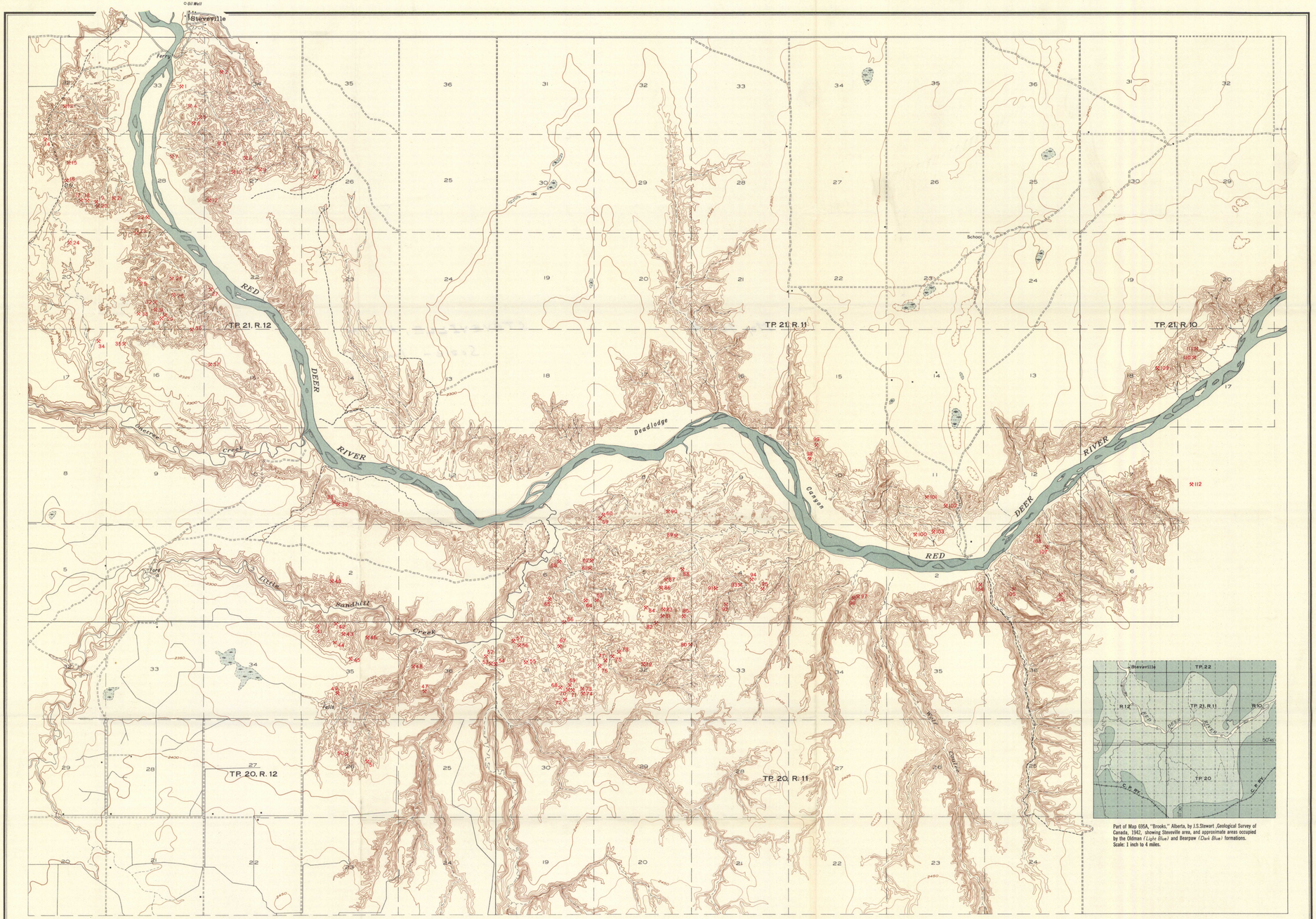
CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA



Part of Map 695A, "Brooks," Alberta, by J.S.Stewart ,Geological Survey of Canada, 1942, showing Steveville area, and approximate areas occupied by the Oldman (*Light Blue*) and Bearpaw (*Dark Blue*) formations.
Scale: 1 inch to 4 miles.

NOTES ON THE DINOSAUR QUARRIES

HISTORY AND SYSTEM OF NUMBERING

Prior to 1935, when the map-area was surveyed, L. Sternberg of the University of Toronto, Royal Ontario Museum staff, had marked certain quarries from which he had collected specimen material for the University of Toronto, as well as many others with which he was familiar, including some from which collections were made by C. H. Sternberg and W. A. Parks. These and other quarries, to the number of about ninety, were located by F. P. DuVernet of the Topographical Survey during the course of mapping in 1935. Subsequently, the writer examined and identified all quarries that had been located, and with the assistance of R. M. Sternberg fixed the positions of the remaining quarries. In this work he was assisted by photographs of quarries from which Barnum Brown had collected specimens for the American Museum of Natural History, and by photographs of others from which G. F. Sternberg had collected for the University of Alberta. Quarries that had not been shown on the preliminary map (Paper 35-18) issued in 1936 were carefully located by plane-table by R. M. Sternberg, and their positions fixed with reference to the nearest mapped quarries. Lack of definite information has, however, made it impossible to plot the position of a few quarries from which it is known that specimens were collected, and a few of Barnum Brown's quarries have not been identified.

Most of the quarries shown on the map have been identified by a brass plate fixed to the top of a galvanized iron pipe driven into, and firmly cemented in, rock. On the plate is stamped the original number of the quarry, the initials of the institution making the collection, and the institution quarry number. The quarries were numbered in the order in which they were discovered. Thus, 24-A.M.1 indicates original quarry No. 24, and the first one from which the American Museum made collections. As the quarries were numbered at different times and by persons working in different parts of the map-area, they were not arranged in any systematic geographic order. Consequently, for convenience in using this map, the quarries have been renumbered, commencing in the northwest corner, and the original numbers placed next to the new numbers in the list shown elsewhere on the map.

ZONING OF SPECIES

Specimens were obtained from quarries ranging in elevation from 2,126 feet above sea-level (No. 26) to 2,328 feet (No. 106).

Of the horned dinosaurs, *Centrosaurus* appears to be lower stratigraphically than others, for of thirteen specimens only five were found above an elevation of 2,200 feet. The genus ranged from 2,135 feet (No. 100) to 2,263 feet (No. 74). *Chasmosaurus* ranges from 2,198 feet to 2,308 feet, with only one species, *C. russelli* (No. 31) below 2,200 feet. The highest horned dinosaur marked is *Styracosaurus* at 2,328 feet (No. 106).

Of the flat-headed hadrosaurs, *Gryposaurus* averages low stratigraphically, though one specimen was obtained from an elevation of 2,292 feet (No. 110), which is 97 feet above any other specimen of this genus. *Prosaurolophus* ranged from 2,264 feet (No. 39) to 2,278 feet (No. 79). This genus shows the shortest vertical range of any duck-billed form.

Of the hooded hadrosaurs, *Corythosaurus casuarius* was found lowest stratigraphically, ranging from an elevation of 2,132 feet (No. 1) to 2,196 feet (No. 50), whereas *C. intermedius* ranges from 2,224 feet (No. 96) to 2,308 feet (No. 47) and *C. excavatus* also falls within this range. *Tetragonosaurus*, the most primitive of the hooded hadrosaurs, ranges from 2,139 to 2,217 feet, with only one specimen above an elevation of 2,200 feet.

The type of *Lambeosaurus lambei* was obtained from an elevation of about 2,260 feet, and a second specimen from about 2,250 feet; neither quarry has been located definitely. Two specimens of *L. clavinitialis* came from elevations of 2,216 feet (No. 30) and 2,261 feet (No. 71), whereas the type of *L. magnicristatus* was obtained at elevation 2,324 feet (No. 46).

LIST OF QUARRIES

MAP NUMBER	ORIGINAL NUMBER	MUSEUM	ELEVATION FEET	SPECIMENS COLLECTED, COLLECTOR, AND DATE
1	24	A.M.1	2,132.8	*Corythosaurus casuarius*, B.B., 1912
2	59	U.A.3	2,235.5	*Eoplocephalus tutus*, G.F.S., 1921
3	58	U.A.2	2,189.2	*Stegoceras validus*, fine skull and part of skeleton; G.F.S., 1921
4	57	A.M.2	2,140.1	*Monoclonius (Centrosaurus) flexus* (type); B.B., 1912
5	78	.....	2,193.5	*Centrosaurus*, skull; W.E.C.
6	79	.....	2,187.8	Not identified
7	100	A.M.5	2,138.6	Armoured dinosaur; B.B., 1913
8	18	.....	2,214.5	Hadrosaur skeleton (lost at sea); C.H.S., 1916
9	19	U.T.11	2,236.8	*Chasmosaurus belli*; skeleton (open mount); L.S., 1926
10	17	.....	2,197.0	Hadrosaur skeleton (lost at sea); C.H.S., 1916
11	21	U.T.	2,259.0	*Aspidentes*, with lower jaws and legs; L.S., 1934
12	20	U.T.12	2,238.1	*Struthiomimus samueli* (type); L.S., 1926
13	50	U.T.32	2,210.9	*Lambeosaurus*, skull; L.S., 1926; in University of Chicago
14	56	U.T.36	2,224.0	*Aspidentes* with head; L.S., 1934
15	51	U.T.33	2,243.9	Hooded hadrosaur, hind leg and foot; L.S., 1934
16	61	G.S.C.13	2,208.4	*Macrophalangia canadensis* (type); C.M.S., 1926
17	40	U.T.25	2,140.8	*Corythosaurus bicristatus*, skull (type); L.S., 1933
18	28	U.T.18	2,139.0	*Struthiomimus*, pelvis, hind legs, and feet; L.S., 1934
19	27	U.T.17	2,140.1	*Corythosaurus brevicristatus*, skull (type); L.S., 1934
20	26	U.T.16	2,148.7	Hooded hadrosaur, pelvis, hind legs, and tail; L.S., 1933
21	29	U.T.19	2,132.3	*Gorgosaurus*, complete skeleton; L.S., 1933
22	31	U.T.21	2,133.5	*Gorgosaurus*, scattered skull (parts); L.S., 1934
23	30	U.T.20	2,156.5	*Corythosaurus casuarius*, skull; L.S., 1934
24	25	U.T.15	2,243.3	*Chasmosaurus*, skull and part of skeleton; L.S., 1926
25	64	G.S.C.16	2,142.1	*Crocodilia*, C.M.S., 1928
26	34	U.T.24	2,126.3	*Gryposaurus*, skull; L.S., 1934
27	35	G.S.C.5	2,161.2	*Gryposaurus notabilis*, skeleton (type); C.H.S., 1913
28	65	G.S.C.17	2,217.0	*Tetragonosaurus cranibrevis*, skull (type); C.M.S., 1928
29	66	G.S.C.18	2,199.3	*Crocodilia* skull; C.M.S., 1928
30	62	G.S.C.14	2,215.9	*Lambeosaurus clavinitialis*, skeleton (type); C.M.S., 1928
31	63	G.S.C.15	2,198.3	*Chasmosaurus russelli*, skull and part of skeleton; C.M.S., 1928
32	32	U.T.22	2,206.4	*Corythosaurus frontalis*, skull (type); L.S., 1934
33	33	U.T.23	2,217.8	*Centrosaurus* skull; L.S., 1926; exchanged in South America
34	39	G.S.C.9	2,175.1	Hadrosaur skeleton (no head); C.H.S., 1915
35	38	G.S.C.8	2,197.6	*Lambeosaurus*, skeleton (no head); C.H.S., 1913
36	36	G.S.C.6	2,247.5	*Gorgosaurus libratus*, skeleton (type); C.H.S., 1913
37	37	G.S.C.7	2,270.0	*Chasmosaurus belli*, skeleton; C.H.S., 1913
38	47	U.T.30	2,241.6	*Champosaurus*, skeleton; L.S., 1920
39	46	U.T.29	2,264.6	*Prosaurolophus*, skull and part of skeleton; L.S., 1920
40	60	G.S.C.12	2,221.1	Hooded hadrosaur, skeleton less head; C.M.S., 1919
41	110	G.S.C.40	2,252.0	*Chasmosaurus belli*, skull without jaws; C.M.S., 1919; Yale University exchange
42	109	G.S.C.39	2,249.9	*Centrosaurus* sp., skull; C.M.S., 1919; Carnegie Museum exchange
43	105	A.M.7	2,261.5	*Monoclonius (Centrosaurus) nasicornus*, complete skeleton (type); B.B., 1914
44	84	U.A.4	2,265.3	*Corythosaurus*, skeleton; G.F.S., 1921
45	101	A.M.6	2,260.0	Armoured dinosaur, skeleton; B.B., 1915
46	108	G.S.C.38	2,324.6	*Lambeosaurus magnicristatum*, skull and skeleton; C.M.S., 1919
47	87	G.S.C.32	2,308.2	*Corythosaurus intermedius*, skull and part of skeleton; C.M.S., 1917
48	48	U.A.1	2,163.3	*Gorgosaurus*, skull and part of skeleton; G.F.S., 1921
49	49	U.T.31	2,308.4	*Chasmosaurus*, skull; L.S., 1930; exchanged in South America
50	74	G.S.C.24	2,326.2	*Gorgosaurus*, C.M.S., 1917
51	73	.....	2,305.7	Not identified
52	5	.....	2,186.0	*Corythosaurus*, skeleton; C.H.S., 1917; in San Diego Museum
53	88	.....	2,203.6	?; B.B.
54	6	.....	2,192.6	*Gorgosaurus sternbergi*, skeleton (type); C.H.S., 1917; in American Museum of Natural History
55	7	U.T.5	2,207.7	Hooded hadrosaur, pelvis, hind legs, and tail; L.S., 1921
56	107	.....	2,186.8	Skull of hooded hadrosaur (not collected)
57	106	A.M.8	2,182.5	*Gorgosaurus* sp.; B.B.
58	103	G.S.C.35	2,132.7	*Gryposaurus* sp., skull and part of skeleton; C.M.S., 1936
59	90	A.M.4	2,151.5	*Gorgosaurus*, limb and skull; B.B., 1913
60	89	A.M.3	2,149.2	Armoured dinosaur; B.B., 1913
61	92	.....	2,205.1	Not identified
62	104	G.S.C.36	2,216.2	Scattered skull of hooded hadrosaur; C.M.S., 1936
63	93	.....	2,235.2	Not identified
64	45	U.T.28	2,189.3	*Tetragonosaurus praeceps*, skull and part of skeleton (type); L.S., 1930
65	91	G.S.C.33	2,172.2	*Centrosaurus longirostris*, skull; C.M.S., 1917
66	102	G.S.C.34	2,219.6	*Centrosaurus dawsoni*, skull without lower jaws; C.M.S., 1917
67	112	.....	2,181.4	Bird. *Coenagnathus collinsi* (type); C.M.S., 1936
68	68	G.S.C.20	2,253.5	*Corythosaurus intermedius*, skull; C.M.S., 1919
69	8	G.S.C.2	2,263.1	*Panoplosaurus mirus*, skeleton (type); C.M.S., 1917
70	70	G.S.C.21	2,210.0	Horned dinosaur; C.M.S., 1919
71	71	G.S.C.22	2,265.0	*Lambeosaurus clavinitialis*, skull; C.M.S., 1919
72	67	G.S.C.19	2,277.9	*Corythosaurus excavatus*, fine skull and part of skeleton; C.M.S., 1919
73	43	U.T.26	2,263.9	*Edmontonia rugosidens*, skull and part of skeleton; L.S., 1935
74	42	.....	2,263.4	*Centrosaurus*, skull; C.M.S., 1917; in United States National Museum
75	69	.....	2,253.5	?; B.B.
76	9	.....	2,233.2	? *Palaeoscincus*, skull and part of skeleton; C.H.S., 1917; in American Museum of Natural History
77	94	U.A.	2,269.8	*Ceoratops* sp.; G.F.S., 1921
78	95	.....	2,226.0	?; B.B.
79	4	U.T.4	2,278.8	*Prosaurolophus maximus*, two skeletons; L.S., 1921
80	98	.....	2,263.6	Horned dinosaur (not collected)
81	85	G.S.C.30	2,234.4	*Lambeosaurus*, part of skull; C.H.S., 1914
82	86	G.S.C.31	2,271.5	*Prosaurolophus maximus*, skull; C.H.S., 1914
83	10	G.S.C.3	2,213.6	*Chasmosaurus belli*, skeleton; C.H.S., 1914
84	111	A.M.9	2,185.1	*Corythosaurus casuarius*, skeleton; B.B., 1914
85	13	U.T.8	2,244.3	*Corythosaurus intermedius*, skull; L.S., 1920
86	11	U.T.6	2,179.1	Two small hadrosaur skeletons: ? *Tetragonosaurus* L.S., 1920; *Tetragonosaurus* sp., skull and skeleton; C.M.S., 1936
87	12	U.T.7	2,177.7	*Parasaurolophus walkeri*, L.S., 1920
88	72	G.S.C.23	2,152.4	*Gorgosaurus*, skeleton (skull mounted); C.M.S., 1921
89	97	.....	2,178.2	?; B.B.
90	96	.....	2,170.2	?; B.B.
91	99	.....	2,210.8	Not identified
92	3	U.T.3	2,292.6	*Lambeosaurus*, skeleton; L.S., 1919
93	2	U.T.2	2,192.7	*Dyoplosaurus acutosquameus* (type); L.S., 1919
94	1	U.T.1	2,198.4	*Centrosaurus apertus*, skull and part of skeleton; W.A.P., 1919
95	44	U.T.27	2,201.1	*Centrosaurus*, skull and part of skeleton; L.S., 1930
96	14	U.T.10	2,224.0	*Corythosaurus intermedius*, skeleton (open mount); L.S., 1919
97	15	U.T.9	2,235.4	*Corythosaurus intermedius*, skull; W.A.P., 1919
98	54	.....	2,139.6	Small hadrosaur (no head); C.M.S., 1921
99	55	U.T.35	2,260.7	Hooded hadrosaur (no head); L.S., 1927
100	22	U.T.13	2,135.1	*Centrosaurus*, skull; L.S., 1934
101	23	U.T.14	2,313.7	*Lambeosaurus*, skull; L.S., 1920
102	53	G.S.C.11	2,258.1	Hooded hadrosaur, skeleton (no head); C.H.S., 1914
103	52	U.T.34	2,180.3	Parts of plated dinosaur; L.S., 1921
104	83	G.S.C.29	2,166.0	*Centrosaurus*, skull; C.H.S., 1913
105	80	.....	2,171.3	*Scolosaurus cutleri* (type); W.E.C., 1914; in British Museum
106	16	G.S.C.4	2,328.0	*Styracosaurus albertensis*, skull (type); C.H.S., 1913
107	81	G.S.C.27	2,182.3	*Styracosaurus*, skeleton; L.S., 1935
108	82	G.S.C.28	2,216.5	*Centrosaurus*, skull; C.M.S., 1921
109	75	.....	2,369.7	*Corythosaurus casuarius*, skull; C.M.S., 1921
110	76	G.S.C.25	2,292.0	About at contact of Pale beds and Bearpaw formation; everything above this elevation is definitely Bearpaw
111	77	G.S.C.26	2,195.2	? *Gryposaurus*, skeleton; C.M.S., 1921; Amherst College exchange
112	41	G.S.C.10	±2,325	*Gryposaurus* (scattered skull); C.M.S., 1921
				? *Euoplocephalus*, skeleton; C.H.S., 1914; off map in SW. ¼, sec. 8, tp. 21, rge. 10

Abbreviations Used

A.M.....American Museum of Natural History
G.S.C.....Geological Survey of Canada
U.A.....University of Alberta
U.T.....University of Toronto
B.B.....Barnum Brown
W.E.C.....W. E. Cutler
W.A.P.....W. A. Parks
C.H.S.....C. H. Sternberg
C.M.S.....C. M. Sternberg
G.F.S.....G. F. Sternberg
L.S.....L. Sternberg

Published, 1950.

Notes and annotated list of quarries by C.M.Sternberg, National Museum of Canada 1948.

Base-map compiled by the Topographical Survey, from surveys by the Topographical Survey 1935 and information supplied by Federal Government Departments. Cartography by the Geological Mapping Division 1948.

Approximate magnetic declination, 20° to 22° East

REFERENCE

Road well travelled
Road not well travelled
Trail
Building
Post Office
Dinosaur quarry
Township boundary

MAP 969A

STEVEVILLE

WEST OF FOURTH MERIDIAN
ALBERTA

Scale: One Inch to ½ Mile = 1/31,680

1 Mile ¾ ½ ¼ 0 2 Miles
5000 0 5000 10000 Feet

REFERENCE

Section line
Irrigation ditch
Intermittent stream
Marsh
Sand bar
Contours (interval 25 feet)
Depression contour

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