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Aspects of the cranial morphology of the therocephalian moschorhinus (reptilia : Therapsida).

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ABBREVIATIONS

aam	anterior ampulla
ac	auditory canal
adbs	antero-dorsal process of the basisphenoid
adbo	antero-dorsal projection of the basioccipital
adf	antero-dorsal flange of the paroccipital process
adg	antero-dorsal groove of the pterygoid
adpe	antero-dorsal process of the epipterygoid
adpp	antero-dorsal process of the prootic
adr	antero-dorsal ridge of the basicranium
aei	anterior extension of the interparietal
alp	antero-lateral process of the supraoccipital
als	anterior portion of the longitudinal sinus
ama	antero-medial aperture for the hypoglossal nerve
Ang	angular
aop	anterior opening of the post-temporal fenestra
Art	articular
asc	anterior semicircular canal
asd	anterior semicircular duct
atb	antero-dorsal tuberosity of the basisphenoid
av	anastomotic vein
avpe	antero-ventral process of the epipterygoid
avpp	antero-ventral process of the prootic
avps	antero-ventral process of the squamosal
ba	basillar artery

bg	basicranial gutter
Bo	basioccipital
bpb	basipterygoid process of the basisphenoid
bpp	basicranial process of the prootic
br	basicranial ridge of the exoccipital
Bs	basisphenoid
bsp	basisphenoid process of the pterygoid
c	cerebrum
car	common anterior and horizontal ampullary recess
cb	cerebellum
cc	crus communis
ce	cavum epiptericum
cVII	canal for the facial nerve (VII)
cXII	canals for the hypoglossal nerve (XII)
co	cochlea
cpp	central process of the prootic
cqp	cranioquadrate passage
cr	cochlear recess
crp	central ridge of the prootic
cs	crista sellaris
ct	crista trabecularis
D	dentary
df	dorsal fossa of the nasal capsule
dhn	depression leading to the antero-medial aperture of the hypoglossal nerve
dlf	dorso-lateral flange of the basisphenoid
dlrb	dorso-lateral ridge of the braincase
dlrp	dorso-lateral ridge of the pterygoid
dmb	dorso-medial bulge of the epipterygoid

dmfl	dorso-medial flange of the epipterygoid
dmfo	dorso-medial fossa of the epipterygoid
dmg	dorso-medial groove of the epipterygoid
dmr	dorso-medial ridge of the pterygoid
do	dorsal opening of the pterygo-paroccipital foramen
dps	dorsal process of the squamosal
drm	depression for the retractor musculature
ds	dorsum sellae
dsp	dorsal shelf of the prootic
dvf	dorsal venous foramen
ea	entrance to the anterior semicircular canal
Ec	ectopterygoid
ecc	entrance to the crus communis canal
eh	entrance to the horizontal semicircular canal
Eo	exoccipital
ep	entrance to the posterior semicircular canal
Ept	epipterygoid
es	endolymphatic sac
ex	exit of the horizontal semicircular canal
F	frontal
fa	position of the foramen of the anterior semicircular canal
fah	position of the anterior foramen of the horizontal semicircular canal
fcc	position of the foramen of the crus communis canal
fe	foot of the epipterygoid
fem	fenestra metoptica
feo	fenestra optica
fep	fenestra prootica

fl	flocculus
flf	floccular fossa
fm	foramen magnum
fo	fenestra ovalis
fp	position of the foramen of the posterior semicircular canal
fpal	possible extra foramen for either the palatine nerve or artery
fph	position of the posterior foramen of the horizontal semicircular canal
fpv	foramen for the pituitary vein
fr	fenestra rotunda
fs	fissura supratrabecularis
fVII	foramen for the facial nerve (VII)
fXII	foramen for the hypoglossal nerve (XII)
gcc	groove for the crus communis
gg	geniculate ganglion
gp	groove for the posterior cerebral vein
gqr	ventral part of the groove between the quadrate ramus of the pterygoid and the postero-ventral process of the epipterygoid
ham	horizontal ampulla
hsd	horizontal semicircular duct
hv	hypophysial vein
iam	internal auditory meatus
ica	internal carotid artery
icd	caudal ramus of the internal carotid artery
icf	internal carotid foramen
icn	cranial ramus of the internal carotid artery

ie	inner ear
ij	internal jugular vein
ik	interpterygoid keel
in	infundibulum
ioa	inferior orbital artery
ioc	indentation in occipital condyle
ip	interparietal
ipo	internal process of the opisthotic
ipr	incisura prootica
ips	intermediate process of the squamosal
is	interorbital septum
iv	interpterygoid vacuity
J	jugal
jc	jugular canal
jf	jugular foramen (lateral)
jfm	jugular foramen (medial)
jp	jugal process of the squamosal
L	lacrimal
la	lagena
lc	lamdoid crest
le	ledge on lateral wall of vestibule
lp	lateral process of the frontal
lr	lagenar recess
lsf	lateral-supraoccipital fossa
lss	lateral supraoccipital sinus
M	maxilla
ma	mandibular artery
mav	position of membrane between the antero-ventral processes of the prootics

mdvf	medial aperture of the dorsal venous foramen
men	meninges
mo	medulla oblongata
mpo	mastoid process of the opisthotic
mpp	medial process of the postorbital
mps	mastoid process of the squamosal
mr	medial ridge of the antero-ventral process of the prootic
mt	medial tuberosity of the exoccipital
mw	medial wall of the opisthotic
N	nasal
nfr	notch for the fenestra rotunda
o	orbit
ob	olfactory bulb
oc	occipital condyle
ocf	oculomotorius foramen
och	optic chiasma
Op	opisthotic
opa	ossified pila antotica
opf	opticus foramen
os	postero-ventral portion of the orbital sinus
osi	ossified part of the subiculum infundibuli (probable position of attachment of the rectus superior muscle)
ot	optic tectum
otc	ossified trabecula cranii (probable position of attachment of the rectus posterior muscle)
P	parietal
pa	posterior apophysis of the epipterygoid

Pal	palatine
pala	palatine artery
palf	palatine foramen
paln	palatine nerve
pam	posterior ampulla
pap	posterior aperture of the post-temporal fenestra
par	posterior ampullary recess
pas	"processus ascendens" of the epipterygoid
pav	parietal vein
pb	postorbital bar
pc	parietal canal
pcv	posterior cerebral vein
pd	posterior depression between the basipterygoid process and the dorso-lateral flange of the basisphenoid
pdpe	postero-dorsal process of the epipterygoid
pdpo	postero-dorsal process of the opisthotic
pdpp	postero-dorsal process of the prootic
pdv	position of the dorsal venous foramen
pe	parietal eye
pec	perilymphatic cistern
pef	pit in endocranial floor
Per	periotic
pes	perilymphatic sac
pf	parietal foramen
pfe	posterior foramen of the epipterygoid
pfl	prootic flange
pfo	paroccipital fossa
phv	position of the hypophysial vein

pib	pineal body
pif	pituitary fossa
pit	pituitary
pk	parasphenoid keel
pls	posterior portion of the longitudinal sinus
Pm	premaxilla
pme	pila metoptica
pmfl	postero-medial flange of the postorbital
pmr	postero-medial ridge of the sella turcica
pn	parietal nerve
Po	postorbital
ppfe	position of the posterior foramen of the pterygoid
ppo	paroccipital process of the opisthotic
pr	parasphenoid rostrum
Prf	prefrontal
Pro	prootic
Ps	parasphenoid
psc	posterior semicircular canal
psd	posterior semicircular duct
psi	paroccipital sinus
P/Sq	parietal and squamosal
Pt	pterygoid
ptf	post-temporal fenestra
ptpf	pterygo-paroccipital foramen
pvf	postero-ventral flange of the paroccipital process
pvpe	postero-ventral process of the epipterygoid
pvpp	postero-ventral process of the prootic
qn	quadrate notch of the squamosal
qpo	quadrate process of the opisthotic

qr	quadrate recess
qrp	quadrate ramus of the pterygoid
rm	retractor muscles
sa	stapedial artery
sac	sacculus
sar	saccular recess
scp	sectioned central process of the prootic
si	subiculum infundibuli
Sm	septomaxilla
soa	superior orbital artery
Soc	supraoccipital
spa	sectioned processus ascendens of the epipterygoid
spc	section through the perilymphatic cistern
spp	sectioned paroccipital process of the opisthotic and postero-ventral process of the prootic
spv	sectioned postero-ventral process of the epipterygoid
Sq	squamosal
sqr	sectioned quadrate ramus of the pterygoid and foot of the epipterygoid
sr	sagittal ridge on the roof of the nasal capsule
ss	solum supraseptale
sst	sectioned squamosal and tabular
sv	suborbital vacuity
T	tabular
ta	temporal artery
tg	trigeminal ganglion
tH	torcular Herophili
tm	taenia marginalis

tp	transverse process of the pterygoid
trif	trigeminus foramen
trof	trochlearis foramen
ts	transverse sinus
tso	tuberculum spheno-occipitale
u	utriculus
ur	utricular recess
V	vomer
va	ventral aperture of the parabasal canal
vcam	vena capitis medialis
vcd	vena capitis dorsalis
vcde	endocranial portion of the vena capitis dorsalis
vcdo	occipital portion of the vena capitis dorsalis
vcdt	temporal portion of the vena capitis dorsalis
vcl	vena capitis lateralis
vcm	vena cerebralis media
vcme	endocranial portion of the vena cerebralis media
ve	vestibule
vf	ventral flange of the prefrontal
vg	ventral groove of the prootic
vip	ventral limit of the incisura prootica
vl	ventral ledge
vlf	ventro-lateral descending flange of the parietal
vlg	ventro-lateral gutter of the parietal
vlr	ventro-lateral ridge of the pterygoid
vmb	ventro-medial bulge on the basioccipital strip
vmf	ventro-medial flange of the pterygoid
vmr	ventro-medial ridge of the parietal
vn	ventral notch

vr	ventral ridge of the prootic
vt	ventral trough on the floor of the braincase
vtr	ventral projecting transverse ridge of the supraoccipital
vu	unidentified vein
vvc	ventral part of the vena cerebralis media passing through the pterygo-paroccipital foramen
I	olfactory nerve
II	optic nerve
III	oculomotor nerve
IV	trochlear nerve
V	trigeminal nerve
V1	ramus ophthalmicus of the trigeminal nerve
V2	ramus maxillaris of the trigeminal nerve
V3	ramus mandibularis of the trigeminal nerve
VI	abducens nerve
VII	facial nerve
VIIm	mandibular ramus of the facial nerve
VIIp	palatine ramus of the facial nerve
IX	glossopharyngeal nerve
X	vagoaccessory nerve
XII	hypoglossal nerve
BP/1	Bernard Price Institute for Palaeontology catalogue number
RC.	Rubidge collection
S.A.M.	South African Museum

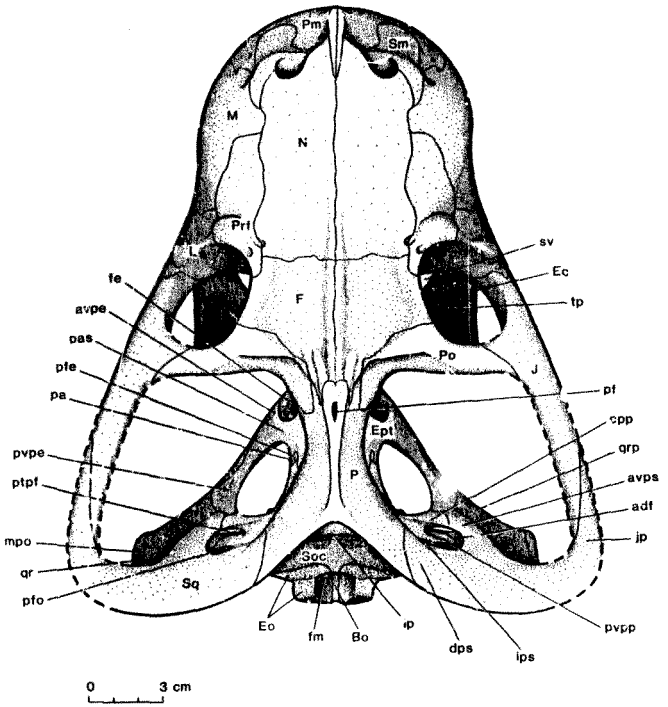


Figure 1 ***Moschorhinus kitchingi.*** Dorsal view.

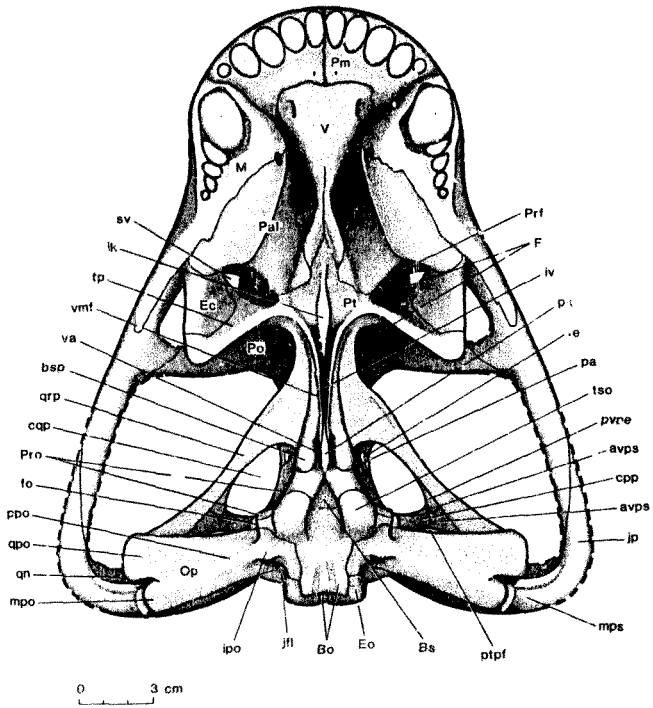


Figure 2 ***Moschorhinus kitchingi***. Ventral view.

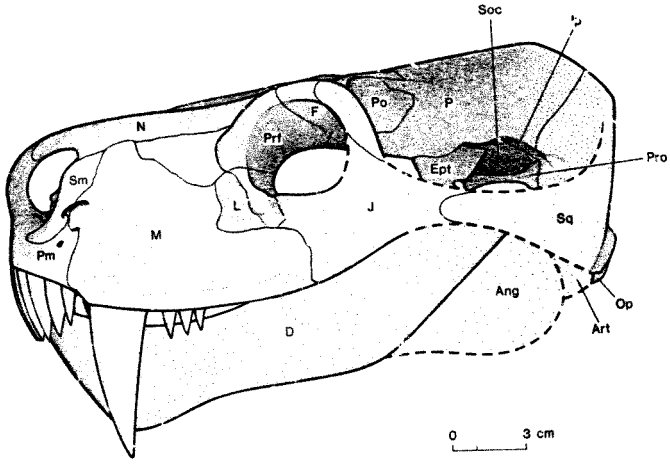


Figure 3 ***Moschorhinus kitchingi.*** Lateral view.

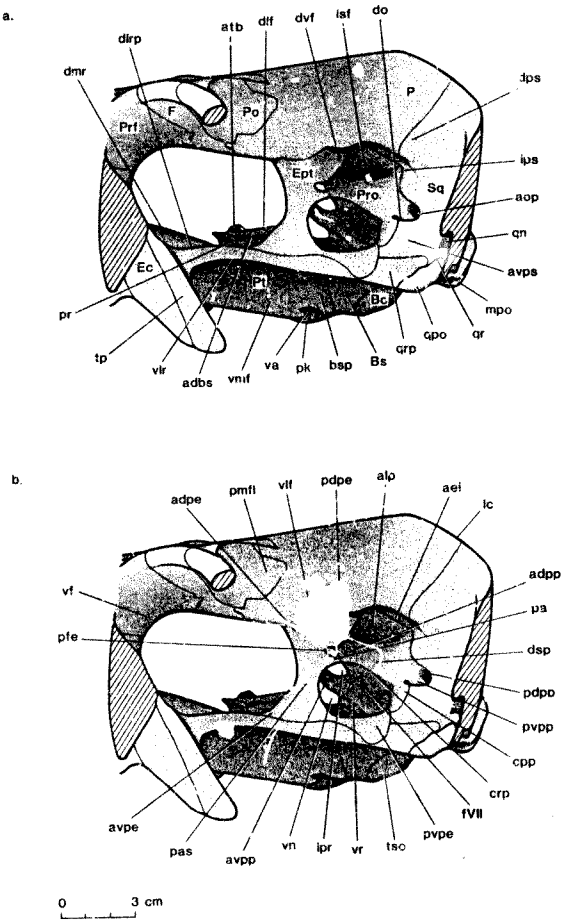


Figure 4 ***Moschorhinus kitchingi***. Detail of left temporal region.

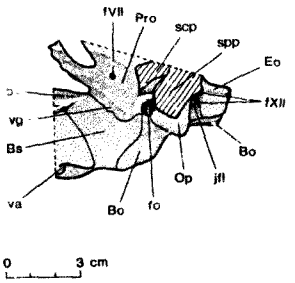


Figure 5 ***Moschorhinus kitchingi***. Detail of left fenestra ovalis and surrounding bones.

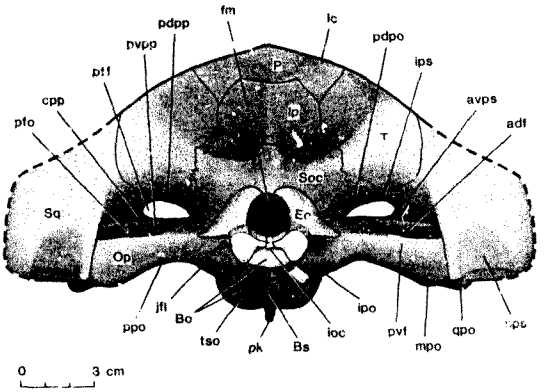


Figure 6 ***Moschorhinus kitchingi***. Occipital view.

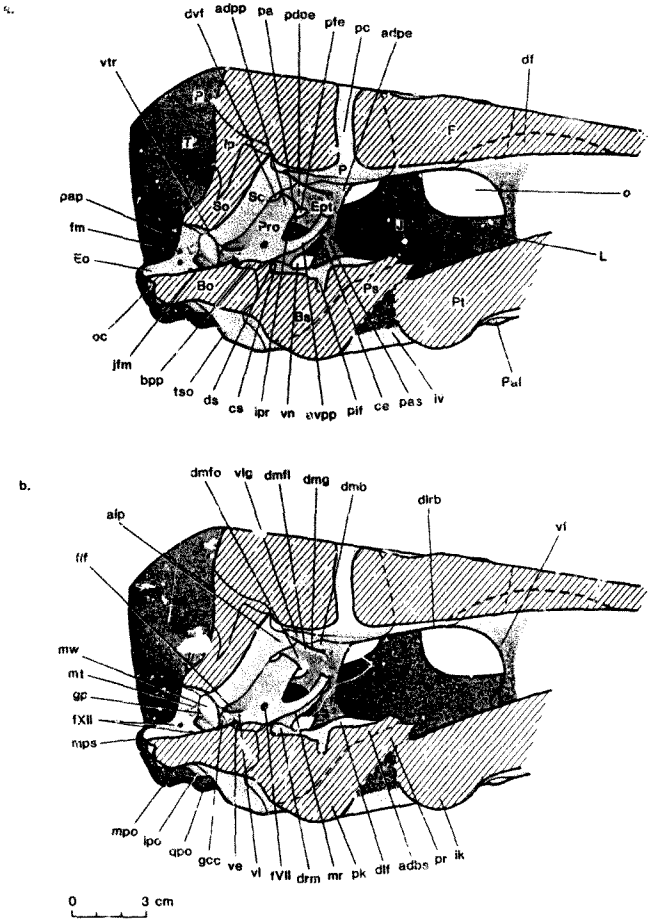


Figure 7 ***Moschorhinus kitchingi.*** Sagittal section showing medial view of the posterior part of the endocranium.

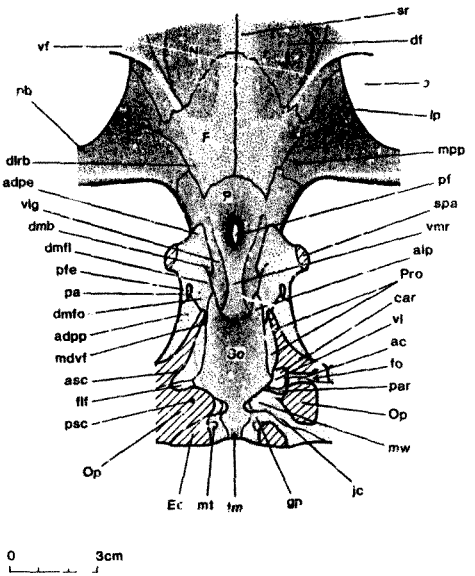


Figure 8 ***Moschorhinus kitchingi.*** Horizontal section showing ventral view of the posterior part of the endocranial roof.

(The left half of the posterior part of the braincase is sectioned at a lower level than the right half. The vestibule, auditory canal and jugular canal are thus exposed in the left half while the floccular fossa and semicircular canals are exposed in the right half.)

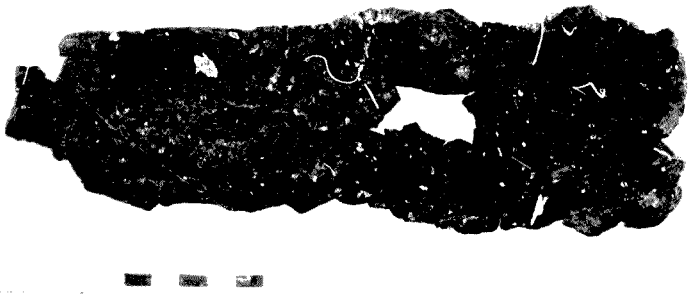


PLATE 6. Moschorhinus kitchingi (BP/1/4636). Lateral view.



PLATE 7. Moschorhinus kitchingi (BP/1/4636). Dorso-lateral view of left temporal region.

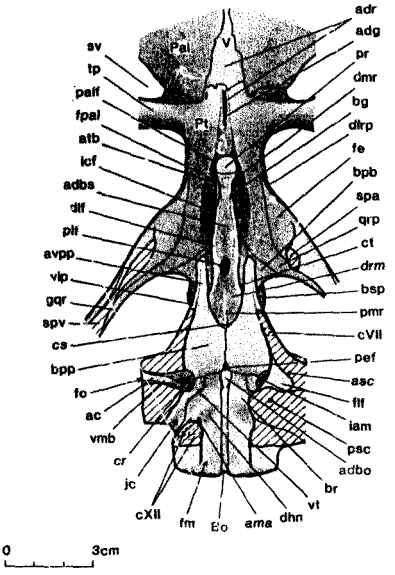


Figure 9 ***Moschorhinus kitchingi.*** Horizontal section showing dorsal view of the posterior part of the endocranial floor.

(The left half of the posterior part of the braincase is sectioned at a lower level than the right half. The *vestibule*, *jugular canal* and groove between the quadrate ramus and postero-ventral process of the epipterygoid are thus exposed in the left half while the floccular fossa and semicircular canals are exposed in the right half.)

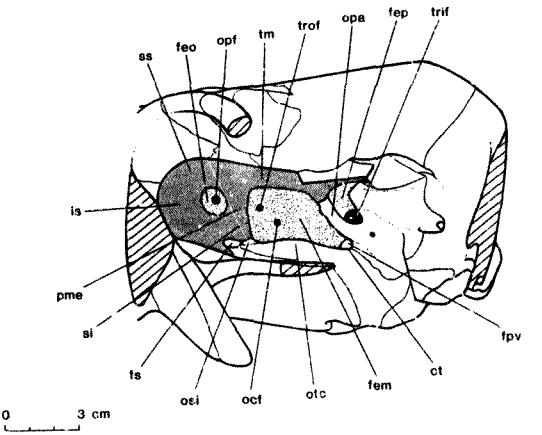


Figure 10 ***Moschorhinus kitchingi.*** Lateral view of the left temporal region with reconstructed membranous and cartilaginous elements.

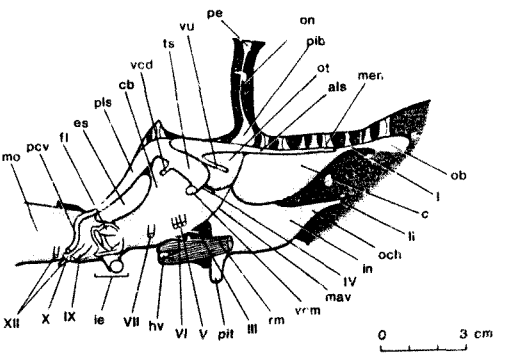


Figure 11 ***Moschorhinus kitchingi.*** Lateral view of reconstructed endocast.

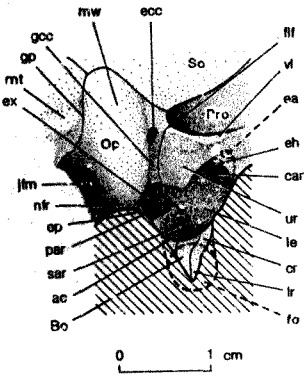


Figure 12 ***Moschorhinus kitchingi.*** Medial view of the left otic region.

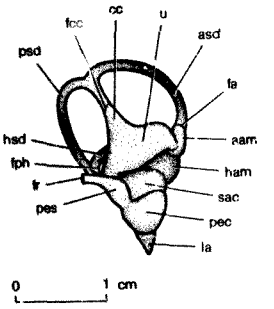


Figure 13 ***Moschorhinus kitchingi.*** Medial view of reconstructed left inner ear (the vestibulocochlear nerve (VIII), endolymphatic duct and sac are not figured).

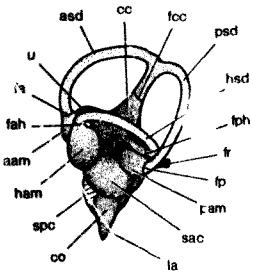


Figure 14 ***Moschorhinus kitchingi.*** Lateral view of reconstructed left inner ear (the portion of the perilymphatic cistern overlying the sacculus is not figured).

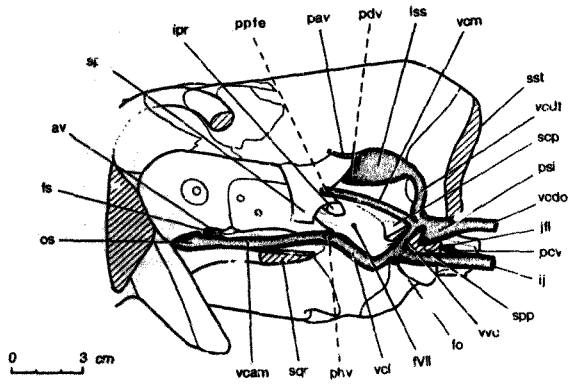


Figure 15 ***Moschorhinus kitchingi.*** **Lateral view of the left temporal region with reconstructed major veins.**

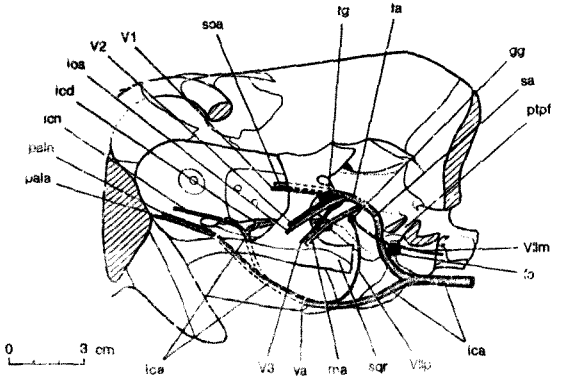


Figure 16 ***Moschorhinus kitchingi.*** Lateral view of the left temporal region with reconstructed trigeminal and facial rami and major arteries.

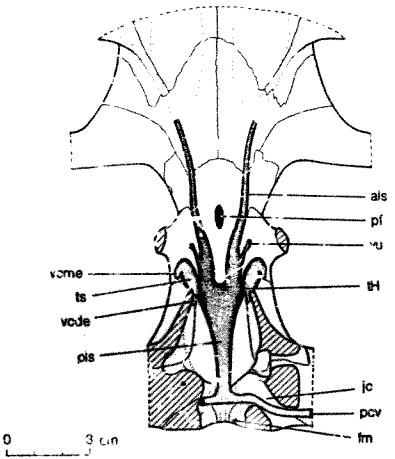


Figure 17 ***Moschorhinus kitchingi.*** Internal view of the posterior part of the endocranial roof with reconstructed major veins.

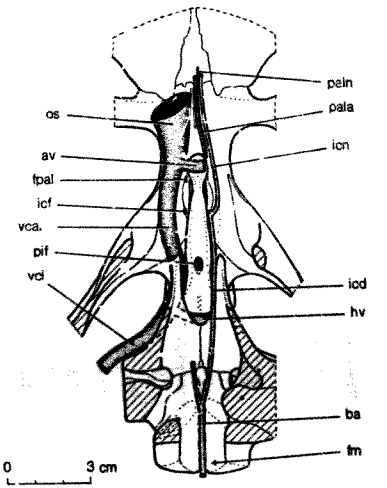


Figure 18 ***Moschorhinus kitchingi.*** Internal view of the posterior part of the endocranial floor with reconstructed major bloodvessels.

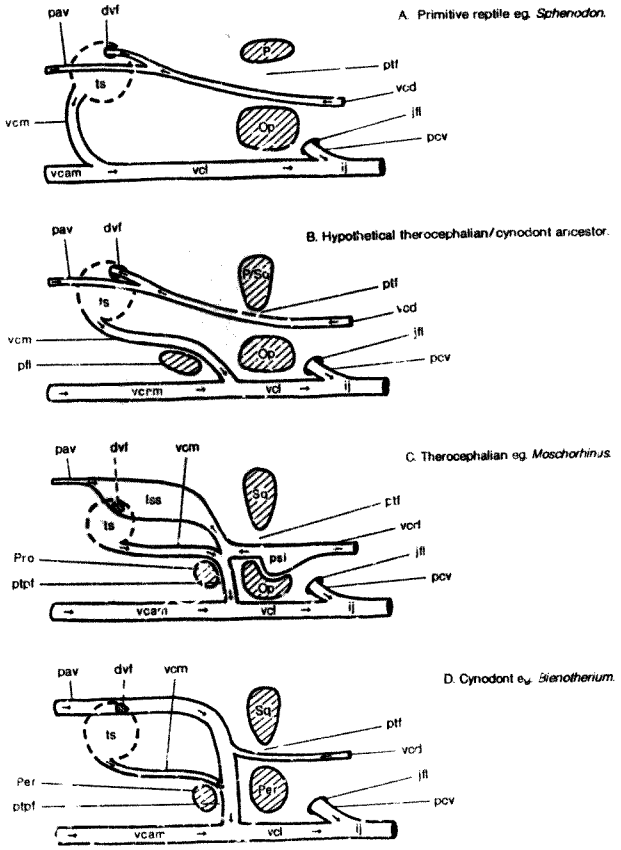


Fig.19 Diagrammatic reconstruction of the evolution of the major cranial veins from primitive reptile level to cynodont level.



PLATE 1. Moschorhinus kitchingi (BP/1/2788). Dorsal view.



PLATE 2. Moschorhinus kitchingi (BP/1/2788). Ventral view.

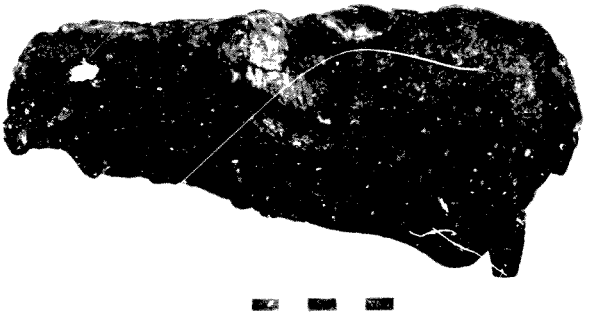


PLATE 3. Moschorhinus kitchingi (BP/1/2788). Lateral view.



PLATE 4. Moschorhinus kitchingi (BP/1/4636). Dorsal view.



PLATE 5. Moschorhinus kitchingi (BP/1/4636). Ventral vi

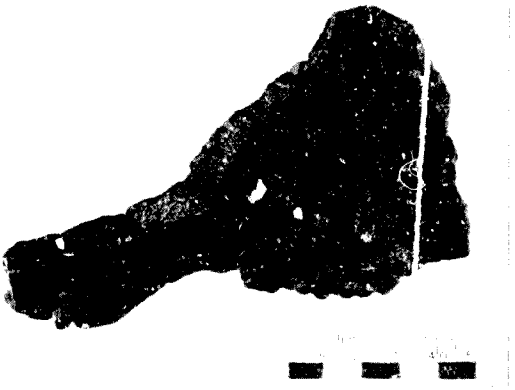


PLATE 8. Moschorhinus kitchingi (BP/1/4636). Occipital view.



PLATE 9 Moschorhinus kitchingi (BP/1/4636). Anterior view of posterior part of the skull.



PLATE 10. Moschorhinus kitchingi (BP/1/4636). Sagittal section showing medial view of the left side-wall of the posterior part of the endocranium.



PLATE 11. Moschorhinus kitchingi (BP/1/4636). Ventral view of the posterior part of the endocranial roof.



PLATE 12. Moschorhinus kitchingi (BP/1/4636). Dorsal view of the posterior part of the endocranial floor.

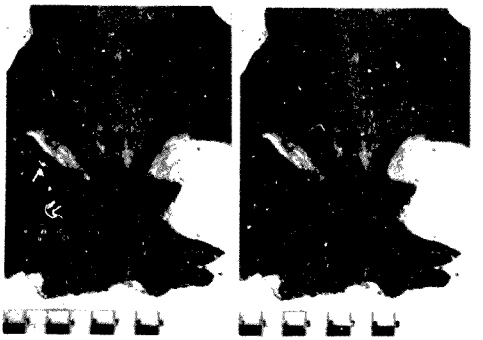


PLATE 13. Moschorhinus kitchingi (BP/1/2788). Horizontal section showing ventral view of the posterior part of the endocranial roof and dorsal part of the right pterygo-paroccipital foramen.

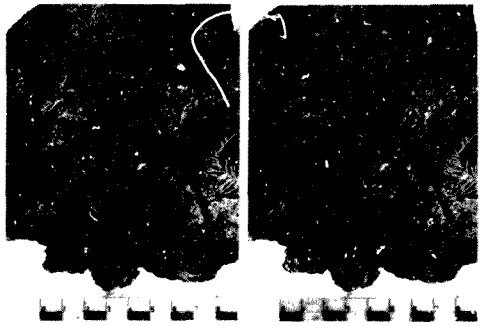


PLATE 14. Moschorhinus kitchingi (BP/1/2788). Horizontal section showing dorsal view of the posterior part of the endocranial floor, the ventral part of the right pterygoparoccipital foramen and the right paroccipital fossa.

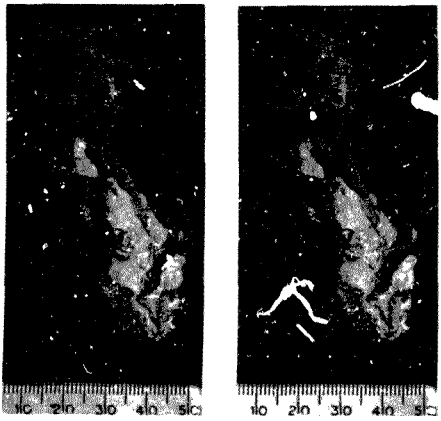


PLATE 15. Moschorhinus kitchingi (BP/1/4636). Right lateral view of the endocast of the posterior part of the endocranium.

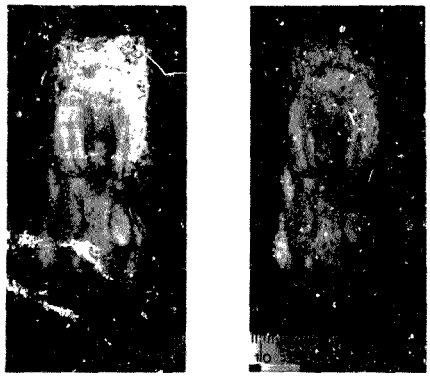


PLATE 16. Moschorhinus kitchingi (BP/1/4636). Dorsal view of the endocast of the posterior part of the endocranium.

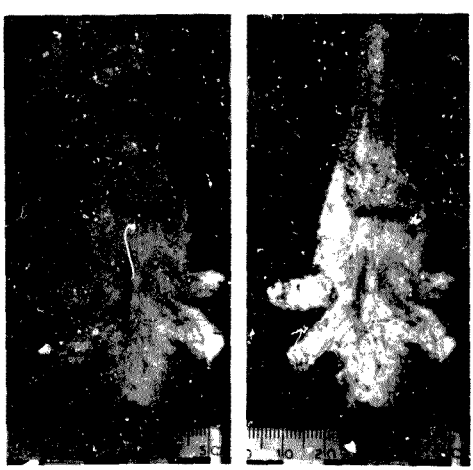


PLATE 17. Moschorhinus kitchingi (BP/1/4636). Ventral view of the endocast of the posterior part of the endocranium.

Author Durand Jacobus Francois
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