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A SURVEY OF THE PLANTS OF ORISSA (INDIA) FOR TANNINS, SAPONINS, FLAVONOIDS AND ALKALOIDS—II

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ABSTRACT

Phytochemical screening of 236 plant species from Orissa has shown the presence of tannins in 74, saponins in 14, flavonoids in 74 and alkaloids in 51 species. The presence of alkaloids in 13 species is reported for the first time. The tannin content of 32 species is found to be between 0.4 to 21.2 per cent.

Phytochemical survey in the Orissa region was started in 1971 and the results of screening of 103 plant species were reported in the first paper of this series (Saxena, 1975). The present paper deals with the results of screening of another 236 species of Angiosperms and Ferns.

MATERIAL AND METHOD

The plant samples were collected from Bhubaneswar, Berbera, Chandka, Kapilas, Saptasajya, Dhabaleswar, tidal forests of Mahanadi delta, Dangmal, Bhitarkanika, Simlipal reserve forests, Sambalpur and various parts of Ganjam district in Orissa. The voucher herbarium specimens are preserved in the herbarium of the Regional Research Laboratory, Bhubaneswar.

The preparation of plant extract and testing procedure employed were the same as described previously (Saxena, 1975).

RESULTS

Phytochemical screening of 310 plant samples representing 236 species of Angiosperms and Ferns, showed the presence of tannins in 74 species, saponins in 14, flavonoids in 74 and alkaloids in 51 species (Table-I). All the four constituents were found to be absent in 86 species; these are, *Abelmoschus crinitus* Wall.-st, lf, fl, *Acanthus ilicifolius* Linn.-r, *Aeginetia indica* Linn.-wp, *Allmania nodiflora* (Linn.) R. Br. ex Wt.-wp, *Amomum dealbatum* Roxb.-rh, *Aponogeton natans* (Linn.) Engl. & Krause-wp, *Avicennia officinalis* Linn.-bk and pn; *Azima tetracantha* Lamk.-st, lf, *Baliospermum montanum* (Willd.) Muell.-Arg.-st, lf, fl, *Bidens pilosa* Linn.-st, lf, fl, *Blumea fistulosa* (Roxb.) Kurz-wp, *B. lanceolaria* (Roxb.) Druce-wp, *B. virens* DC.-wp, *Boehmeria platyphylla* D. Don-st, lf, fl, *Breynia retusa* (Denst.) Alston-st, lf, fl and r, *Caesalpinia digyna* Rottl.-st, lf, fl, *Carmona retusa* (Vahl) Masamune-wp, *Cayratia auriculata* (Roxb.) Gamble-st, lf and fr, *C. pedata* (Lour.) Juss. ex Gagnep.-st, lf and fr, *Centotheca lappacea* (Linn.) Desv.-wp, *Ceratopteris trichoides* Brogn.-wp, *Cheilanthes tenuifolius* Sw.-wp, *Cissus adnata* Roxb.-st, lf, fl, *Conyza stricta* Willd.-st, lf, fl, *Crassocephalum crepidioides* (Benth.) S. Moore-wp, *Crotalaria alata* Buch.-Ham.-wp, *C. calycina* Schrank-st, lf, fr, *Croton oblongifolius* Roxb., st, lf, *Cymbidium aloifolium* (Linn.) Sw.-wp and fr, *Cyperus dubius* Rottb.-wp, *C. puncticulatus* Vahl-wp, *Dendrobium herbaceum* Lind.-wp, *Dicliptera bupleuroides* Nees-st, lf, fl, *Diospyros montana* (Roxb.-st, lf, *Drypetes sepiaria* (W. & A.) Pax & Hoffm.-st, lf, *Dysophylla quadrifolia* Benth.-wp, *Ecbolium viride* (Forsk.) Alston var. *dentata* (C. B. Cl.) Raizada-st, lf, *Eriocaulon*

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quinquangulare Linn.-wp, *Euphorbia caducifolia* Haines-lf, bk and r, *Ficus comosa* Roxb.-st, lf, *Flagellaria indica* Linn.-st, lf, *Fuirena ciliaris* (Linn.) Roxb.-wp, *Globba bulbifera* Roxb.-wp, *Glossogyne bidens* (Retz.) Alston-wp, *Hemionitis arifolia* Bedd.-wp, *Homalium nepalense* Benth.-st, lf, fl and bk, *Hoya pendula* Wt.-st, lf, *Ipomoea obscura* (Linn.) Ker-Gawl.-st, lf, fl, *Knoxia sumatrensis* (Retz.) DC.-wp, *Laggera alata* (D. Don) C. Schultz-Bip. ex Oliver-st, lf, fl, *L. pterodonta* (DC.) Benth. ex C. B. Cl.-st, lf, fl, *Laportea interrupta* (Linn.) Chew-wp, *Leersia hexandra* Sw.-wp, *Lepisanthes tetraphylla* (Vahl) Radlk.-st, lf, *Ludwigia octovalvis* (Jacq.) Raven.-st, lf, fl, fr, *Merope angulata* (Willd.) Swingle-r, *Meyna spinosa* Roxb. ex Link var. *pubescens* Robyns-fr, *Mimulus orbicularis* Benth.-wp, *Mollugo pentaphylla* Linn.-wp, *Mucuna gigantea* DC.-st, lf, fr and sd, *Ocimum gratissimum* Linn.-st, lf, fl, r and bk, *Oldenlandia nudicaulis* Roth-wp, *Oroxylum indicum* (Linn.) Vent.-st, lf, sd and fc. *Orthosiphon glabratus* Benth.-wp, *Petalidium barlerioides* Nees-st, lf, *Pholidota pallida* Lindl. wp, *Pisonia aculeata* Linn.-st, lf, fr, *Pueraria tuberosa* (Roxb. ex Willd.) DC.-tb, *Pupalia lappacea* (Linn.) Juss.-wp, *Rhamnus nepalensis*-st, lf, fr, *Rhinacanthus nasuta* (Linn.) Kurz-st, lf, fl, *Sarcanthus quadrangularis* Muell.-Arg.-st, lf and r, *Scindapsus officinalis* Schott-st, lf, *Sesuvium portulacastrum* Linn.-wp, *Sphenoclea zeylanica* Gaertn.-st, lf, fl and fr, *Tenagocharis latifolia* (D. Don) Buchen.-wp, *Teramnus labialis* (Linn. f.) Spreng.-st, lf, fr, *Thespesia lampas* (Cav.) Dalz. and Gibbs.-st, lf, *Tragia involucrata* Linn-wp, *Trichosanthes bracteata* (Lamk.) Voigt-st, lf, fl, *Typhonium triobatum* (Linn.) Schott.-tb, *Urginea indica* (Roxb.) Kunth-bl, *Vernonia teres* Wall.-st, lf, *Wedelia scandens* C. B. Cl.-st, lf and *Wendlandia tinctoria* DC.-st, lf and bk.

Thirteen new alkaloid containing species were found in which alkaloids have not been reported previously (Saxena 1975; Bhattacharjee and Das, 1969; Kapoor et al., 1975; Smolenski et al., 1975); these are, *Abutilon persicum* (Burm. f.) Merrill, *Capparis olacifolia* Hook. f. & Thoms., *Courtoisia cyperoides* (Roxb.) Nees, *Gelonium lanceolatum* Willd., *G. multiflorum* A. Juss., *Grewia disperma* Rottl. ex Spreng., *G. rhamnifolia* Heyne, *Lepidagathis fasiculata* (Retz.) Nees, *Opilia amentacea* Roxb., *Phaylopsis parviflora* Willd. *Polyalthia cerasoides* (Roxb.) Bedd., *Sopubia delphiniifolia* (Linn.) G. Don and *Symphorema involucratum* Roxb.

The following 28 species showed false positive tests for alkaloids as they did not respond to the confirmatory test: *Allmania nodiflora* (Linn.) R. Br. ex Wt., *Blumea fistulosa* (Roxb.) Kurz, *Canscora diffusa* (Vahl) R. Br., *Cayratra pedata* (Lour.) Juss, ex Gagnep., *Cissus vitiginea* Linn., *Croton caudatus* Gies., *Ecbolium viride* (Forsk.) Alston var. *dentata* (C. B. Cl.) Raizada, *Elephantopus scaber* Linn., *Fissendocarpa linifolia* (Vahl) Benth., *Gliricidia sepium* (Jacq.) Kunth ex Steud., *Glossogyne bidens* (Retz.) Alston, *Hugonia mystax* Linn., *Ipomoea barlerioides* (Choisy) Benth. ex C. B. Cl., *Leersia hexandra* Sw., *Mallotus philippensis* (Lamk.) Muell.-Arg., *Maytenus emarginata* (Willd.) Ding-Hou, *Meyna spinosa* Roxb. ex Link var. *pubescens* Robyns, *Micromelum minutum* (Forst. f.) W. & A., *Neolitsea foliosa* Gamble var. *caesia* Meissn., *Petalidium barlerioides* Nees, *Pogostemon benghalensis* (Burm.) O. Ktze., *Polyalthia suberosa* (Roxb.) Thw., *Pterospermum xylocarpum* (Gaertn.) Sant. & Wagh, *Sonneratia caseolaris* (Linn.) Engler, *Stereospermum personatum* (Hassk.) Chatt., *Urginea indica* (Roxb.) Kunth. *Viscum articulatum* Burm. and *Zanthoxylum armatum* DC.

The tannin content of 42 samples representing 32 species, showing clear gelatin-salt block test, was determined quantitatively and found to be between 0.4-21.2 per cent.

TABLE I : RESULTS OF PHYTOCHEMICAL SCREENING

Species	Plant part *	Tannins & %	Saponins	Flavonoids	Alkaloids
1	2	3	4	5	6
ACANTHACEAE					
Andrographis elongata T. And.	st, lf	–	–	+	–
Asystacia gangetica (Linn.) T. And.	st, lf	–	–	–	+
Eranthemum capense Linn.	st, lf	–	–	+	–
Lepidagathis fasciculata (Retz.) Nees	wp	–	–	–	+
Phaylopsis parviflora Willd.	wp	–	–	–	+
Thunbergia fragrans Roxb.	st, lf	–	–	–	+
AMARANTHACEAE					
Aerva monsoniae (Linn. f.) Mart.	wp	–	–	+	–
ANNONACEAE					
Polyalthia cerasoides (Roxb.) Bedd.	bk	+	–	+	+
P. suberosa (Roxb.) Thw.	st, lf	3.3	–	+	–
APOCYNACEAE					
Cerbera manghas Linn.	st, lf	–	–	–	–
	bk	–	+	+	–
Wrightia tinctoria R. Br.	st, lf	–	–	–	+
ARISTOLOCHIACEAE					
Aristolochia indica Linn.	r	–	–	–	+
ASCLEPIADACEAE					
Cryptolepis elegans Wall.	st, lf, fl	+	–	+	–
Tylophora rotundifolia Buch.-Ham. ex Wight	st, lf	–	–	–	+
T. tenuis Blume	st	–	–	–	+
	r	–	–	–	–
Wattakaka volubilis (Linn. f.) Stapf	st, lf	–	–	–	+
BIGNONIACEAE					
Stereospermum personatum (Hassk.) Chatt.	st	+	–	+	–
	fr	–	–	–	–
BORAGINACEA					
Trichodesma indicum (Linn.) Lehmann.	wp	+	–	–	+
BUXACEAE					
Sarcococca saligna (D. Don) Muell.-Arg.	st, lf	–	–	–	+
CAESALPINIACEAE					
Cassia auriculata Linn.	st, lf, fl	+	–	–	–
C. mimosoides Linn.	wp	+	–	–	–
Cynometra iripa Kostel	st, lf	8.4	–	+	–
	bk	10.8	–	–	–
	fr	+	–	–	–
Saraca asoca (Roxb.) De Wilde	st, lf	–	–	–	–
	bk	+	–	+	–
CAPPARACEAE					
Capparis brevispina DC.	r	–	–	–	+
C. olacifolia Hook. f. & Thoms.	st, lf, fl	–	–	–	+
C. zeylanica Linn.	st, lf, fl	–	–	–	+
	r	–	–	–	+

Contd.

1	2	3	4	5	6
CELASTRACEAE					
Gymnosporia acuminata Hook. f.	st, lf, fr	3.9	–	+	–
Maytenus emarginatus (Willd.) Ding-Hou	r	+	–	+	–
COMBRETACEAE					
Calycopteris floribunda (Roxb.) Poir.	st, lf	+	–	–	–
	fl	–	–	+	–
	bk	+	–	–	–
COMPOSITAE					
Centratherum anthelminticum (Linn.) O. Ktze.	wp	–	–	–	+
Elephantopus scaber Linn.	wp	+	–	–	–
CONVOLVULACEAE					
Cressa cretica Linn.	wp	–	–	–	+
Merremia umbellata (Linn.) Hall. f.	st, lf	6.3	–	–	–
	r	8.6	–	+	–
M. vitifolia (Burm. f.) Hall. f.	st, lf, fl	–	–	+	–
CUCURBITACEAE					
Cucumis sativus Linn.	st, lf	–	–	–	+
CYPERACEAE					
Courtoisia cyperoides (Roxb.) Nees	wp	–	–	–	+
Cyperus cyperoides (Linn.) O. Ktze.	wp	+	–	–	–
C. platystylis R. Br.	wp	+	–	–	–
DILLENIACEAE					
Dillenia pentagyna Roxb.	lf	–	–	–	–
	bk	+	–	+	–
	r	+	+	+	–
DIOSCOREACEAE					
Dioscorea anguina Roxb.	bll	8.7	–	–	–
EBENACEAE					
Diospyros chloroxylon Roxb.	st, lf	+	–	+	–
	fr	+	–	+	–
D. malabarica (Desr.) Kostel	st, lf	+	–	–	–
	fr	5.5	–	–	–
	r	4.2	–	–	–
ELAEOCARPACEAE					
Elaeocarpus tectorius (Lour.) Poir.	st, lf	13.3	+	–	–
	bk	9.0	+	–	–
EUPHORBIACEAE					
Acalypha indica Linn.	st, lf	–	–	–	+
Bridelia tomentosa Blume	st, lf	–	–	–	–
	fr	7.1	–	+	–
Cleistanthus collinus Benth.	st, lf	+	–	+	–
	fr	+	–	+	–
Croton caudatus Geis.	st, lf	–	–	+	–
	bk	–	–	–	–
	fr	–	–	–	–
	r	–	–	–	–
	r	+	–	–	–
Excoecaria agallocha Linn.	st, lf, fl	–	–	–	+
Gelonium lanceolatum willd.	st, lf, fr	–	–	–	+
G. multiflorum A. Juss.	st, lf	3.7	–	–	–
Mallotus philippensis (Lamk.) Muell.-Arg.	bk	4.1	–	+	–
	fr	–	–	–	–
Sebastiana chamaelea (Linn.) Muell.-Arg.	wp	+	–	–	–

Contd.

1	2	3	4	5	6
GENTIANACEAE					
Canscora diffusa (Vahl) R. Br.	wp	+	–	–	–
GRAMINEAE					
Chrysopogon aciculatus (Retz.) Trin.	wp	–	–	+	–
HIPPOCRATEACEAE					
Salacia prinoides DC.	st, lf	6.4	–	+	–
LABIATAE					
Anisochilus carnosus (Linn.) Wall.	wp	–	+	–	–
Colebrookea oppositifolia J. E. Sm.	st, lf, fl	–	–	–	+
Pogostemon benghalensis (Burm. f.) O. Ktze.	st, lf, fl	+	–	–	–
LAURACEAE					
Litsea monopetala Roxb.	bk	10.7	–	+	+
Neolitsea foliosa Gamble var. *caesia* Meissn.	st, lf	+	–	+	–
LECYTHIDACEAE					
Careya arborea Roxb.	bk	+	+	+	–
	fr	+	+	–	–
LINACEAE					
Hugonia mystax Linn.	st, lf	–	–	+	–
	fr	–	–	–	–
	r	–	–	–	–
Reinwardtia indica Dumort.	st, lf, fl	–	–	–	+
LORANTHACEAE					
Macrosolen cochinchinensis (Lour.) van Tieghem	st, lf	+	–	–	–
Scurrula parasitica Linn.	st, lf, fl	+	–	+	–
Viscum articulatum Burm.	st	–	–	+	–
LYTHRACEAE					
Ammannia multiflora Roxb.	wp	14.9	–	+	–
MAGNOLIACEAE					
Michelia champaca Linn.	bk	–	–	–	+
MALVACEAE					
Abutilon persicum (Burm. f.) Merrill	st, lf	–	–	–	+
	r	–	–	–	+
Hibiscus prainii Raizada & Chatt.	bk	10.5	–	–	–
MELASTOMATACEAE					
Memecylon umbellatum Burm. f.	fr	–	–	+	–
	sd	–	–	–	–
	r	+	–	+	–
Osbeckia truncata D. Don ex W. & A.	wp	–	–	+	–
MELIACEAE					
Amoora cucullata Roxb.	st, lf	9.8	–	+	–
	bk	15.1	–	–	–
Chloroxylon swietenia DC.	r	–	–	–	+
Cipadessa baccifera (Roth) Miq.	fr	+	–	+	–
	r	+	+	–	–
Soymida febrifuga A. Juss.	st, lf	9.0	–	–	–
	bk	15.0	–	–	–

Contd.

1	2	3	4	5	6
MIMOSACEAE					
Entada pursaetha DC.	fc	–	–	–	–
	sd	5.4	–	–	–
Mimosa himalayana Gamble	fr	+	–	+	–
Neptunia oleracea Lour.	wp	+	–	–	–
MORACEAE					
Plecospermum spinosum (Willd.) Trecul.	r	+	–	+	–
MYRSINACEAE					
Aegiceras corniculatus (Linn.) Blanco	bk	7.0	+	+	–
	r	–	+	+	–
MYRTACEAE					
Syzygium ruscifolium (Willd.) Sant. & Wagh	r	1.5	–	–	–
NYCTAGINACEAE					
Mirabilis jalapa Linn.	r	–	–	–	+
OCHNACEAE					
Ochna obtusata DC.	r	1.3	–	+	–
OLACACEAE					
Olax scandens Roxb.	bk	–	+	–	–
ONAGRACEAE					
Fissendocarpa liniifolia (Vahl) Benth.	st, lf, fl	+	–	–	–
OPILIACEAE					
Opilia amentacea Roxb.	st, lf, fl	–	–	+	+
	r	–	–	–	+
ORCHIDACEAE					
Dendrobium moschatum Wall.	wp	–	–	–	+
Oberonia iridifolia Lindl.	wp	–	–	+	–
OXALIDACEAE					
Biophytum sensitivum (Linn.) DC.	wp	–	–	–	+
PALMAE					
Calamus viminalis Willd.	st, lf	–	–	–	–
	r	+	–	–	–
Phoenix paludosa Roxb.	r	1.8	–	–	–
PAPILIONACEAE					
Atylosia scarabaeoides (Linn.) Benth.	lf	–	–	+	–
Crotalaria prostrata Roxb.	st, lf	–	–	–	+
	r	–	–	–	+
C. verrucosa Linn.	st, lf, fl	–	–	+	+
Desmodium pulchellum (Linn.) Benth.	st, lf, fl	–	–	–	–
	r	–	–	–	+
D. triquetrum (Linn.) DC.	wp	+	–	+	–
Flemingia chapper Buch.-Ham. ex Benth.	st, lf, fl	–	–	+	–
Gliricidia sepium (Jacq.)Kunth ex Steud.	fl	–	–	+	–
Indigofera astragalina DC.	st, lf, fl	+	–	+	–
I. nummularifolia (Linn.) Livera ex Alston	st, lf	–	–	+	–
Pterocarpus marsupium Roxb.	st, lf	+	–	+	–
Rhynchosia rufescens (Willd.) DC.	st, lf, fl	+	–	+	–
PASSIFLORACEAE					
Passiflora foetida Linn.	fr	–	–	–	+
POLYPODIACEAE					
Pyrrosia adnascens (Sw.) Ching.	wp	+	–	–	–

Contd.

1	2	3	4	5	6
PTERIDACEAE					
Adiantum philippense Linn.	wp	+	–	+	–
Acrostichum aureum Linn.	fd	3.3	–	+	–
	rh	5.6	–	–	–
RANUNCULACEAE					
Clematis smilacifolia Wall.	st, lf, fl	–	–	–	+
RHIZOPHORACEAE					
Bruguiera conjugata (Linn.) Merr.	bk	4.0	–	–	–
	r	–	–	–	–
Carallia brachiata (Lour.) Merr.	bk	–	–	+	–
Ceriops roxburghiana Arn.	bk	10.2	–	+	–
	r	+	–	–	–
Kandelia candel (Linn.) Druce	bk	12.9	–	+	–
	r	+	–	–	–
RUBIACEAE					
Gardenia latifolia Soland. ex Ait.	fr	+	–	+	–
Hymenodictyon excelsum (Roxb.) Wall.	bk	0.4	–	–	–
Ixora arborea Roxb. ex Sm.	bk	2.6	–	+	–
Pavetta tomentosa Roxb. ex Sm.	bk	–	–	+	–
	fr	–	–	–	–
RUTACEAE					
Atalantia monophylla (Roxb.) DC.	r	–	–	–	+
Clausena heptaphylla W. & A.	st, lf	–	–	–	+
Glycosmis mauritiana (Lamk.) Tanaka	bk	–	–	+	+
	r	–	–	+	+
Micromelum minutum (Forst. f.) W. & A.	st, lf	–	–	+	–
Toddalia asiatica (Linn.) Lamk.	r	–	–	–	+
Zanthoxylum armatum DC.	st, lf	–	–	+	–
	r	–	–	–	+
SANTALACEAE					
Osyris quadripartita Salz. ex Decne	st, lf	7.8	–	+	–
SAPINDACEAE					
Allophylus serratus (Roxb.) Radlk.	st, lf, fr	–	–	+	–
	r	+	–	–	–
Harpullia imbricata Thw.	st, lf, fl	–	+	–	–
	bk	–	–	+	–
Lepisanthes teraphylla (Vahl) Radlk.	bk	–	+	–	–
SAPOTACEAE					
Xantolis tomentosa (Roxb.) Rafin.	fr	–	+	–	–
	r	+	–	+	–
SCROPHULARIACEAE					
Sopubia delphiniifolia (Linn.) G. Don	wp	–	–	–	+
Striga angustifolia (Don) Saldanha	wp	–	–	+	–
SOLANACEAE					
Solanum indicum Linn.	fr	–	–	–	+
S. trilobatum Linn.	fr	–	+	–	+
SONNERATIACEAE					
Sonneratia apetala Buch.-Ham.	bk	7.5	–	–	–
	r	+	–	–	–
S. caseolaris (Linn.) Engler	st, lf	2.3	–	–	–
	bk	8.5	–	–	–
STEMONACEAE					
Stemona tuberosea Lour.	r	–	–	+	+
STERCULIACEAE					
Byttneria herbacea Roxb.	st, lf	+	–	–	+
	r	+	–	–	+
Heritiera littoralis Dryand. ex Ait.	r	+	–	+	–
	bk	21.2	+	–	–
	r	5.0	–	+	–
Pterospermum xylocarpum (Gaertn.) Sant. & Wagh	r	8.5	–	–	–

Contd.

1	2	3	4	5	6
TAMARICACEAE					
Tamarix indica Koenig	st, lf	12.9	–	+	–
	r	+	–	+	–
TILIACEAE					
Grewia disperma Rottl. ex Spreng.	st, lf	–	–	–	+
G. rhamnifolia Heyne	st, lf	–	–	–	+
Triumfetta rhomboidea N. Jacq.	st, lf, fr	+	–	–	–
VERBENACEAE					
Phyla nodiflora (Linn.) Greene	wp	–	–	+	–
Premna latifolia Roxb.	st, lf	–	–	–	+
	bk	–	–	–	+
	r	–	–	–	+
Symphorema involucratum Roxb.	st, lf	–	–	–	+
Vitex peduncularis Wall.	st, lf	–	–	+	–
V. pinnata Linn.	r	–	–	+	–
VITACEAE					
Ampelocissus latifolia (Roxb.) Planch.	st, lf, fr	+	–	–	–
Cissus vitiginea Linn.	bk	–	+	+	–
	r	–	–	+	–
ZINGIBERACEAE					
Zingiber montanum (Koenig.) Link ex Diet.	rh	–	–	+	–

*St—stem; lf—leaf; wp—whole plant with root; bk—bark; fl—flower; fr—fruit; sd—seed; r—root ; rh—rhizomes; fd—frond; pn—pneumatophore; tb—tuber; bll—bulbil; bl—bulb; fc—fruit without seeds.

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