f. 9).

Diagnosis: Shell globose, spire depressed, and very acute, volutions six, increasing in size rapidly, last volution large and swollen; suture well defined; aperture ovate. Surface smooth or marked by faint lines of growth.

Locality and Horizon: Carre Heys, Colne; over Bullion coal, lower coal-measures.

Observations: This beautiful little *Naticopsis* is to be found in most collections from the Lancashire coal-measures.

It is readily distinguishable by the almost globular last volution, above which stands the extremely short acute spire.

Specimens are almost invariably completely pyritised.

RAPHISTOMA (?) *ORNATA*, *sp. nov.* (Pl. 5, f. 10).

Diagnosis: Shell small, spire depressed, increasing in size rapidly; consisting of three and a half whorls.

Suture deep, whorls sharply convex above, sides almost flat, broadly convex below. Ornament of strong raised longitudinal lines, crowded on the shoulder, more widely spaced below.

Locality and Horizon : Bacup ; in "bullion-balls" of the Bullion seam, lower coal-measures.

Observations : Several specimens of this pretty little shell were found by me in a bullion-ball which had been partially calcined in order to extract the fossils.

The species was associated with what appears to be a small form of *Anthracomya*.

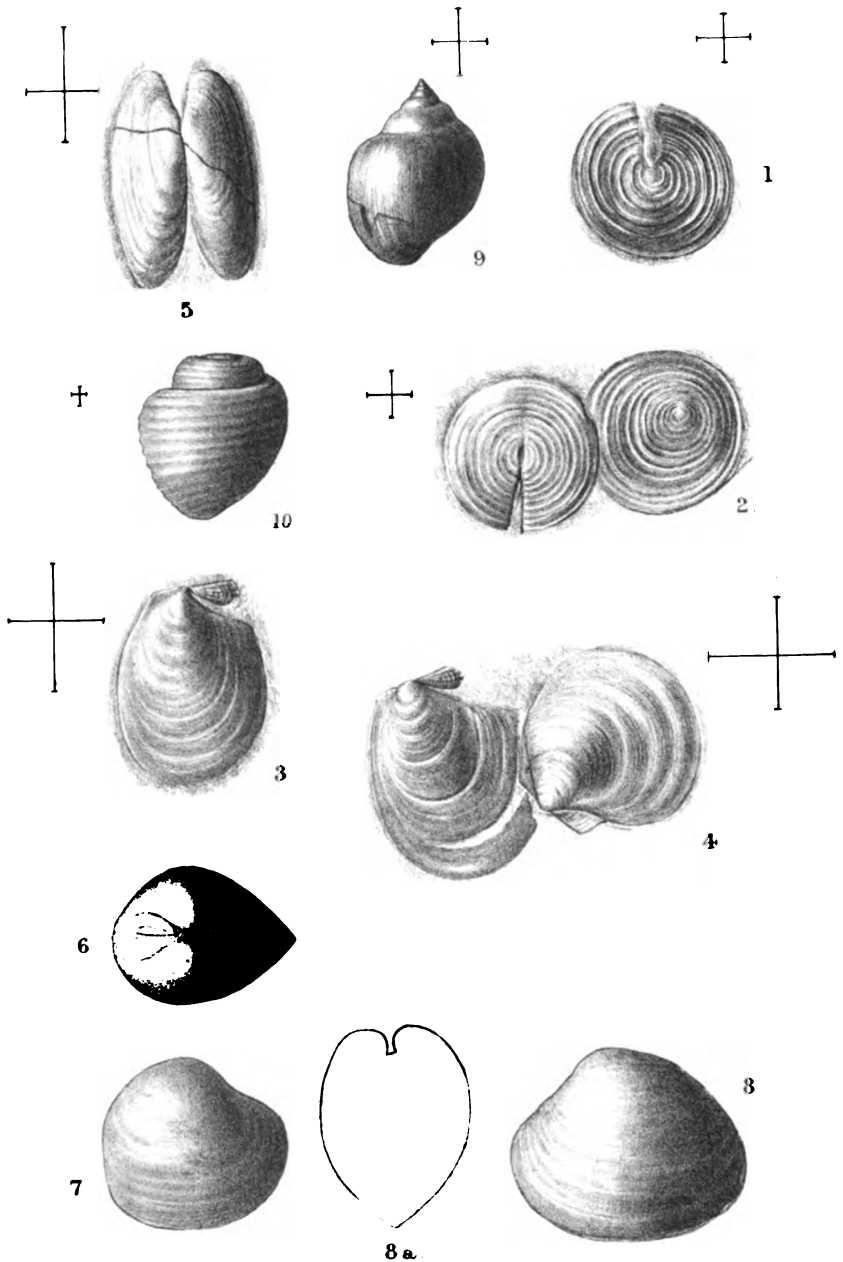
It may be that this species belongs to the *Pleurotomaria*, but the flattened spire and the absence of any evidence of a sinus have led me to place it in the genus *Raphistoma*.

BOLTON, *New Brachiopoda and Mollusca.*

Explanation of figures in Plate 5.

(The lettered numbers are those of the registers of the Manchester Museum, and are painted upon the matrix enclosing the specimens.)

- Fig. 1. *Discina orbicularis*. Ventral valve. Carre Heys, Colne. W 466, e coll. Wild.
- „ 2. „ „ Dorsal and ventral valves. Ashton Moss Colliery. L 2620, e coll. Cairns.
- „ 3. *Aviculopecten Cairnsii*. Left valve. River Tame, Dukinfield. L 3489, e coll. Cairns.
- „ 4. „ „ Right and left valves. Same locality and collection as fig. 3. L 3490.
- „ 5. *Anthracomya bellula*. Conjoint valves. Bonfire Hill, Crawshawbooth. L 3491, e coll. Dugdale.
- „ 6. *Tellinomya robusta*. Conjoint valves seen from above. Watergate Colliery. L 3492. (The anterior side of the shell is to the right, the faintly marked area to the left of the umbone being the escutcheon within which is a small well-marked ligament. The anterior lunule is more strongly defined than is indicated by the figure, and bears a few feeble longitudinal ribs.)
- „ 7. „ „ Same shell as above, viewed from the right side. Posterior margin much contracted, partly by abrasion.
- „ 8. „ „ Seen from the left side, and showing a greater development than fig. 7. Watergate Colliery. L 3493.
- „ 8a. „ „ Diagrammatic section through original of fig. 8.
- „ 9. *Naticopsis globularis*. Carre Heys, Colne. W 467, e coll. Wild.
- „ 10. *Raphistoma* (?) *ornata*. Figure of whole shell, built up from a series of four incomplete specimens. Bacup, Rossendale. L 3494, e coll. Bolton.
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G.M.Woodward del et lith.

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