

Notebook # 17

1953
Rimini



Made in U. S. A.

THIS BOOK CONTAINS EYE-EASE PAPER

"Easy on the Eyes"

M.S. 222

25 gm. bottle - in powder form

Tricaine Methanesulfonate

Sandoz Chemical Works, Inc

68-72 Charlton St., N.Y.-14, N.Y.

Supposed to be better than urethane
for fish (Priscilla) = questionable

0.025 % in sea water put shed out fast

0.0125 % " " " " " " very slowly
did not stop breathing - but knocked a
few scales clear

0.02 % probably OK or 0.015 better
sub letter.

Shillaber's (Non-Drying) Immersion Oil 1 oz bottles

Cumic & Amend, Fisher Sci. Co.

No. 12-368A - low viscosity can be mixed
12-368B - high "

The Aquaditioner Air-Pump

J. R. Saurie Lab

So. Brewer, Me.

Plugs into 110 volts
100 watts

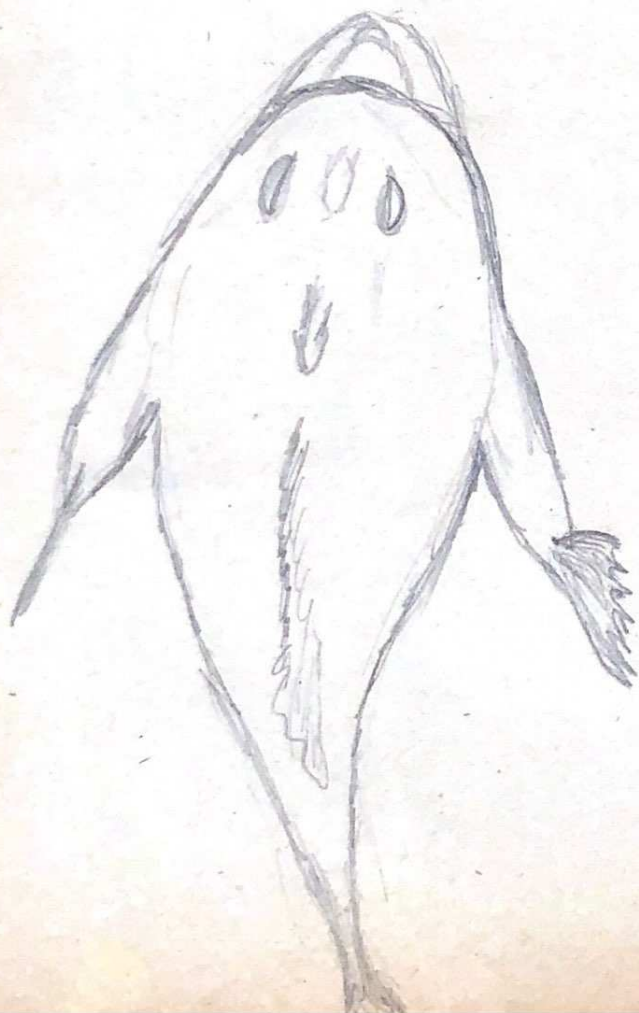
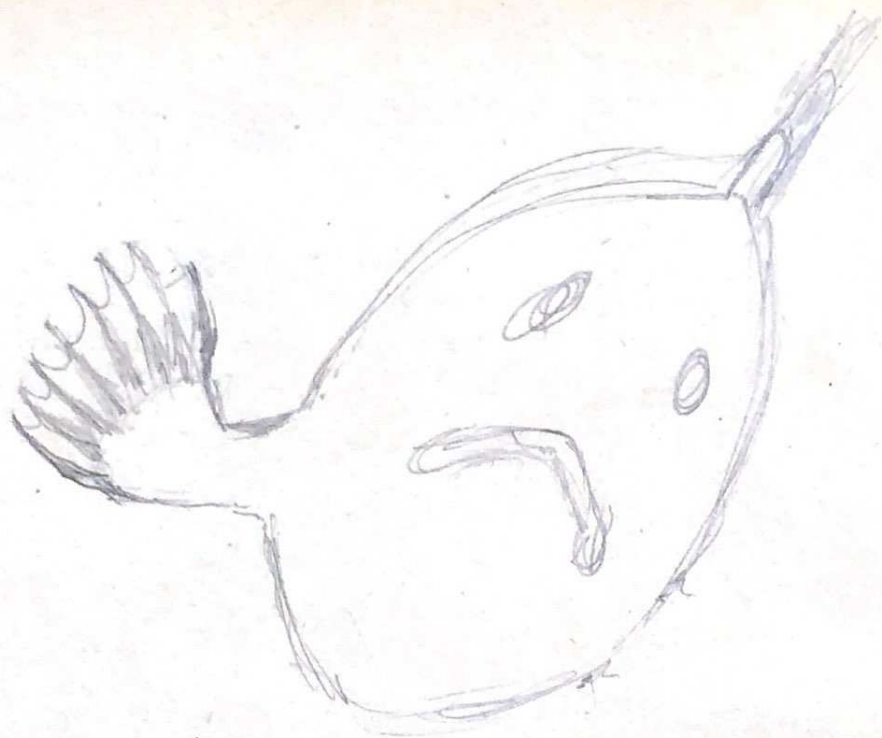
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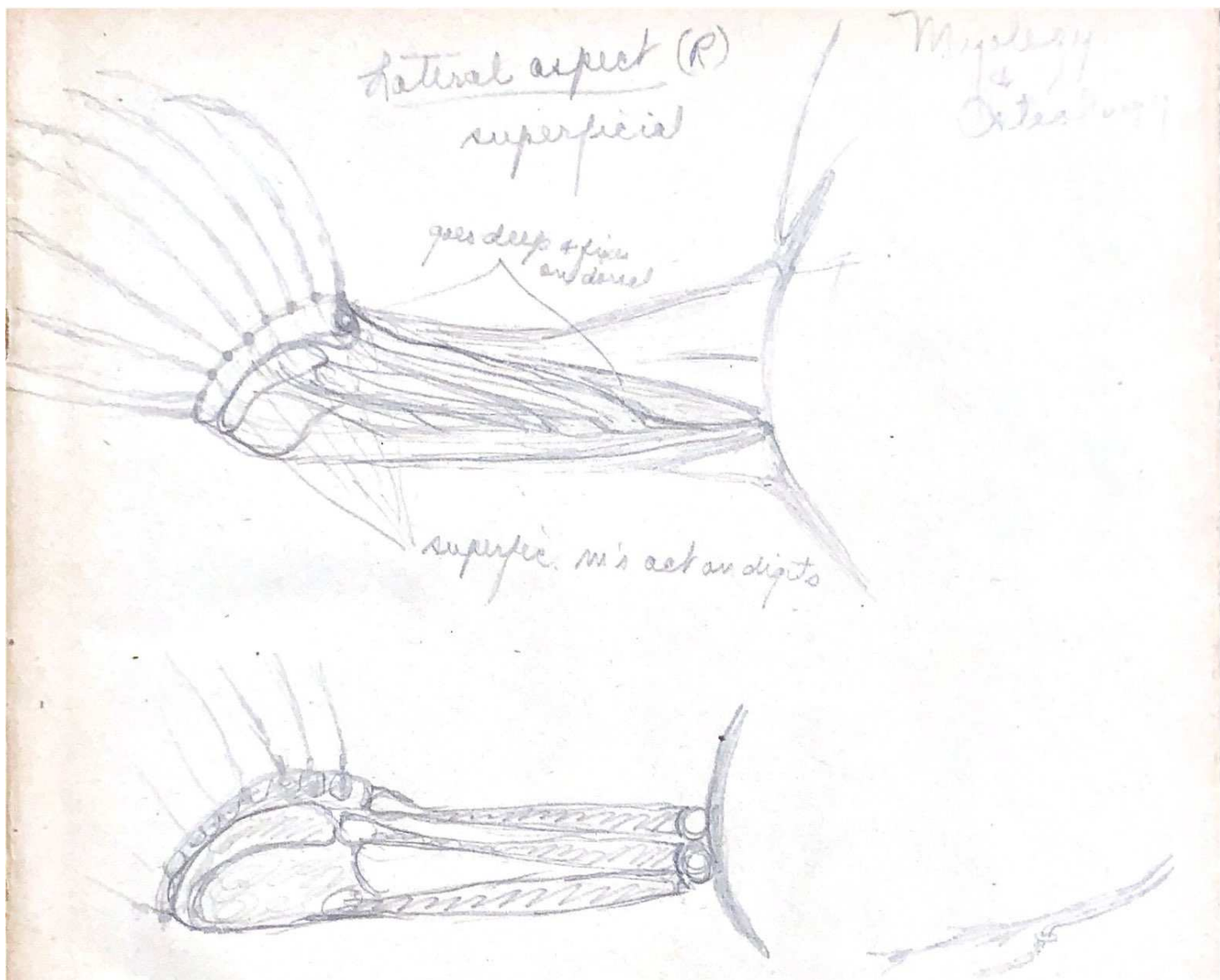
Tank sizes

6.5 x 8.5 x 10.5 cm. - small

31 x 32 x 31 cm. = $\frac{1}{2}$ 61.5 length

182 x 90 x 62 cm. = outdoor tanks





Nerves run together until at base of limb, one division tucks thru to opposite side:

Maybe pull one division out & tuck into muscle elsewhere — so whole limb must be innervated from nerves that formerly supplied only $\frac{1}{2}$ of musculature

need: sun retractors for more history
injection outfit

Cuffer. L. & R. n's are long & wd reach across
to oppo. n's if open otherwise possible.

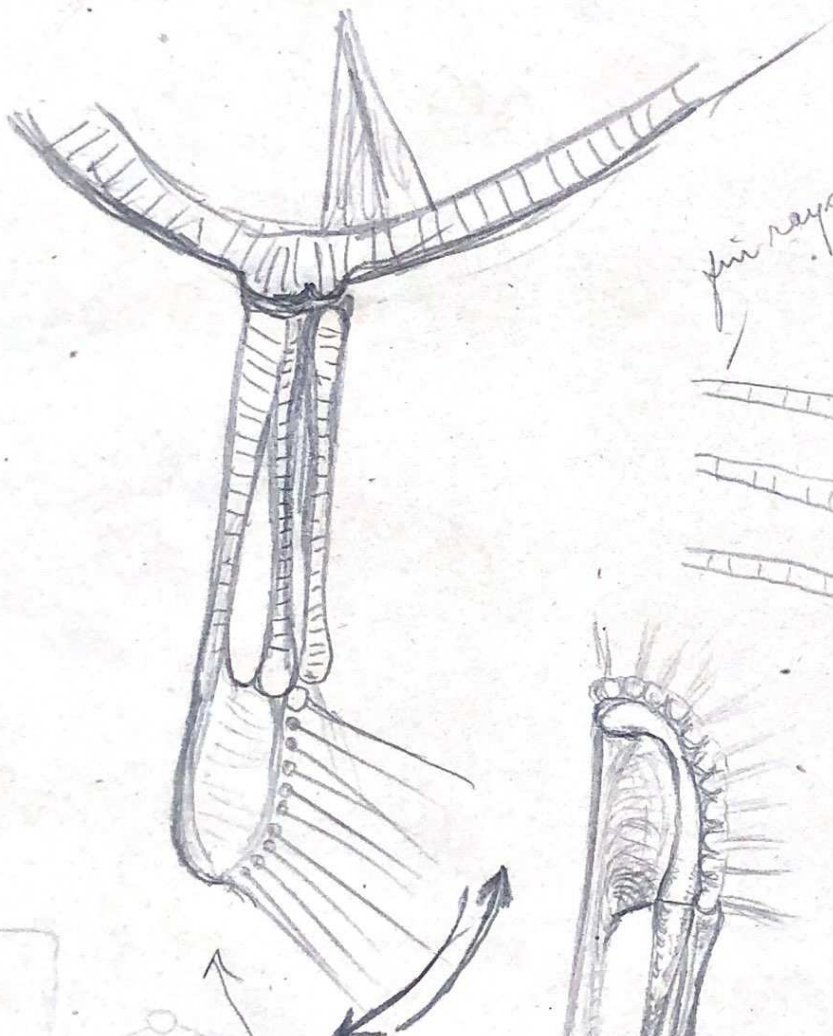
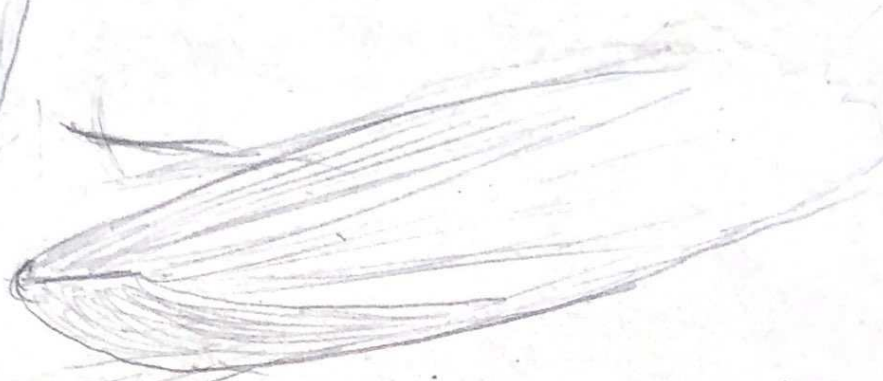
Filefish & maybe others - remove one eye & work
thru this orbit to the other.

Optic nerve (tract) is clearly divided into 2
dorsal & ventral.

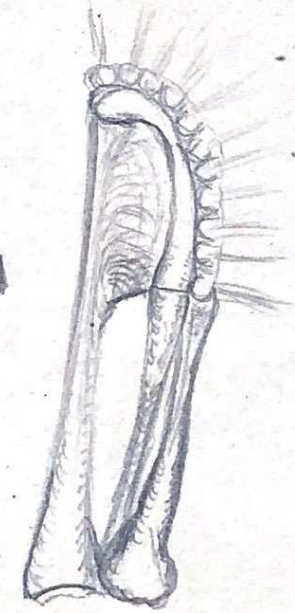
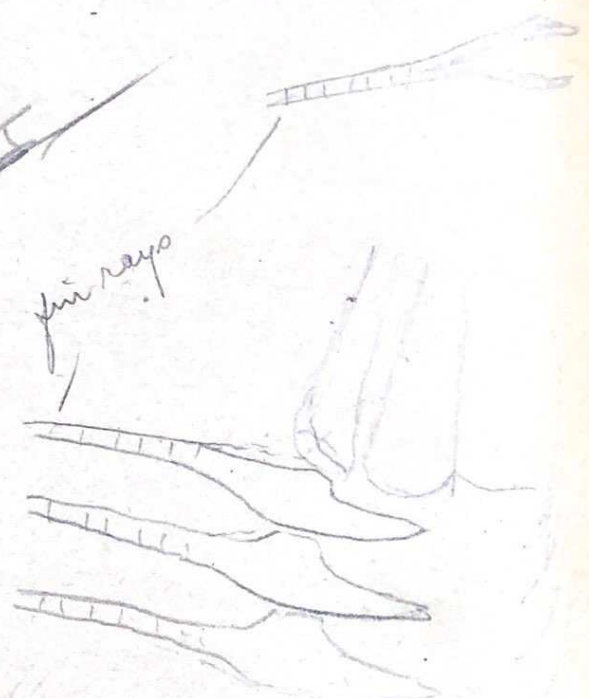
Other eye sinks in: - maybe replace plastic balls.

operculum
not really
attached to
fin.

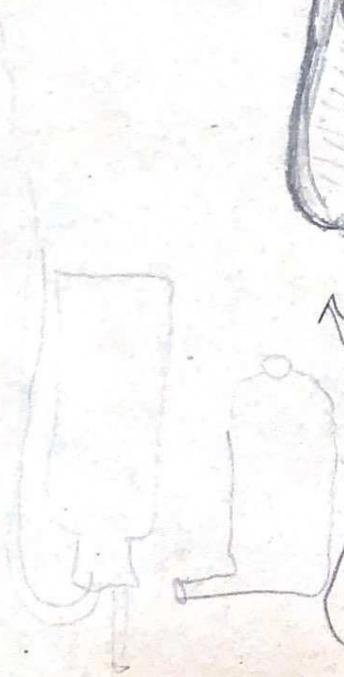
Left lateral

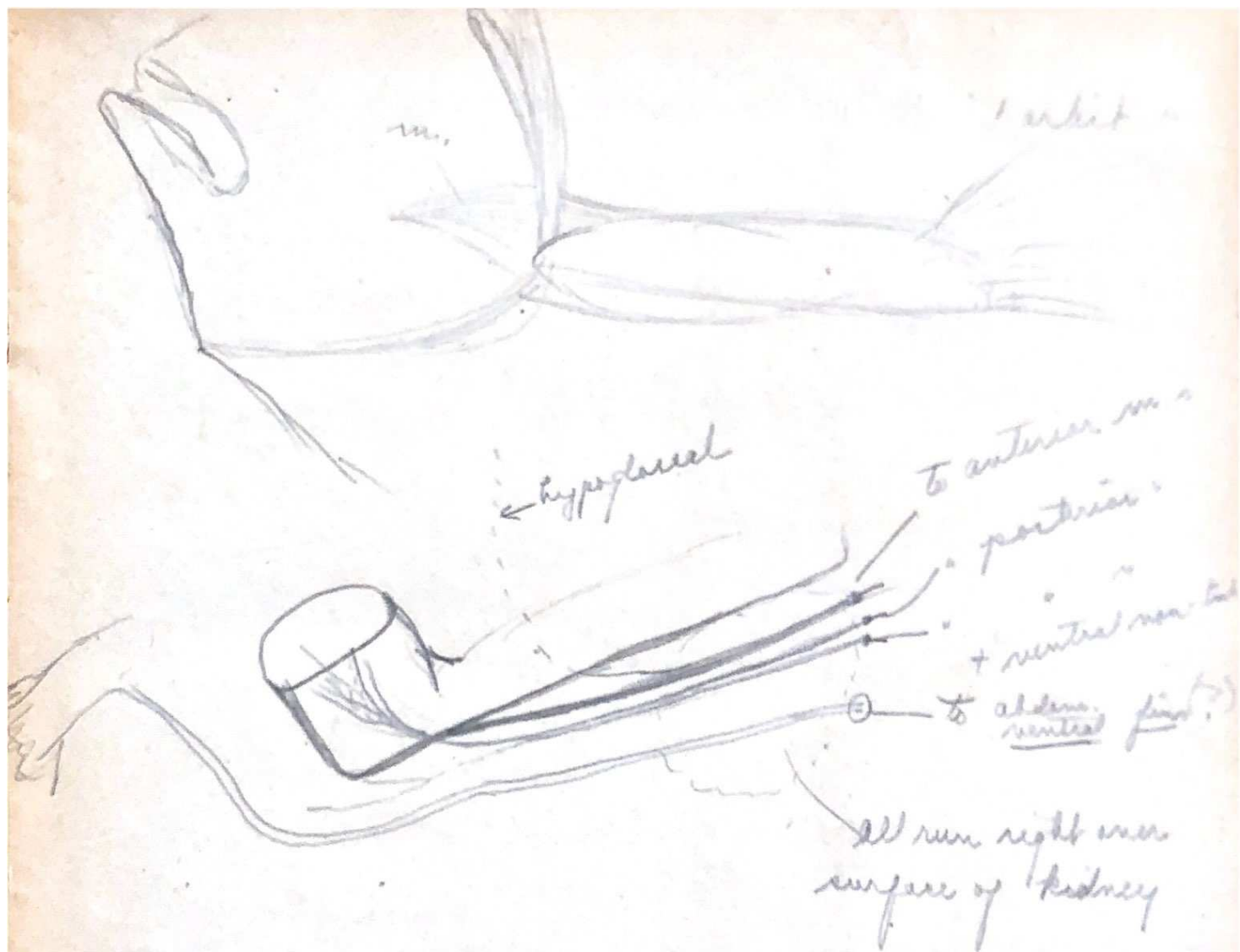


fin rays



elbow
w. flexion
& extension
possible
How - ?





3 segmental v's to limb (post) fin. [ner]

2 " " " ventral fin

make a single fascicle supply whole limb

For puppet oculometer:

Go in latero-dorsally just behind orbit -
just anterior to labyrinth. Remove chondro-
cranium over op. lobe so it can be raised.

By raising op. lobe can expose the
Vth components and further medially.

III & IV running side by side.

Have to scrape a lot of muscle
off skull at start - work from front to back

normal H. limb very sensitive shows good
retraction - [diff?] only adduction

Operated:

29
30
59

Histric (Fri. Jan. 30)

Tried to pull apart completely the nerves to both the pectoral and the pelvic fins.

(AM) Put up in tanks 1, 2, 3, 4 in order.
Op'd on left side.

(PM) Six used - ten in all in tanks 1-10.

In most got n's to pelvic along w. pect., but in a few by smaller ones, missed pelvic.

The nerves are completely broken & may be too far apart.

(n's cut about where hypoglossal comes off).

Feb. 2 AM #4 found dead

Replaced #4 w. operate (2-2-53) in which anterior-most branch (out of 12) was looped back so it would not reg. into distal stump.

Feb. 2

Op'd fins = dark in color

fin rays do not spread

limb held posteriorly about 45° instead of straight out.

sharp bend at the elbow

doesn't look as large as normal
insensitive

#3 looks incompletely paralyzed. Rays are somewhat spread + color not as dark as in rest

Feb. 3 #7 found dead.

Feb. 8 #9, 10, 43 show signs of rec'y. 9+10 spread fin when it is touched.

Feb. 9 #9, 10, 3 show pronounced rays of mouth

Feb. 10 Denervated fins are still stunted in all cases. Good retractor reflex in #9.

" 13 Function getting better in all cases.

" 17 Recy well advanced, but not complete yet in all but #5 & #1. #1 was the largest fish he is showing improvement over early post-op. #10 has no twist reflex. #8 & #9 are post-op and show good withdrawal R., & grasping & spreading, & protrusion & retraction & protrusion & suppr.

" 24 Still improving, but asymmetries still evident in majority.

Mar 11 #8 & #1 found dead. (bends) The entire group by now is well recovered. However, one could not say recy is perfect. Incomplete rather atypical. The incompleteness = minor & hardly noticeable. #1 has poor scar - wonder any recovery - fibers of pelvic mixed in

Mar 18 #9 & #10 - perfect recy? Others not. Some looks as tho pelvic & pectoral mixed. Try cutting pelvic high up.

Mar 19 #6 & #15? tried to break pelvic n. to see if corrects over-protrusion these cases. Didn't find it in #15 for sure. This surgery seems not to have helped a bit.

Mar 20 - #10 has right fin protruded & closed & in contact w/ face even in front of eye. A normal transient pose!

Mar 24 - #6 shows some x'd pelvic withdrawal when

Operated

Cross Pelvic n into Pectoral & cut
for withdrawal reflex

Feb. 3 1st small tank - #11

Eliminated middle branch nerves.

2nd " #12

Eliminated anterior branch

#13 - dark one

eliminated whole ant. nerve quite cleanly &
looped back into dorsal muscles
brought pelvic fin. n. over to join post.

#14 small

eliminated ant. portion of n. supply.

#15 eliminated ant.

Feb. 9 - #12 & 15 are only ones still alive.

There shows no merit, tho 12's fin is
slightly spread & not pigmented.

2-17 #12 shows retraction of pax. fin in w/d reflex.

2-24 " pretty well rec'd.

pectoral is S'd = further indication of neurogen in this case,
when scared, pulls up pectoral strongly against face.

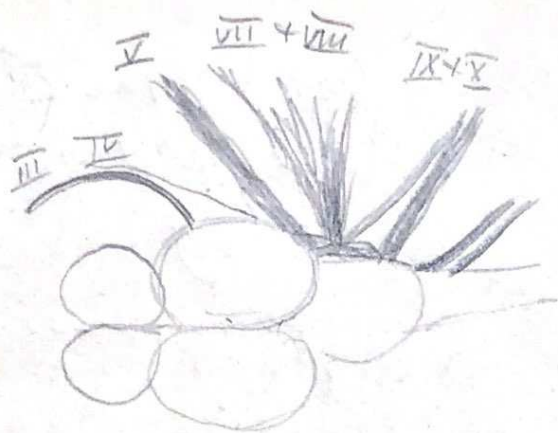
Mar. 26

- #2 = complete recy
- #3 = excellent " but fin rays don't spread quite as much
- #5 = signs of pect. - pelv. & 1 more protraction & lee ray spread
& pelvic fin pulled up.
- #6 = like 5 only good spread of fin rays when relaxed, planing
still shows crossed posture.
- #15 = like 5
- #9 = like 3
- #10 = practically complete

Distal fin ray part less completely
rest than prox.

Sacrificed, no histology!

~~Payer~~



III & IV run deep - along ventral
lobe, ventral to optic n.s. & medial
to V & VII

Cannot get at VI intracranially
from dorsal approach

Go in along postero-dorsal wall of orbit.

Try avoid anteri. nerv. semi-canal.

May want to remove forebrain
part of op. lobe.

On canthogaster, go farther ventrally just back
of orbit.

Feb. 10 - #8 poorly done. IV earned OK, but never saw III except once when pulled in & broke it by error.

put 5 along w. ①, ②, ③, ④ in outside tank.

⑨ well done. IV widely removed, III completely broken & fairly well apposed, but an accidental stab wound into brain or orbital cavity. Thread on rear top fin higher than #5. Hardest in indoor tank & has top of tail chewed off.

#10 well done, " " " " apposed. Thread on top ray of tail fin. Large eyes. Distal stump of IV was fairly close to central of III. Put outside [Ulcer on top of head]

2-11 prep'd a central w. tracheal and abductors muscles excised. then done lateral incision. Shortly after recy has good eye posture and fair mount, tho not as exten. as normal. (During recy eye was pulled anteriorly & ventrally.)

15
2-13
38
43
②-13 cut n. to pectoral fin via abdominal incision. Completely cut thru nerve in several snips with iridectomy scissors. Nerve is large & easy to expose (w. system of retractors). Next day fin twitches up with proper beat. The rays are lifted & spread, but there is no post-beat beating of rays. Fin remains flat, no waves, just lifting & spreading. (Complete recy by Mar 28)

2-18 - Remained stitches on all 4 inside & all but 1 on 1 in 1st outside tank.

2-28 Eye still shows horiz. warts only.
The lateral deviation, excessive during ¹ few
days after pin, seems gradually to have
been corrected somewhat.

"Fin" case still shows only the ^{upward} twitching
with no front-back warts. Possibly a
slight undulatory component in this residual
twitching or successive action of rays.

Feb-27

Mar. 4

Signs of reg. yesterday are definite
today. Fin is held out from body
and there's a definite back beat in fin.
Feb 13²⁶ to Mar. 4. = 19 days when reg starts

Mar. 5

The 4 remaining III cases plus the
cut fin case. moved into tank #5.

Mar. 8

Tried to excite the abduens m. in
5, 6, 7, or 8. This abolished all ocular warts
except very slight occasional twitching in
horiz. plane.

Mar. 10

Excited abduens m. in 2 more - not
#10. Slight twitching remains in one. On the
other the warts are a little more pronounced
not sure they are normal coordin yet.

(One of these died (the latter). 10 hours later. Had
a nicely reg'd III

Mar. 17

Still show only trace of wart in
op'd eye

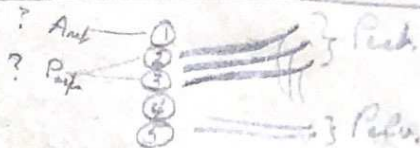
Mo & various v. to limbs & see what their function are
- remove one or another part of n. supply & see
remainder gives complete resp.

Abducens n. may have slip to connective
tissue around eyeball, but it is single at origin
& completely blind if removed from there.

Nictus

#16 Feb 8 sect'd 2 large posterior n's - did not see any to pelvic fins.

#17 - sect'd anterior n's



Feb. 18

Cut #1 in finger-bowl case in Lab room. Fins spread OK, but arm held posteriorly. Can't ~~cut #3~~ ~~input in tank~~ rotate so well and maybe fin spread not so good.

#3 cut in tank ① seems to cause very little motor deficit. Still has good control Rn, but can't spread fin rays so well as right side.

#2 cut in tank ② - not much defect.

Results of cutting these indiv. n. trunks suggest the fibers are distributed differently to fin musculature. Shows one needs only 1/3 of the normal innervation to look like good motor coordination.

(cont. over)

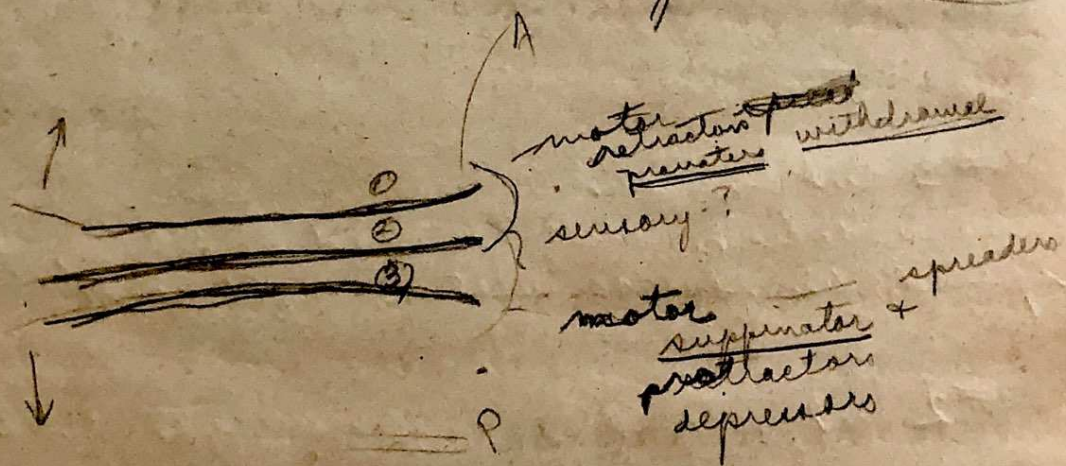
Feb 19

In #1 cut nerves 2 & 3 & accidentally crushed most of 1 on the right side. \uparrow Pharynx a fine m. \odot riving along bl. v. anterior.
1. R. fin spreads but not right. Can withdraw R. fin. Fin seems insensitive

#2 Cut all n's but #2 on right side. (R. fin drops ventrally & partly & will not plane - always responsive doesn't spread too well, is sensitive)

#2 acts almost completely denervated.

#3 Cut all n's but #3 on right side (in tank \odot)



Dissected another.
Found only 2 segments to pectoral. Anter - larger & supplies bulk of n.s. ~~Posterior~~ part thru base & part posterior to posterior ~~base~~ nerve

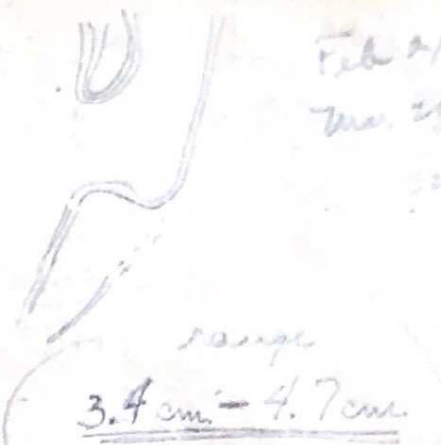
so - w anter $\frac{2}{3}$ cut - should get defects in protraction
retraction

Histrio - Pelvic to Pectoral

Feb 21
Mar 26

Feb. 21

- #1* largest (very well done*)
- #3 not so well done, but not bad
- #4, #5*



2-22

20 days

pt ser. ended up 7.5 - 9 mm.

#6 - 9

growth

2-23

#4, #11

Feb 24 - #6 + 11 dead + #8 - empty.

Feb 25 #6, 8, 10, + 11 are dead

Mar 4 #9 found dead, tank empty righted back

Mar 4 #1, 5, + 7 alive - no signs of reey -
Pector. collapsed, + pelvic pulled up

Mar 4 Put #7 above into #6 (so 1-6 = pel -> pect)

4 Opd #7, 8, 9, 10

leaving anterior 1/2

Reflected about 1/2 of the pect. m. supply

" 4 #11, 12, 13 Ref. 2/3 " " " "

leaving the anterior 1/3.

" 7 #10 found dead w. gaping wound

Mar 9 Signs of reey of mant in 1-6. Not normal, couple pull the fin forward in flex against gills when S.
Ought to fall pelvic sensory fibers

Mar. 10 #1-6 show abnormal Rins, fin is tense, flexed forward & only Rin is increase of this forward flexion & tightening of fin rays. Picture could well be of structure & contraction in maxilla.

#8 found dead w. gaping infected wound

#13 also infected

(#1) has part of corner of mouth eaten away died Mar. 15 with infected jaw, still showing exaggerated protrusion & pursing of fin. Dissection showed n.s. nicely cracked.

Mar. 15 2-6 still draw fin forward against operculum under eye. Caudal begin to show ray of pelvic fin margin, that is normal.

Mar 17 (#5) dead - still w. forward bent limb. Dissection showed the superficial flexors of fin rays are in permanent contraction. permanently shortened. The nerve - cross found to be very good in all respects.

Mar. 18 Notice that the pelvic fin is showing ray of margin of normal posture in all remaining cases. (except - #2) In #24 the pectoral fin does not look as bad as it did. = less flexed and fin rays are better spread.

Mar 18 notice resp is well started in the
fractional reinnervation group. #7-13.

Mar. 24

#2, 3, 4 & 6 remain. They all show crossed
responses of the pelvic fin to Sin of the
Pectoral. So, the cutaneous fibers involved
must have retained their pelvic specificity
after growing into pectoral skin.

Perhaps fibers to elevator m. of pelvic fin
do not travel in the crossed pelvic nerves.
That would acct for postoperative posture - if
appared m's all paralyzed.

#4 = only one of this grp that shows normal retract to
Sin - & sometimes this one protracts rigidly.

- in #2 Pelvic R's only to Pect. Sin & not strong Pelvic picking
- in #4 pelvic moves in swimming, but no R to Sin of either pl. or ped.
- #6 pelvic R's to both pect. & pelv. stems.
- #3 " " only to pect. Sin. pelvic pulled way up against
pectoral & pectoral pushes on chin all time.

Mar 25. Tried to cut pectoral n's high in #4. As he
recovers, Sin of pelvic fin gives clear cut ^{abnormal} movement
(abduction) of upper ^{pectoral} fin rays, but don't get the
retraction & suppenation so before n. section.
(get these consistent in ^{group} #7-13)
Don't see very much mant of pectoral fin
in this group any more - more like contracture.
Can't say fin mant is as what w. pelvic n. pick
Don't know whether gradual disappearance

of pectoral protraction cause contracture
already so extreme can't get any more - or
maybe central mechanisms.

(looks here as if nerves can connect with
foreign muscles and produce contraction
= contrary to interpretation of straight regn.)

However, the muscle mass of these limbs is
greatly reduced (by $\frac{1}{2}$?). They are very
atrophic. stunted in growth.

Could not find any reg'd pectoral n. in #34⁶.

There is slight mass remaining in #4 after
cutting out pectoral, but don't see it in #34⁶
where contracture is worse.

Apptly pelvic nerve fibers do innervate pectoral m.
Why they don't function? Further analysis needed.

Pelvic fins ended up in better shape than
pectoral. Apptly fibers cross over to pelvic
& there survive & function.

Mar. 26. #2 opened & found no evidence of
pectoral reg'n. The pelvic fin also somewhat
stunted but not so bad as pectoral.

#6 Pectoral fin doesn't show much R - too protracted. Pelvic
shows some normal mass to pelvic fins.

Stim. of pelvic n. causes slight reaction in both pelvic &
pectoral fins.

Muscle on extensor side (retractors) are atrophied - no reaction.
On dissection - looks as if most of nns. go into pectoral fins.

#4 good reaction. Strong protraction of pectoral fin to pelvic n.
stim. & very slight twitch of pelvic fin.

Direct stim. of retractor muscles causes retraction of limb, but
limb showed little or no movement in swimming under natural conditions.
Most of fibers are crossed to pectoral, but one strand goes to pelvic. Taper
external fin looks lesser than pectoral.

Nistius limb coordin

- ① Fins self forward with fin spread, propelling against back of hand. Fin contracts on back stroke? ^{virtually}
- ② Fins self backward, pulling spread fin forward in reverse of ①.
- ③ Grasps used ext. with middle of fin, but also with any (?) part that comes in contact.
- ④ Flashes forward by jet propulsion with fins widely extended in horiz. plane.
- ⑤ Withdraws fin on S_{in} against body, fin spread vertically.
- ⑥ Flex and extend ~~elbow~~ ^{wrist}. [has no elbow or upper arm]
- ⑦ Forearm can be lifted, depressed, or protracted or retracted or combinations of these. = almost universal joint - if rotation. [rotated ^{fin used being} = same where]
- ⑧ Lifts limb upward & forward over head
- ⑨ Slight "suction" in fin ray action on towing backward

Can't see any contraction in extensor muscles - only protractors & fin ray flexors - on stim. of whole pelvic nerve?

Very slight, if any, contraction of extensors ^{retractors} & direct stem.

#3 Stim. nrv. of pectoral nrv. gives ^{slight} fin protraction - fin ray closure. Depression of base of both pelvic fins but not of fins themselves.

Has pelvic fin "holding up" pectoral fin.

Stim. of pelvic nrv. this time gives strong protraction & elevation of pectoral fin.

Protraction of pectoral fin is accompanied by pronation (Probably true in all of the series)

Get anterior depression of pelvic fin base - lacks bilateral - & Stim of pelvic nerves.

[Power]

on Mar 13 }
 from Mar. 9 = 4 days ✓ - #18
 " " 7 = 6 days ✓ - #19
 " " 4 = 7 days
 " Feb 28 = 13 days ✓ - #17 eye internal

Fixed in Radafsky - 4-7-13-15 + 2

#17 - 13 days eye in
 #18 - 4 days eye out
 #19 - 7 " eye out
 #20 - 15 " eye in
 #25 - 12 " " out

Fixed in Cajal #6 - 8-11-17 + 2 + 4

#21 - 8 days (eye out) 48 +
 #22 - 17 " (" ") 30 +
 #23 - 11 " (eye in) 1 1/2 +
 #24 - 12 " " out 2 + 4

Can get limb depression by direct stim. of muscles.
 Depression, elevation, + protrusion but no retraction.
 Same pelvic movt. from stim. pectoral fin muscles
 Nerve cross looks pretty good on dissection.
 About all n. fibers go into pectoral fin.
 Get good elevation of pelvic fin by direct stim. of muscles
 but can't get any kick by stim. pelvic n. alone.
 Pect. retractor + extensor m's don't get wind, or get stretched + deg.

Puffin for histology:

Feb 27 cut n. to pectoral in largest - right

28 " " " " " remaining 4
fish tank 2, including case w. abducent m. + track
excised. In 2 of these also removed left
eyeball + most of extracocular m. masses.

Mar. 4 - Cut nerve to pectoral fin +
excised left eye in 2³ cases - 11 case killed
by heads. (Put in tank #3. The largest
case in this tank + a smaller animal with
~~the left eye unexcised.~~)

Mar 7 Cut n. to right pect. fin + excised
left orbit on remaining 3 cases in tank #3.
~~but the smallest in tank left the eye in.~~

Mar. 9 Cut pect. n + excised eye as
above in 3 cases in tank #2. (2 left)

21
9.

2	3	4	cut left pect. n. Mar 24.
23	24	25	cut 3. n. + left eye m. 25
23	24	25	III.
23	24	25	

another in tank 2 Mar 25 = 19 days
Mar. 17 one in tank 4 begg to recover = 17 days
20 - other " 4 " " = 20 " "

Mar 23 AM Cut pect. n. on left side + removed left eye
in oldest fin case in tank 2

Fixing Procedure

Chill 15° sea H₂O

Artes. 15° urethane

(Expose brain + cord) — **No!**

Cannulate dorsal aorta where veins bifurcate.

Quickly knock heart ^{veins} & release 1% chilled

X Roll over aspirate top of optic lobes

X Release fixative (chilled)

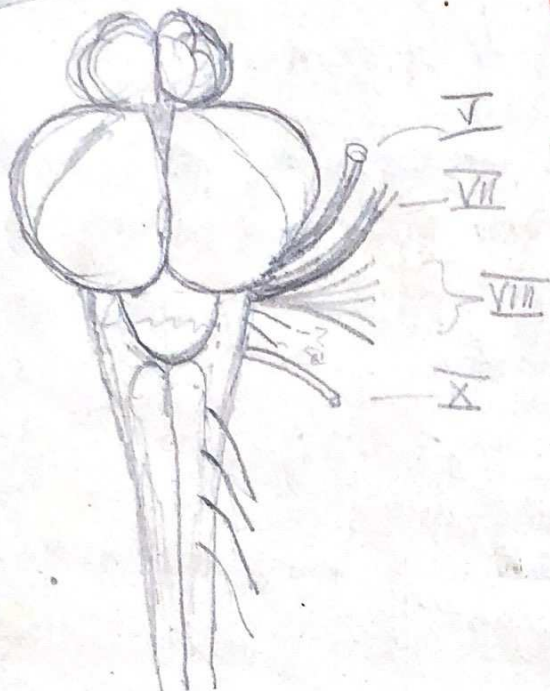
X Pipette " into ventricles of over cord

Put in from height of about a foot. Use pulsation pressure applied w. fingers to tubing & get good fixation this way. Have to continue for some time

Mar. 23 Rank #2, Mar. 4 case, Cut left feet in. & excised m.'s of eye, except adductors, & left eye & op. n. intact.

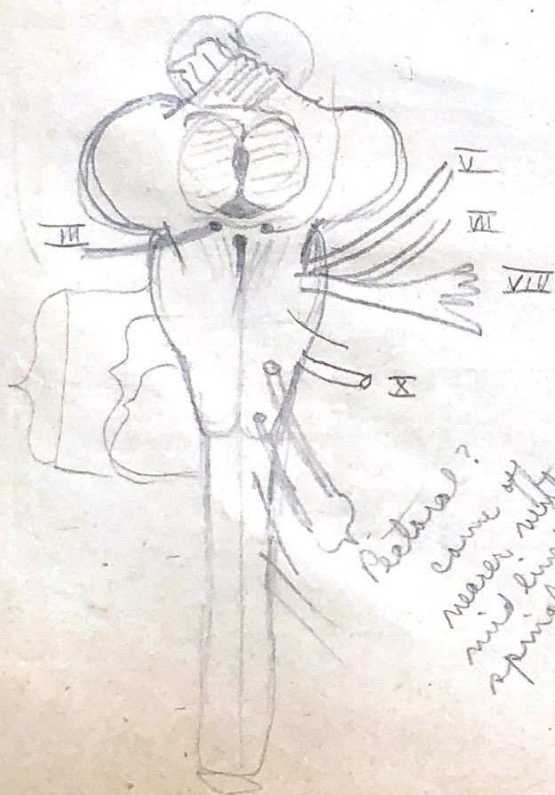
Puffish Brain

Dorsal



Puffish = 21 cm ±
16 - 22 cm.

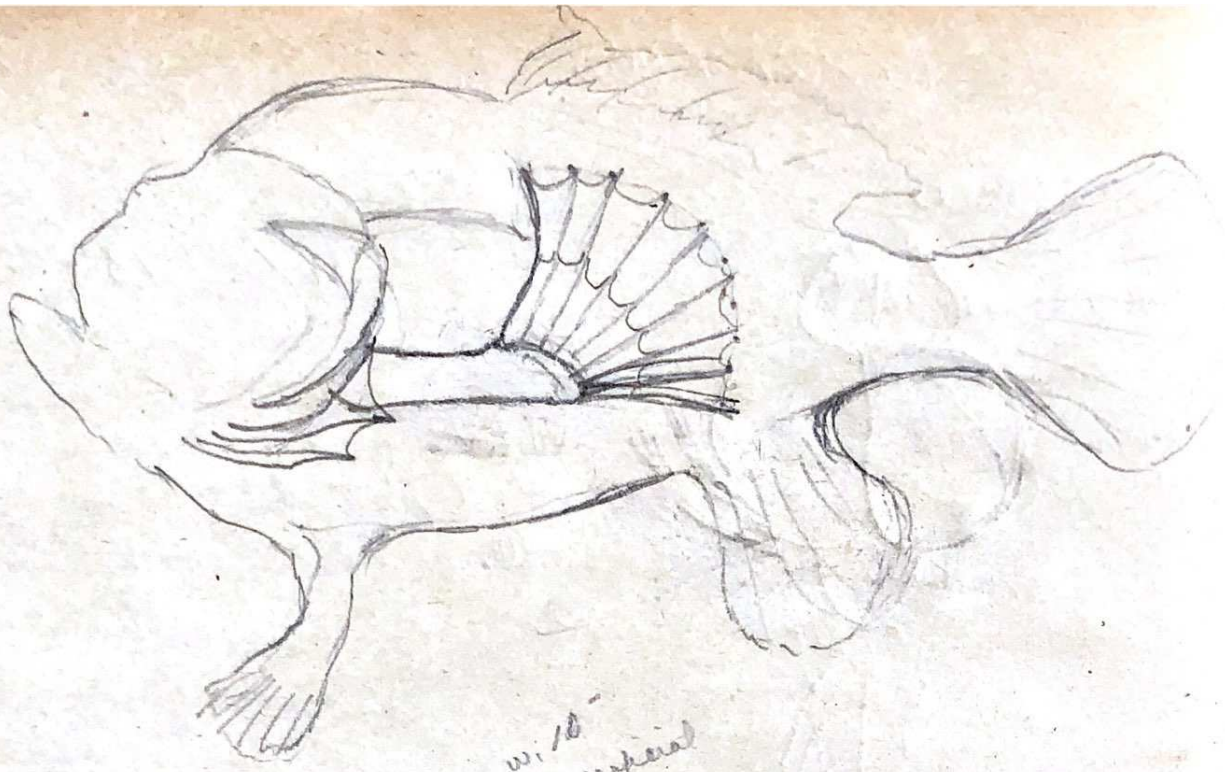
A smaller one = 20 cm
range = 18 - 22 cm
= ~~small~~ - total



Slight bulbous
enlargement for
Pectoral segments
come just
posterior to X

A heavy ventral
commissure at
rostral end of
medulla. just back
of ventral lobe peduncle
III exits a little off
midline, just posterior
to this com

Pectoral?
come off
nearer rostral
midline than rest of
spinal motor roots



origin single, m. w. 10
digital slips superficial
zonopterygials
girdle

origin on two bones
inserts on top base of fin
elevates fin

Fixed

Rateral view left fin
retracted

Posterior view

ball & socket in effect

Deltoid like w. ph. origin inserts all along main bone

elevator

cartilage runs between fin rays

delto. & ris tunnel thru here

depressor, inserts on lower bone

Deep digital m. on lateral anter. largest, most ventral bone

balls of both scapulae 2 cartilage knobs Hard bony process

suprad

pron deep short m. that span joint

cleithra scapula

coracoid cleithrum

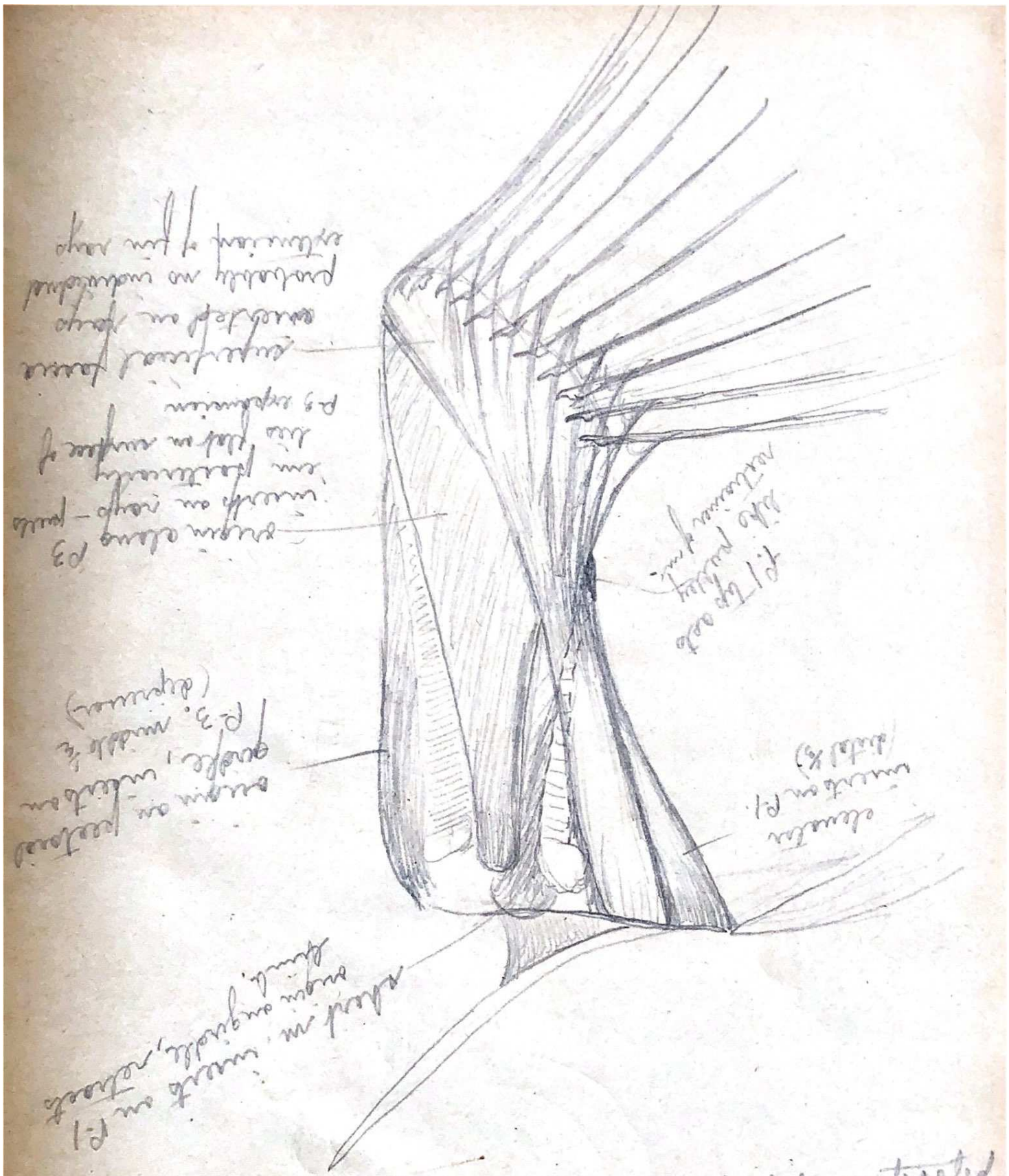
surrounding fragment helps make shell of beak



prox pterygials 4, 3, 2

xiphoid middle

pterygines + distal pterygials



Posterior view, left limb protracted

May 2 -

#11 - Could not find central reflected stump of pectoral. Looked as tho pedicles were crissed into pectorals. Left fin bent forward. This probably = #2, the p-p cross

#13 - Looks OK - central peck stumps reflected + can't see any signs of their getting back, tho can't exclude their getting back under, along, side aluminum. Remaining stump does not fill all distal stumps. Fin maybe little small, but not definitely = light-colored one.

no # (tail off) - a few fibers seem to have succeeded in getting back into fin - but bulk, no. smaller in 11.

#12, Fin = normal size. Looks very good. Immature of pectoral = $\frac{1}{2}$ normal size + no signs of misregen.

#7. Not so good. Looks as tho reflected stumps got back into fin

#9 Suggestive of misregeneration - not a clear case

Withdrew reflex in Histicis - cross from one finger
to another, pectoral.

Analyze compensatory adjts of eye posture
w/ opt. m. (see if functional, reflex or mechanical)

Bimini 1957 Jan-Apr. Five Nerues
broken. Various Nerues broken - (#17)
III, IV, V, VII, VIII, IX & X

References

Expt data + drawings

O.W. Piego's excellent review of skeletal muscle inn.
in Physiol. Rev.'s 1953 vol. 33 p. 1002

Retzius Biol. Untersuchungen N.F. 3: 41-52 1892 on
motor endings in fish!

also:

Parey 1934 Proc. Lab. Reberer. Biol. Med. 29: 707-

Kirsche 1948 Anat. Anz. 96: 419

group endings of varying complexity

(Localization of stretch reflexes to small muscle strips
within quadriceps - almost point to point localization
between S & R. Cohen & Murphy 53

From the Desk of

LERNER MARINE LABORATORY

Your large puffers check as

Spheroides testudineus (Linnaeus)

C.B.

Blue - Pectoral
6 HISTRIO # 9, 13, 2, 11, 12, & 7

NERVES TO LEFT PECTORAL FIN WERE CUT AND ARE GROWING BACK,
BRINGING RECOVERY OF FIN MOVEMENT.

PROBLEM: IS NORMAL MUSCLE COORDINATION RECOVERED?

IF NOT -- IN WHAT RESPECTS IS FIN MOVE-
MENT ABNORMAL?

LOOK FOR DEFECTS IN:

- A. RETRACTION OF FIN CRUDALLY AGAINST
BODY WHEN STIMULATED, I.E. THE
WITHDRAWAL REFLEX. THE FIN RAYS ARE
SPREAD AND TURNED "PALM" OUT (SUPPINA-
TION).
- B. PLANING WITH FIN STRETCHED OUT WITH FIN RAYS
SPREAD AND PALM DOWN (PRONATION).
- C. GRASPING OF GLASS TUBING, WEEDS, ETC.
- D. PADDLING MOVEMENTS OF VARIOUS KINDS --
COMPARE WITH THE NORMAL MOVEMENTS OF
THE OPPOSITE FIN.

#3

SO - only about $\frac{1}{2}$ reduced

SR - muscle about normal
didn't find nerve

MR - little if any reduced
nerve is large - as large as normal

IO - m. not noticeably reduced.
neither n. nor muscle shows atrophy
cut n. long so can recognize.

IR - m. not reduced, didn't find n. clearly

6 HISTRID # 9, 13, 2, 11, 12, & 7

NERVES TO LEFT PECTORAL FIN WERE CUT AND ARE GROWING BACK,
BRINGING RECOVERY OF FIN MOVEMENT.

PROBLEM: IS NORMAL MUSCLE COORDINATION RECOVERED?

IF NOT -- IN WHAT RESPECTS IS FIN MOVEMENT ABNORMAL?

LOOK FOR DEFECTS IN:

- A. RETRACTION OF FIN CAUDALLY AGAINST BODY WHEN STIMULATED, I.E. THE WITHDRAWAL REFLEX. THE FIN RAYS ARE SPREAD AND TURNED "PALM" OUT (SUPPINATION).
- B. PLANING WITH FIN STRETCHED OUT WITH FIN RAYS SPREAD AND PALM DOWN (PRONATION).
- C. GRASPING OF GLASS TUBING, WEEDS, ETC.
- D. PADDLING MOVEMENTS OF VARIOUS KINDS -- (COMPARE WITH THE NORMAL MOVEMENTS OF) THE OPPOSITE FIN.

OBSERVATIONS ON 6 MISTRIO # 9, 13, 2, 11, 12 & 7 OVER A TWO WEEKS PERIOD FROM MARCH 30 TO APRIL 13, 1953.

WEEK ENDING APRIL 6TH.

- A. RETRACTION OF FIN CAUDALLY AGAINST BODY WHEN STIMULATED.
IN NUMBERS 12, 9 AND 13 YES.
IN NUMBERS 11 AND 2 NO.
IN NUMBER 7 HALFWAY, I.E. FROM POSITION OF FIN MARCH 30TH.
- B. FIN RAYS SPREAD AND TURNED OUT (SUPPINATION)
ANSWER IS NO IN ALL SPECIMENS, THE FIN TURNED DOWN, ONLY
IN # 9 COULD ANY NORMAL SPREADING BE NOTICED.
- C. FIN STREACHED OUT WITH FIN RAYS SPREAD AND PALM DOWN (PRONATION)
ALL FINS WERE AT SAME ANGLE AS ON MARCH 30TH.,
- D. GRASPING OF GLASS TUBING, WEEDS, ETC.
IN # 9 GRASPING OF WEED NOTICED.
IN # 12, 13 & 11 A SLIGHT TENDENCY NOTED.
IN # 7 & 11 NO.
- E. PADDLING MOVEMENT OF VARIOUS KINDS.
IN ALL SPECIMENS VERY WEAK COMPARED TO OPPOSITE FIN.
IN # 9 MORE ACTIVE THEN OTHER SPECIMENS.
EXCEPT FOR #9 COULD NOT NOTE ANY DIFFERENCES IN FIN
MOVEMENT SINCE MARCH 30TH.

NOTE: WHAT I ACTUALLY MEAN IN ANSWERING QUESTION IN PARAGRAPH B., THE PALM TURNED DOWN, ONLY IN # 9 COULD ANY NORMAL SPREADING BE NOTICED.

OBSERVATIONS OF HISTRIO COND.

WEEK ENDING APRIL 13TH.

A. RETRACTION OF FIN CAUDALLY AGAINST BODY WHEN STIMULATED.

9, 12 & 13 YES.

2 & 7 NO.

11 ALMOST. NOTE: # 7 REFUSES TO MOVE FIN BACK AT ALL AS OF WEEK ENDING APRIL 6TH.

B. FIN RAYS SPREAD AND TURNED OUT (SUPINATION)

ALL SPECIMENS WITH THE EXCEPTION OF # 2 HAVE GOOD USE OF THEIR FINS IN GENERAL. WHILE FREE SWIMMING ABOUT THEY SHOW A TENDENCY TO FAVOR THE EXPERIMENTAL FIN, I.E. DO MOST OF THE PADDLING WITH THE GOOD ARM, THEY HOLD THE EXPERIMENTAL FIN AT AN ANGLE. WHEN AGITATED, IN MOST CASES, WILL PUT BOTH FINS TO WORK. THEY ALL CAN SPREAD THEIR PALMS WITH SUCCESS, # 9 HAS GAINED NORMAL WIDTH OF PALM, THE REST NOT QUITE SO.

C. FIN STRETCHED OUT WITH FIN RAYS SPREAD AND PALM DOWN.

THE ABOVE SHOULD ANSWER PART OF THIS QUESTION. IN ADDITION IT SHOULD BE ADDED THAT WITH THE EXCEPTION OF # 2, THE PALMS CAN BE MOVED IN A PERFECTLY NORMAL MANNER.

D. GRASPING OF GLASS TUBING, WEEDS, ETC.

GRASPING HAS BEEN NOTED IN ALL SPECIMENS.

E. PADDLING MOVEMENT OF VARIOUS KINDS.

AS EXPLAINED IN PARAGRAPH B, EXPERIMENTAL FIN FAVORED.

9 & 12 USE THE EXPERIMENTAL FIN CONTINUALLY, THE REST OCCASIONALLY.

NOTE: ON APRIL 11TH. # 2 WAS FOUND DEAD FOR NO APPARENT REASON. THE CAUDAL HAD BEEN PICKED DURING THE NIGHT BY GAMBUSIA.

ON APRIL 12TH. # 13 WAS FOUND DEAD ON THE FLOOR. A SARGASSUM BERRY HAD FLOATED OVER THE OVERFLOW PIPE AND THE TANK RAN OVER. THE FISH HAD AN EASY HOP OUT OF THE TANK.