



STATE OF ISRAEL
MINISTRY OF AGRICULTURE
DIVISION OF FISHERIES
SEA FISHERIES RESEARCH STATION

BULLETIN No. 30

**CONTRIBUTIONS TO THE KNOWLEDGE
OF THE RED SEA**

Nos. 21-25

A NOTE ON THE HYDROGRAPHY OF THE GULF OF EYLATH

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**RED SEA OPISTHOBANCHIA FROM THE COAST OF
ISRAEL AND SINAI**

*by H. ENGEL and C. J. VAN EEKEN
Zoological Museum, Amsterdam*

**ON THE OCCURRENCE OF ASYMMETRON IN THE
GULF OF EYLATH (AQABA)**

*by H. STEINITZ
Department of Zoology, The Hebrew University of Jerusalem*

**SUR UNE COLLECTION D'ASCIDIENNES DE LA COTE ISRAELIENNE
DE LA MER ROUGE ET DE LA PENINSULE DU SINAI**

*par J. M. PERES
Station Marine d'Endoume, Faculté des Sciences de Marseille*

**TINTINNINA FROM THE VICINITY OF THE STRAITS
OF TIRAN AND MASSAWA REGION**

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HAIFA, ISRAEL
MAY, 1962

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by

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INTRODUCTION

The survey of the tintinnid fauna from the Gulf of Eylath (Aqaba) carried out by the author (1959), provided a first account of the occurrence and seasonal distribution of this group of protozoa in that particular habitat. In that survey 66 species and varieties of Tintinnina were described, including a new species of *Codonellopsis*, *C. eylathensis* named after the locality in which it was recorded.

The composition of this fauna, which belongs to 24 recognized genera of which all but two are also represented in the adjacent Mediterranean Sea, showed strong affinities to that of circumtropical seas in general and of the Tropical and Sub-tropical Pacific in particular. The most detailed account of fauna in the latter areas have been given by KOFOID and CAMPBELL (1929, 1939) and CAMPBELL (1942).

In view of the fact that the Gulf of Eylath is an almost closed sea adjoining the Red Sea, it was thought desirable to extend the scope of this investigation to the Red Sea proper, whose samples were collected at stations located in the northern and southern regions.

Samples were collected during the months January-March, 1958, in the course of fishing activities, using both Eylath and the Red Sea Port of Massawa as base for the experimental boat employed for this purpose.

Due to the limited period of time devoted to the collection of plankton samples, no attempt is being made at this stage to discuss the seasonal distribution of the species as was done in the case of the survey undertaken in the Gulf of Eylath (KOMAROVSKY, 1959), where the collection of samples was carried out over a number of years at a fairly large number of localities.

The following are the main stations from where plankton samples were collected:

Station	Coordinates (position)	Date	Depth (m)	Type of hauling	Time of collection	T°C	S ^o /m	pH
Tiran Island	35 miles NNW	25.1	120	Vertical	15	23.95	40.46	8.20
Tiran Island	SW	25.1	150	Vertical	10.20	23.50	40.62	8.20
St. John's Isl.	N23°23' E36°31'	27.1	150	Vertical	5.00	24.50	39.83	8.25
	N22°40' E36°45'	27.1	150	Vertical	15.00	24.30	39.49	8.20

Station	Coordinates (position)	Date	Depth (m)	Type of hauling	Time of collection	T°C	S ^o /‰	pH
Abington Reef	N22°51' E37°38'	28.I	150	Vertical	7.30	26.20	39.13	8.10
	N20°25' E37°40'	28.I	250	Vertical	12.00	26.00	39.22	8.20
	N20°10' E37°53'	28.I	250	Vertical	16.15	26.70	38.68	8.50
	N18°45' E38°34'	29.I	250	Vertical	15.00	26.00	37.61	8.15
Mararib Bull Hassab		8.II		Vertical	—	—	—	—
Shuma Island		10.II		Vertical	—	—	—	—
Ajuz Island		15.II		Artificial light	—	—	—	—
Off Massawa		15.II		Vertical	—	—	—	—
Gergaman Kabir		17.II		Vertical	—	—	—	—
Shabshag		25.II		Vertical	—	—	—	—

SYSTEMATIC ACCOUNT

The following species not previously recorded from the survey of the tintinnid fauna of the Gulf of Eylath are recorded below :

1. *Tintinnopsis bütschlii* var. *mortenseni* (SCHMIDT).
2. *Tintinnopsis lobiancoi* DADAY.
3. *Tintinnopsis radix* (IMHOF) BDT.
4. *Codonellopsis ostenfeldi* (SCHMIDT).
5. *Codonellopsis schabi* (BDT.) KOF. and CAMPB.
6. *Dictyocysta duplex* BDT.
7. *Favella panamensis* KOF. and CAMPB.
8. *Rhabdonellopsis triton* (ZACHARIAS) KOF. and CAMPB.
9. *Xystonella scandens* (BDT.) BDT.
10. *Eutintinnus erythraensis* sp. nov.

The following species already recorded from the Gulf of Eylath have also been found at various stations in the Red Sea :

1. *Tintinnopsis beroidea* ENTZ Ajuz Island 17.II
2. *Codonella galea* HAECKEL SW of Tiran 25.I
3. *Codonella olla* var. *minor* var. nov. SW of Tiran, 25.I.
4. *Codonella perforata* ENTZ, Sr., as above.
5. *Codonellopsis eylathensis* St. John's Island 27.I
6. *Codonellopsis longa* KOF. and CAMPB. St. John's Island 27.I (common), Tiran 25.I, 1958.
7. *Codonellopsis morchella* CLEVE Ajuz Island 15.II.

8. *Codonellopsis orthoceras* HAECK. St. John's Island, 27.I.
9. *Dictyocysta pacifica* KOF. and CAMPB. N20°25'; E37°40', 28.I.
10. *Coxiella laciniosa* (BDT.) LAACK. St. John's Island 27.I.
11. *Cyttarocylis eucecryphalus* (HCK.) KOF. St. John's Island, 27.I (common).
12. *Epiplocylis undella* (OSTF. and SCHM.) JÖRG. St. John's Island 27.I (abundant).
13. *Epiorella curta* KOF. and CAMPB. N18°45'; E38°34', 29.I.
14. *Epicancella nervosa* (CLEVE) KOF. and CAMPB. as above.
15. *Petalotricha ampulla* (FOL) KENT SW of Tiran, 25.I; 18.IV.
16. *Petalotricha major* JÖRG. St. John's Island, 27.I.
17. *Protorhabdonella simplex* (CLEVE) JÖRG. N18°45'; E38°34', 29.I.
18. *Rhabdonella brandtii* KOF. and CAMPB. Tiran Island, 25.I.
19. *Rhabdonella poculum* (OSTF. and SCHM.) BDT. Ajuz Island (artificial light), 27.II.
20. *Rhabdonella valdestrata* BDT. Tiran Island 18.IV.
21. *Xystonella treforti* (DAAD.) LAACK. St. John's Island, 27.I.
22. *Proplectella claparèdei* KOF. and CAMPB. Tiran Island, 18.IV.
23. *Climacocylis scalaria* (BDT.) JÖRG. St. John's Island, 18.I; Tiran Island, 18.IV.
24. *Favella azorica* (CLEVE) JÖRG. Ajuz Island (artificial light), 27.II.
25. *Eutintinnus fraknoi* (DADAY) KOF. and CAMPB. St. John's Island, 25.I.
26. *Eutintinnus lusus-undae* ENTZ, Sr. N18°45'; E38°34', 29.I.
27. *Eutintinnus macilentus* (JÖRG.) KOF. and CAMPB. Ajuz Island, (artificial light) 27.II.
28. *Salpingella acuminata* (CLAP. and LAACK.) JÖRG. Tiran Island, 25.II.
29. *Amphorella quadrilineata* (CLAP. and LAACK.) DADAY N20°25'; E37°40', 28.I.

DESCRIPTION OF SPECIES

Tintinnopsis bütschlii var. *mortenseni* (SCHMIDT) Fig 1.

Lorica greatly expanded into an horizontal collar at its oral end. Suboral region almost cylindrical with more or less rounded aboral end devoid of caudal prolongation. Annuli not visible in our specimens.

Total length 82 μ , oral diameter 82 μ , lorica diameter in its lower part 33 μ .

Found off Masawa Harbour and Ajuz Island in February, 1958.

The dimensions of our specimens are lower than those given for *T. bütschlii* by BALECH (1959) while corresponding very closely to those given by the same author in an earlier Report (1948) dealing with the tintinnid fauna of the Atlantida (Uruguay Coast).

T. bütschlii var. *mortenseni* has certainly close affinities with *T. mortenseni* as described by KOFOID and CAMPBELL (1929) as well as with *T. bütschlii* f. *typica* as described both by BALECH (1959) and other authors. It may in fact be a transitional form between these and perhaps some other allied species. Owing, however, to the great similarity in size and shape of our form to that described by BALECH from the Uruguay Coast (1948), we propose to adhere to the present determination.

GEOGRAPHICAL DISTRIBUTION

Tintinnopsis bütschlii var. *mortenseni* as such has been recorded solely from the Uruguay Coast of the Atlantic. The main species, however, *T. bütschlii*, which is considerably larger (T.L. 139–158 μ ; oral diameter 76–77 μ), has a somewhat wider

distribution, having been recorded from the Mediterranean and the Atlantic Coast of Portugal.

Tintinnopsis lobiancoi DADAY Fig. 2.

Lorica cylindrical, elongated, abruptly narrowing to a tapering point at its aboral end. No spiral structures on the upper part of the lorica could be observed in our specimens. The species has affinities with both *T. cylindrica* and *T. radix*.

Recorded in vertical samples off Massawa Harbour and Ajuz Island in February 1958.

GEOGRAPHICAL DISTRIBUTION

Reported from the Bay of Naples in the Mediterranean, western Coast of Africa, Atlantic Coast of Portugal.

Tintinnopsis radix (IMHOF) BDT. Fig. 3.

Lorica elongated, subconical, gradually narrowing towards aboral end into an asymmetrical cone, slightly bent. Surface of lorica rough, due to agglutinated bodies. No spiral structures have been observed on the upper part of the lorica. The species is considered as very variable in dimensions and general shape. It is closely allied to *Colonellopsis cylindrica*.

Total length 487μ ; oral diameter 45.4μ .

Recorded from Massawa Harbour and Ajuz Island in February 1958.

GEOGRAPHICAL DISTRIBUTION

Reported from the Mediterranean, Uruguay and Argentine Coasts of the Atlantic.

Codonellopsis ostenfeldi (SCHMIDT) Figs. 4, 5.

Lorica divided into the lower bowl, which is rather irregular in shape, and the collar; the latter displays a suboral region provided with 2-3 annuli and a main region up to the junction with the bowl, on which 5 horizontal rows of fenestrae of circular to hexagonal shape are present. Fig. 4 probably represents a younger specimen in which the collar is not yet fully developed, while Fig. 5 represents a specimen which has attained full development from a morphological point of view.

Total length 132μ ; collar: oral diameter 48μ ; length 45μ ; lower diameter 42μ . Bowl: length 87μ ; maximum diameter 70.5μ .

Found off Shobshog in a vertical plankton sample in February 1958.

GEOGRAPHICAL DISTRIBUTION

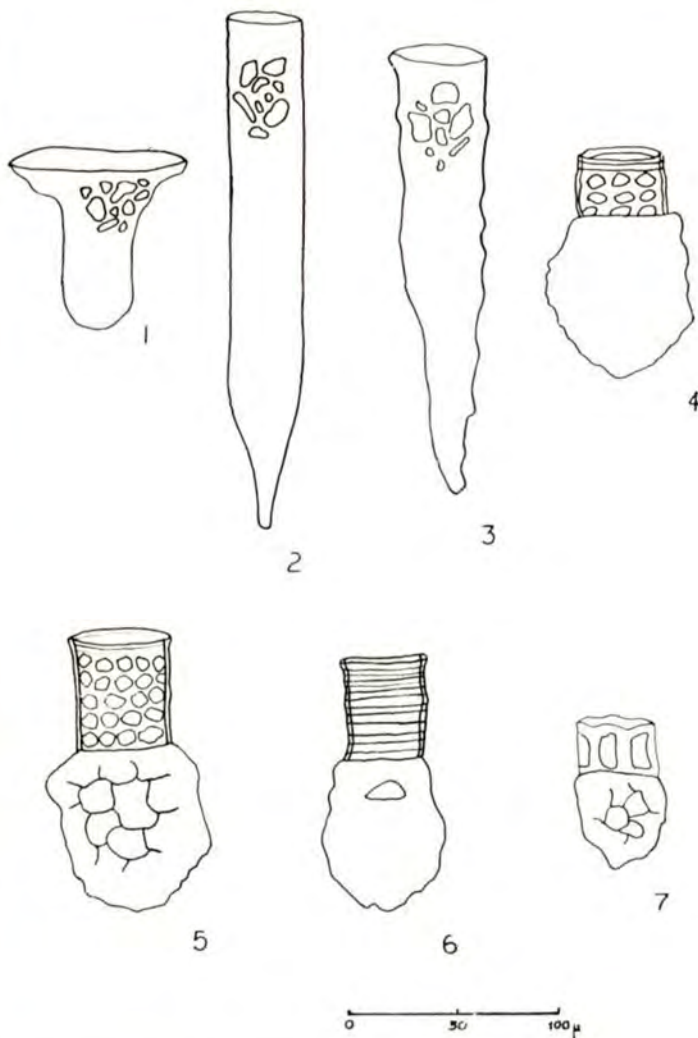
Recorded from the western Coast of Borneo.

Codonellopsis schabi (BDT.) KOF. and CAMPB. Fig. 6.

Bowl ovoidal with maximum diameter a little below its middle region. Collar with 12 spiral turns more widely spaced towards the bowl than at the rim. Aboral end of lorica almost rounded.

Total length 120μ ; collar: length 45.4μ ; oral diameter 41μ .

Found off Ajuz Island in a vertical sample in February 1958.



Figures 1-7.

1. — *Tintinnopsis bütschlii* var. *mortenseni*. 2. — *Tintinnopsis lobiancoi*. 3. — *Tintinnopsis radix*. 4, 5. — *Codonellopsis ostenfeldi*. 6. — *Codonellopsis schabi*. 7. — *Dictyocysta duplex*.

GEOGRAPHICAL DISTRIBUTION

Recorded from the Monrovia Coast in the Guinea Current, the Mediterranean, littoral waters of Portuguese Guinea.

Dictyocysta duplex BDT. Fig. 7.

Lorica elongated with collar forming about 0.3 of total length. Upper end of lorica strongly undulating. 6-7 fenestrae of rectangular shape almost twice as long as wide. Bowl slightly elongated with a slight asymmetrical tapering end which may not, however, be typical of the species.

Total length 70 μ ; collar (length) 22 μ . Oral diameter 38.6 μ . fenestrae 16/9; maximum diameter of bowl 43.2 μ .

Found off Kumaran Island in a vertical sample in February, 1958.

GEOGRAPHICAL DISTRIBUTION

Recorded from the eastern Tropical Pacific, Labrador and Florida Currents, Brazil Current of the Atlantic, Mediterranean.

Favella panamensis KOF. and CAMPB. Figs. 8, 9.

Lorica cylindrical with suboral ring; aboral region contracting abruptly into a caudal horn, slightly symmetrical and tapering to a point.

Total length 132-200 μ ; oral diameter 82 μ ; at shoulder level 93 μ ; caudal prolongation 22-40 μ .

Common, found in large numbers off Ajuz Island in February, 1958.

GEOGRAPHICAL DISTRIBUTION

Recorded from the Bay of Panama, California and Mexican and Peruvian currents in the Pacific and the coast of Puerto Rico in the Atlantic.

Rhabdonellopsis triton (ZACHARIAS) KOF. and CAMPB. Fig. 10.

Lorica elongated with chalice-shaped bowl. Aboral horn with pronounced, spindle-shaped knob at junction of long, tubular pedicel and lance. 12-14 longitudinal ribs fading away in the pedicel region towards the knob. Few circular fenestrae present in intercoastal areas. Oral rim rises slightly above suboral trough, the outer margin of which flares abruptly.

Recorded in a vertical sample taken at Station N20°10' E37°53' in January, 1958 (depth 250m.). At that particular station it occurred in large numbers (surface temperature of the water 26.70°C).

GEOGRAPHICAL DISTRIBUTION

Recorded from the Atlantic (Sargasso Sea) and eastern Tropical Pacific.

Xystonella scandens (BDT.) BDT. Fig. 11.

Lorica subconical with channeled oral rim and secondary structure of the wall. Spiral shelf with 9 turns projecting laterally, not reaching either the anterior or posterior ends of lorica. Bowl elongated, rapidly narrowing in its lower fourth, then passing abruptly into a short, pointed caudal prolongation with pedicel, skirt and lance.

Total length 409 μ , oral diameter (inner) 70 μ , caudal prolongation 33.5 μ .

Found once only off St. John's Island in a vertical plankton sample (150-0m) in January 1958.

GEOGRAPHICAL DISTRIBUTION

Rare, reported by KOFOID and CAMPBELL (1929) from the western Tropical Pacific.

Eutintinnus erythrænsis sp. nov. Fig. 12.

Lorica stout with distinct median bulge gradually narrowing towards aboral end. Oral end with pronounced flare; no flare at aboral end.

Total length 277 μ ; oral diameter 66 μ ; maximum diameter 46 μ ; aboral diameter 46 μ .

Differs from *Eutintinnus latus* previously recorded from the Gulf of Eylath in its shorter and wider lorica and absence of aboral flare and from *Eutintinnus brandti* in the absence of premedian bulge and prominent aboral flare.

The type locality for this species is Ajuz Island where it was found in February 1958.

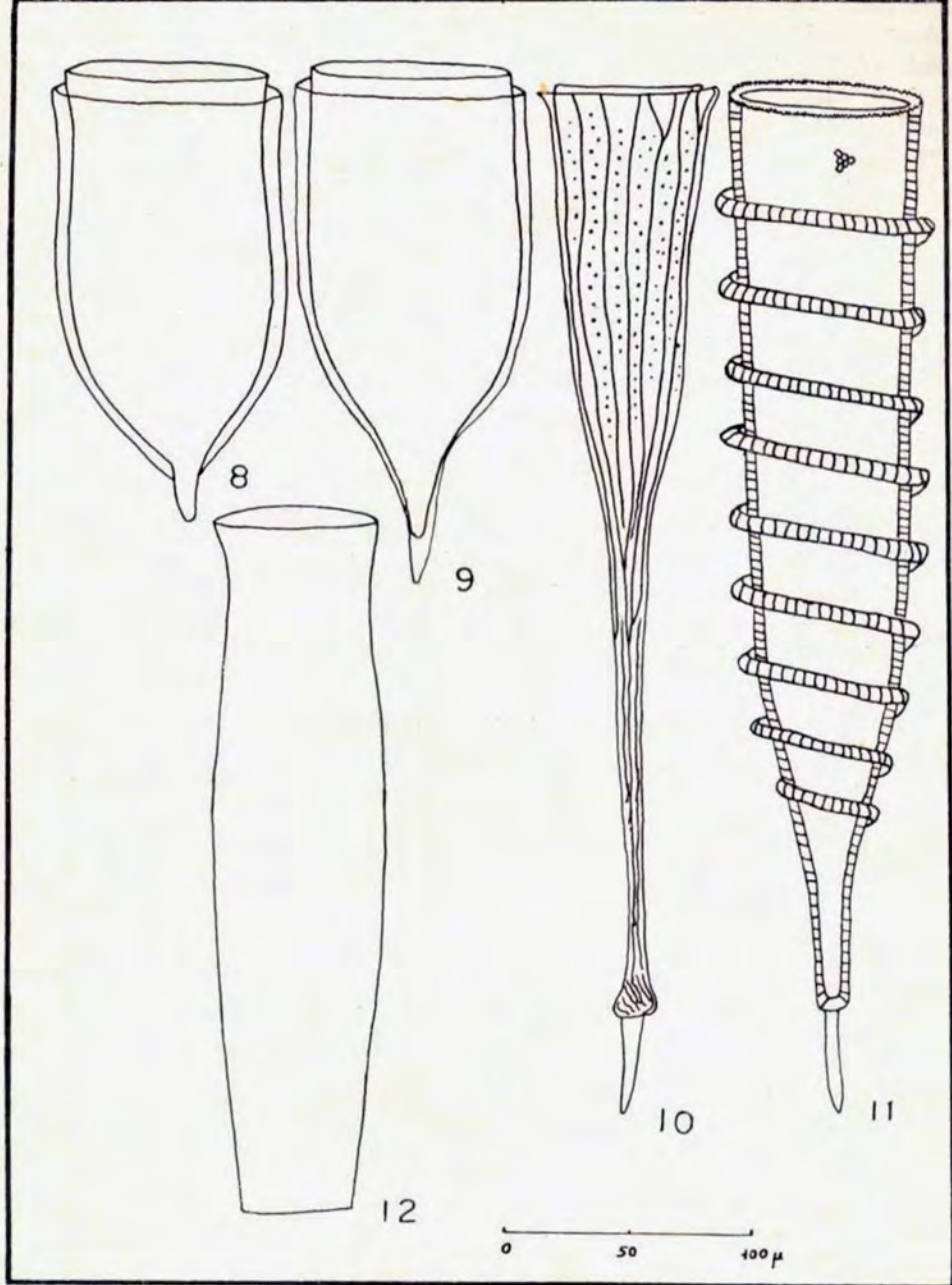
DISCUSSION

This short survey of the tintinnid fauna of two main regions of the Red Sea enabled us to add ten more species to the list of 66 species and varieties already reported from the Gulf of Eylath. One of these, *Eutintinnus erythrænsis*, differs from its most closely allied species in the shape and dimensions of the lorica and in the characteristics of the oral and aboral ends and is, therefore, considered by us as new to science.

Of the 66 species and varieties recorded previously from the Gulf of Eylath, only 29 were also recorded from the region of Tiran Island in the northern part of the Red Sea and the Massawa region in its southern part. Considering the fact that the plankton samples from the Red Sea were collected for only 2-3 months during the winter seasons and from two rather limited regions, it may be assumed that the number of species to be found would be considerably higher if the sampling season and locations were extended. It would also be assumed that these species would include some of those already recorded from the Gulf of Eylath. Most of the Red Sea samples were collected close to Massawa Harbour and over the island fields and, therefore, mainly include neritic species clinging to coastal waters and the continental shelf. This is mainly true of the three species *Tintinnopsis*, *T. bütschlii* var. *mortenseni*, *T. lobiancoi* and *T. radix* and of *Favella* represented in the present material by *F. panamensis*. The presence of *Dictyocysta duplex*, generally considered an eupelagic species, in the area of the island fields in the southern Red Sea, is exceptional, although it has already been reported from similar environments (KOF. and CAMPB., 1939).

It is quite likely, therefore, that should the number of stations sampled in the open sea at locations remote from continental shelves, coast lines and island fields have been larger, the number of eupelagic species would also have been considerably higher.

A common characteristic of most of the additional tintinnid species listed in the present report is their distribution in the warm-water regions of the oceans. Most



Figures 8-12.

8, 9. — *Favella panamensis*. 10. — *Rhabdonellopsis triton*. 11. — *Xystonella scandens*.
 12. — *Eutintinnus erythrænsis*.

of the species have already been recorded in the tropical and subtropical regions of the Pacific and Atlantic Oceans.

Another point worth mentioning is that, with few exceptions, none of the species mentioned in this report are found in great abundance. Among those found in relatively high concentrations are *Epiplocyis undella* off Tiran and St. John's Islands and *Codonellopsis ostenfeldi* off Ajuz Island.

The present contribution tends to suggest that certain differences, both qualitative and quantitative, exist in the composition of the tintinnid fauna between the Red Sea proper and the Gulf of Eylath. Certain species present in one environment are conspicuously absent from the second and vice versa, although it may be expected that the examination of additional material, especially from the Red Sea proper, might minimize these discrepancies. A thorough study of the tintinnid fauna of the Indian Ocean, especially in the immediate vicinity of the Red Sea, might throw further light on the zoogeography of individual species belonging to this group and, perhaps, also on the more general characteristics of the various regions of this marine environment.

ACKNOWLEDGEMENTS

The author wishes to express his thanks to Mr. O. H. OREN, who collected the plankton samples and kindly put the hydrographical data at the disposal of the author; to Mrs. M. POROSZ for her assistance in the examination of the plankton samples and in the preparation of the drawings, and to Mrs. R. PALDI for the final preparation of the drawings for publication.

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