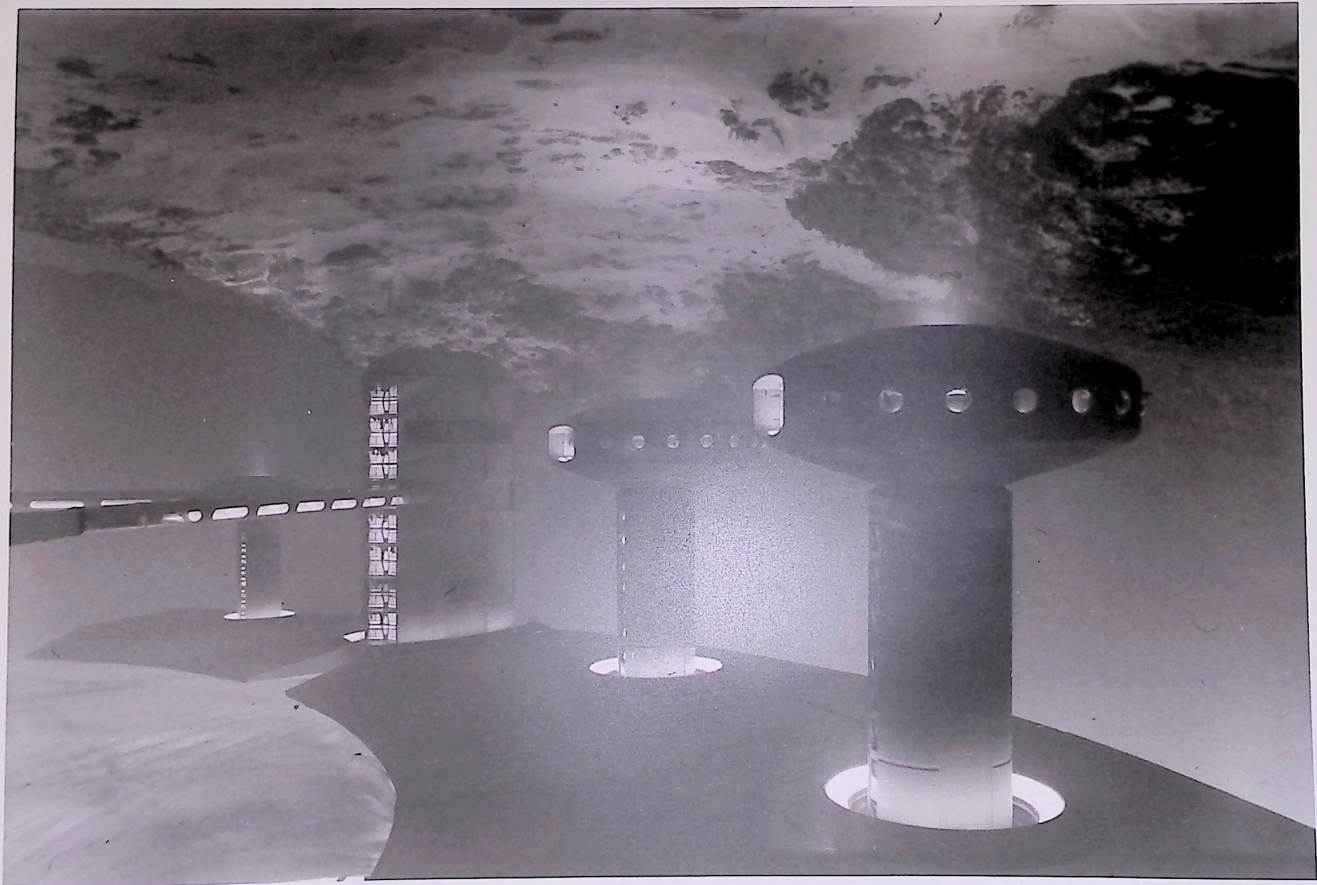
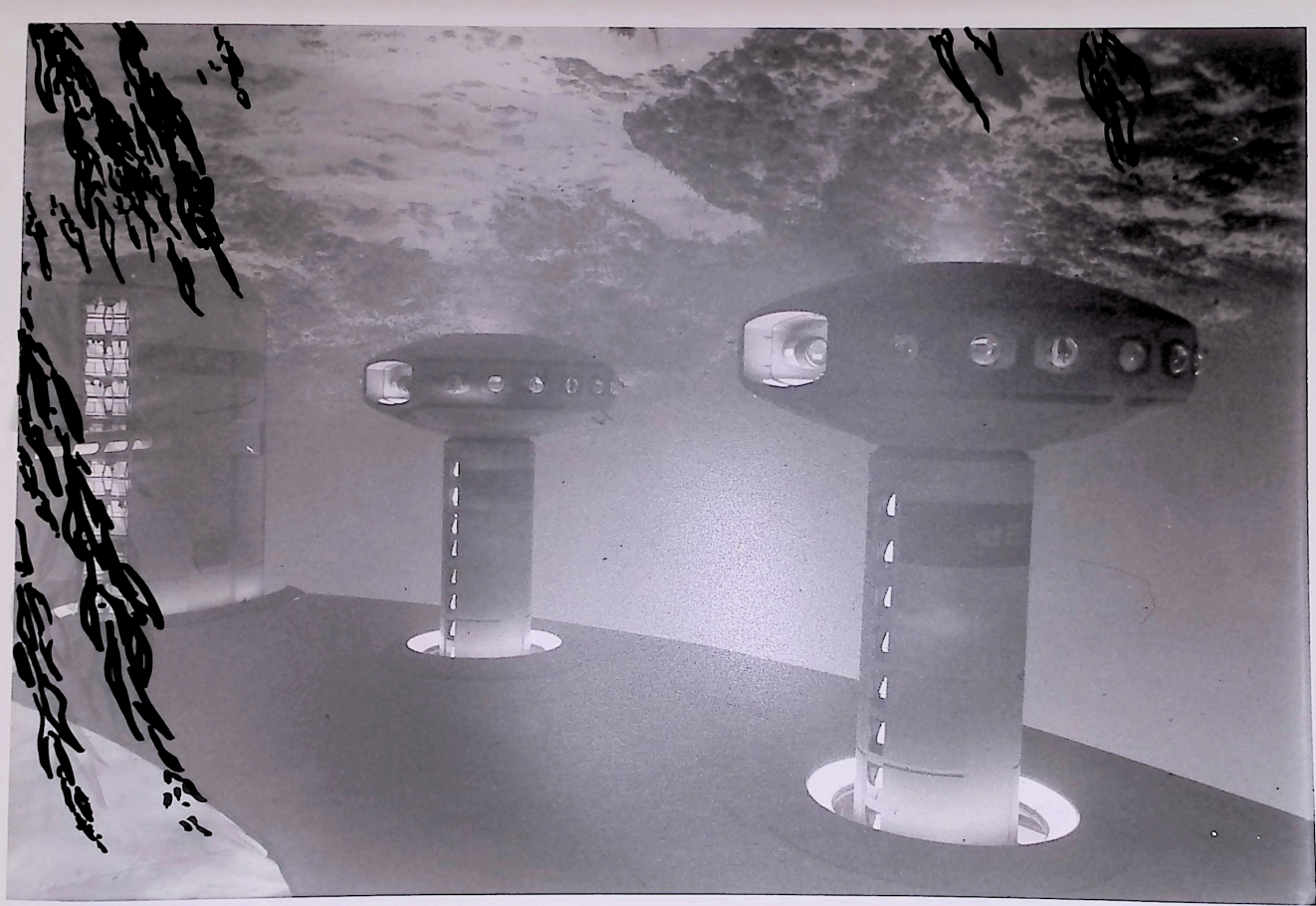


AQUA SEQUENT







OCEAN SEQUENCE

- DIVE CHAMBER
- SURFACE MATTE PAINTING
- ONE MAN SUB
- FLOATING CITY AND "TOWERS"
- SUNKEN TREASURE SHIP
- TREASURE SHIP RECOVERY RIG
- DOCKING BAY
- LARGER SUB
- MINIATURE TERRAIN
 - OCEAN BOTTOM COVER
 - CORAL
 - SEA FANS
 - ETC.

MARCH 25, 82

OCEAN SEQUENCE MINIATURES

LAUNCH DIVE CHAMBER

MATTE PAINTING OUTSIDE WINDOW (SURFACE CITY)

OCEAN FLOOR LAYOUT

"HANGING" CITY PIECES (6 HANGING + OVERHEAD)

SEA CORAL, SEA WEED, GROUND COVER, KELP

ONE MAN SUBS - FOLLOW ME SUB

SUNKEN SHIP

ONE MAN MANIPULATOR SUB AT SUNKEN SHIP - VERY MODERN

ARRIVAL STATION *CAN THIS BE A PIECE FROM CITY EARLIER?*

DOCKING TUBE

DIVERS

PORPOISES

SHARK

SMALL FISH

SCHOOL FISH

SEEMS HEAVILY ON SUPPORT STAGE SHOTS

UNDERWATER HABITAT SEQUENCE

- LAUNCH DIVE CHAMBER
- MINIATURE UNDERWATER - OCEAN FLOOR LAYOUT (APPROX 2
30x70 FT)
- UNDER WATER CITY HABITATS
- ONE-MAN SUBS
- LARGE UNDERWATER BUSES

- "SCUBA" TYPE DIVERS
- PORPOISES
- SCHOOLS OF FISH
- ASSORTED SEA LIFE - TURTLES, ETC.

- SEA CORAL
- SEA WEED, ETC.

- OCEANS "SURFACE" EFFECT - W SURFACE BOAT "WAKES"
- SUNKEN SHIP

- "CLOSE-UP" HABITAT STRUCTURE
- DOCKING BAY
- ANY BACKGROUND "SCENICS"

UNDERWATER FILMING

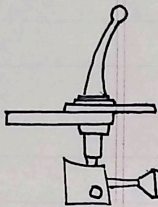
- CHUCK NICKLIN —
SAN DIEGO —
FOR YOUR EYES ONLY
- AL GIDDINGS
SAN FRANCISCO

GREGG JEIN \$20-25?

MARK STETSON- \$20-/HR.

FRAN CREEVY





1764 SHARON DEAN —
NEWS GIDDINGS SEAS.

TS 37 HENCLY

1-415-548-2110

TIL AUG. 8TH

← AL GIDDINGS —

JERRY THOMPSON — PRODUCTION MANAGER

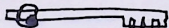


● "MYSTERIES OF THE SEA"

$\frac{3}{4}$ " TAPE 90 MIN.

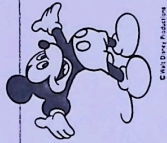
RANDY OR DON

SHARK SECTION TOWARD THE FRONT



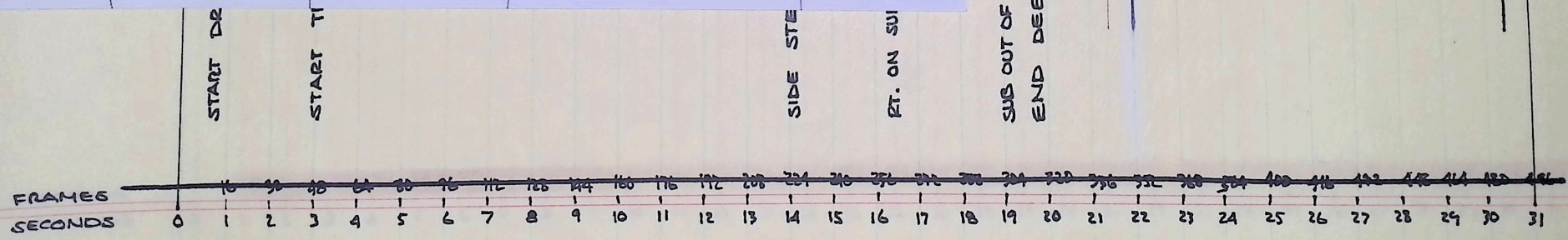
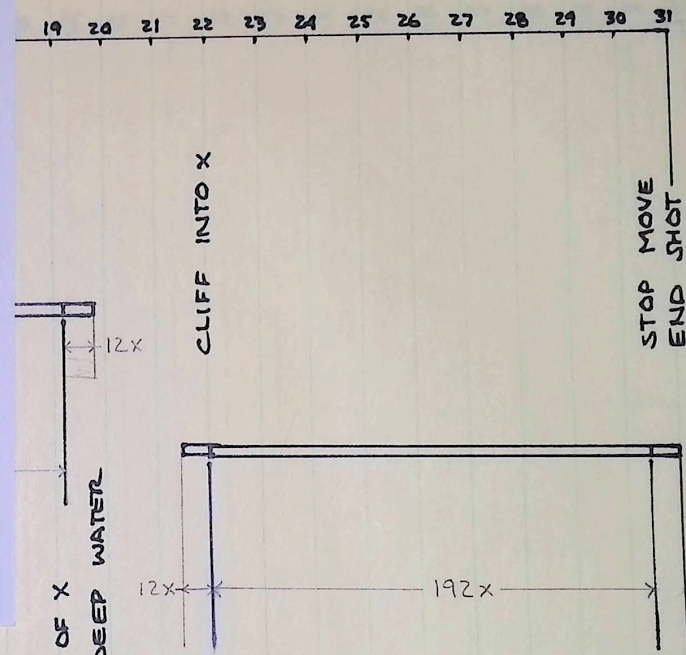
		FX TOTAL	SECONDS
ALL DROP	3-5	53 X	2.208 SEC.
FORWARD	5-3	83 X	3.458 SEC.
END SC. 2	30-0	480X	20.0 SEC.
STOP MOVE	43-10	698X	28.2 29.08 SEC.
END	44-11	715X	29.79 SEC.

Dave Jones



© Disney Animation

31 SEC. = 744 X



83
53x
30x

FRAMES
SECONDS

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
---	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

START DR

START TR

SIDE STEP

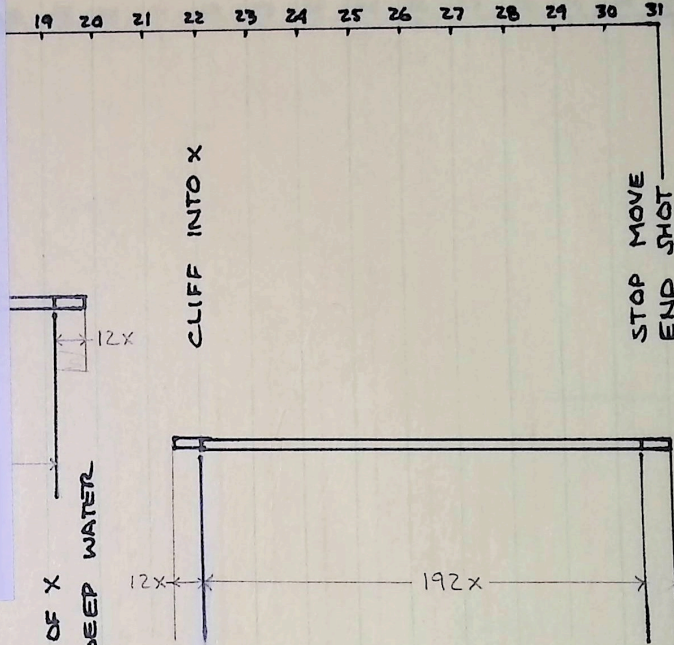
RT. ON SUN

SUB OUT OF X
END DEEP WATER

CLIFF INTO X

STOP MOVE
END SHOT

31 SEC. = 744 X



0 → 3-5 STILL

3-6 → 5-3 DROP

5-4 → MOVE FORWARD
30-0 END 1ST MOVE

43-10 STOP MOVE

44-11 END

¹⁷BX — 82363

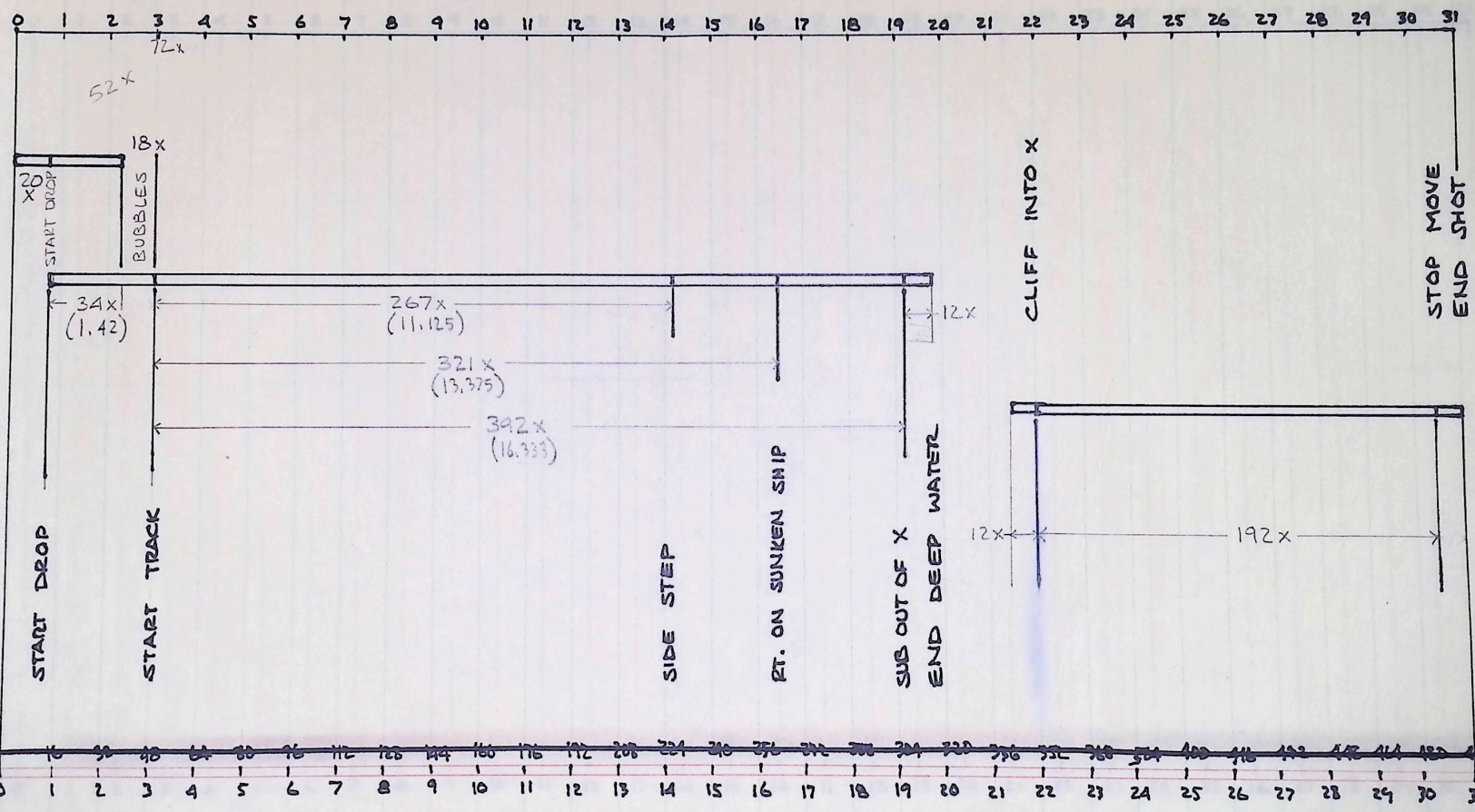


Dave Jones

53X
30X

FLOATING CITY LAYOUT

31 SEC. = 744 X

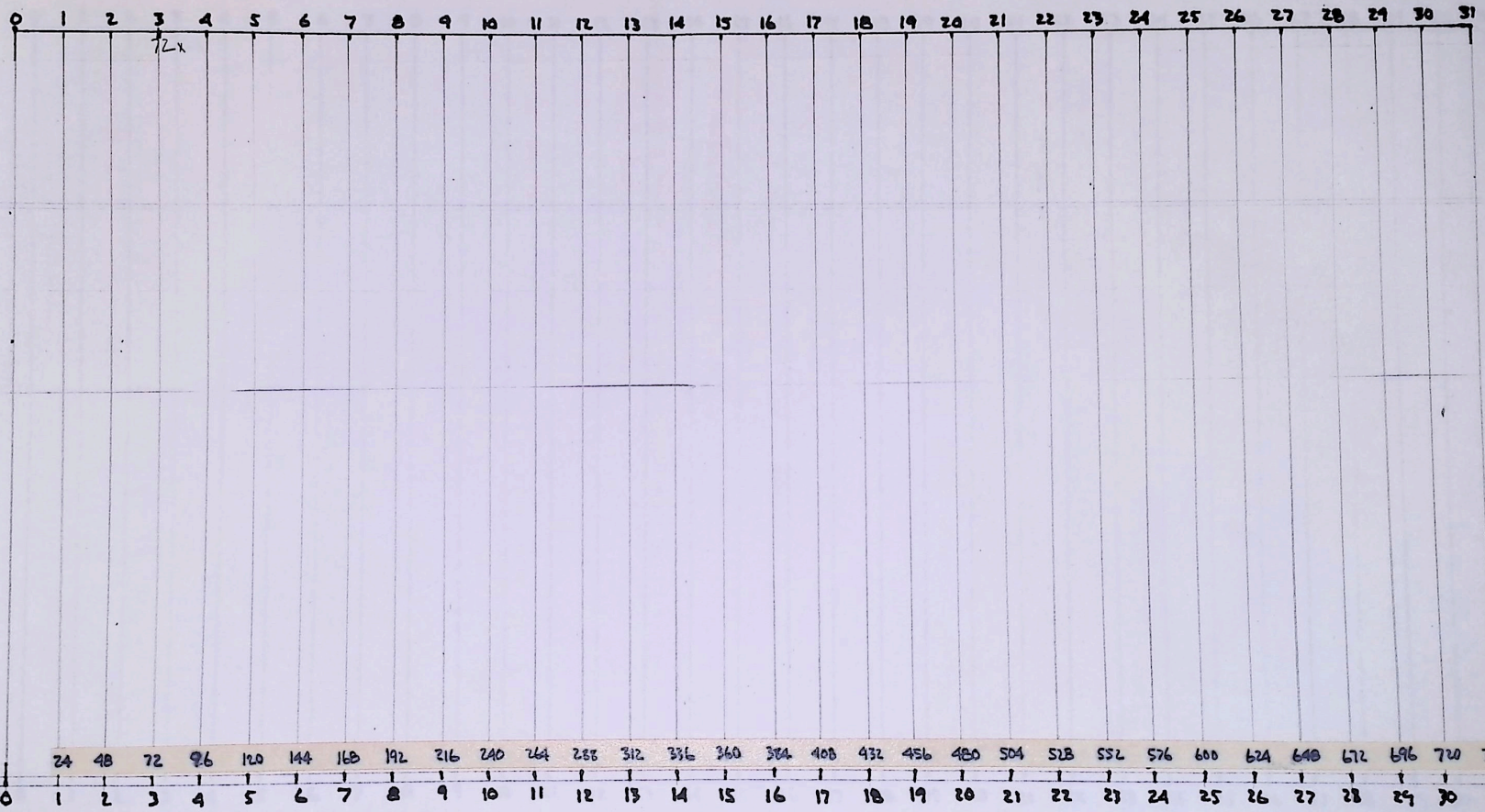


FRAMES	SECONDS
0	0
16	1
32	2
48	3
64	4
80	5
96	6
112	7
128	8
144	9
160	10
176	11
192	12
208	13
224	14
240	15
256	16
272	17
288	18
304	19
320	20
336	21
352	22
368	23
384	24
400	25
416	26
432	27
448	28
464	29
480	30
496	31

53x
30x

FLOATING CITY LAYOUT

31 SEC. = 744 X



FLOATING CITY LAYOUT

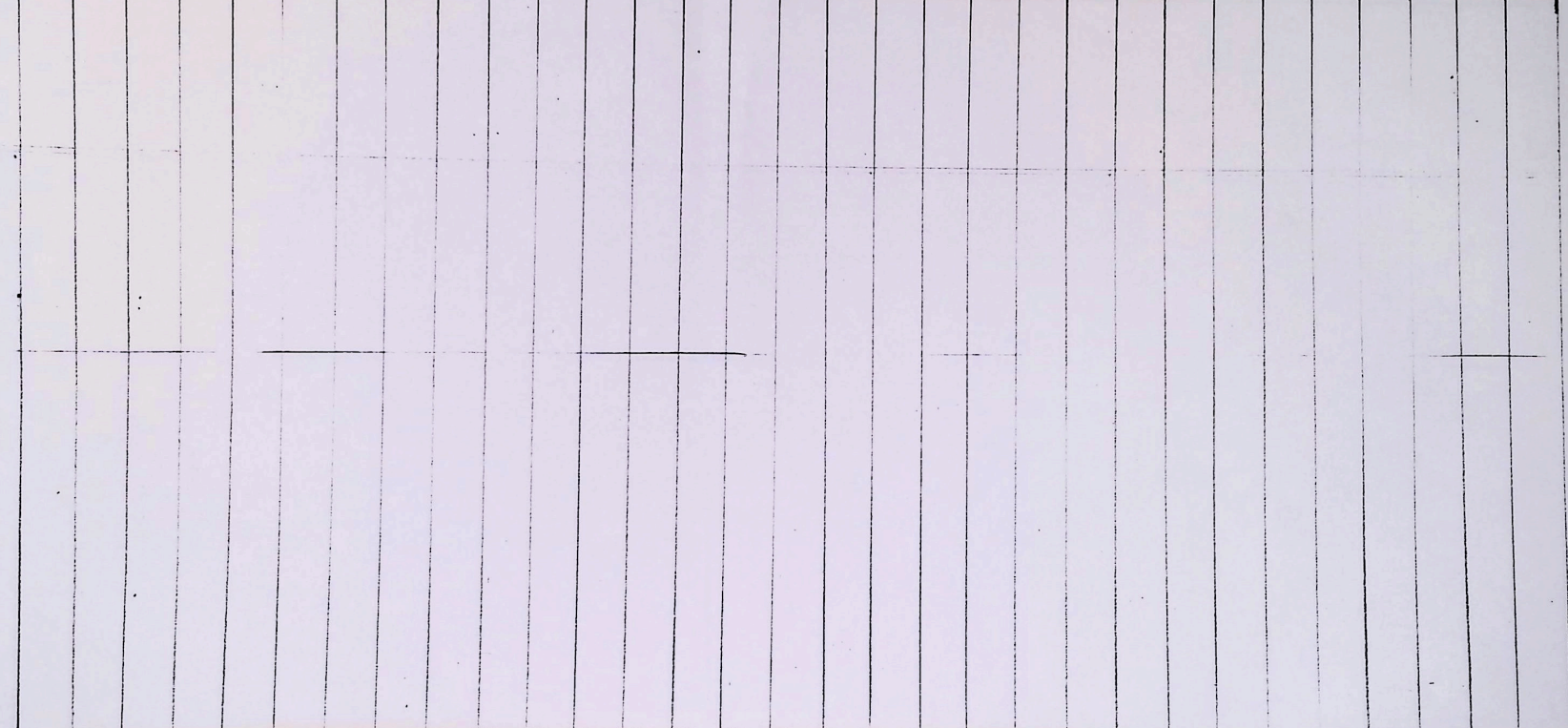
31 SEC. = 744 X

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

72x

FRAMES
SECONDS

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31



FLOATING CITY LAYOUT

31 SEC. = 744 X

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

2x

SECONDS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
FRAMES		10	27	40	54	70	76	112	128	144	160	176	172	208	224	240	256	272	288	304	320	336	352	368	384	400	416	432	448	464	480	496

0-50-56 76-80

TV 80-90

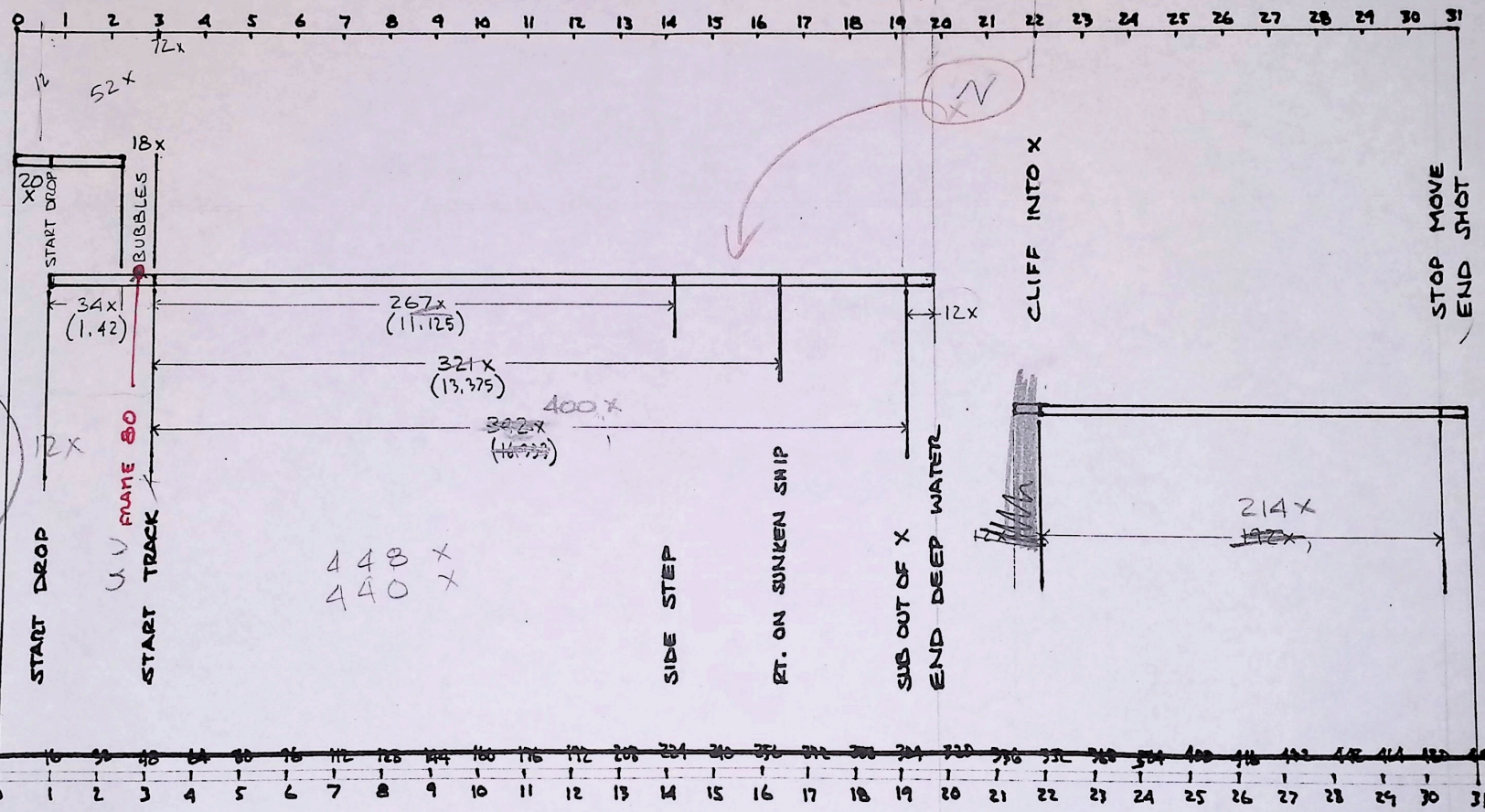
FLOATING CITY LAYOUT

31 SEC. = 744 X

42
6
48

View Cpt.
18x
Drop Comp
42x
Move F.
+6x

W



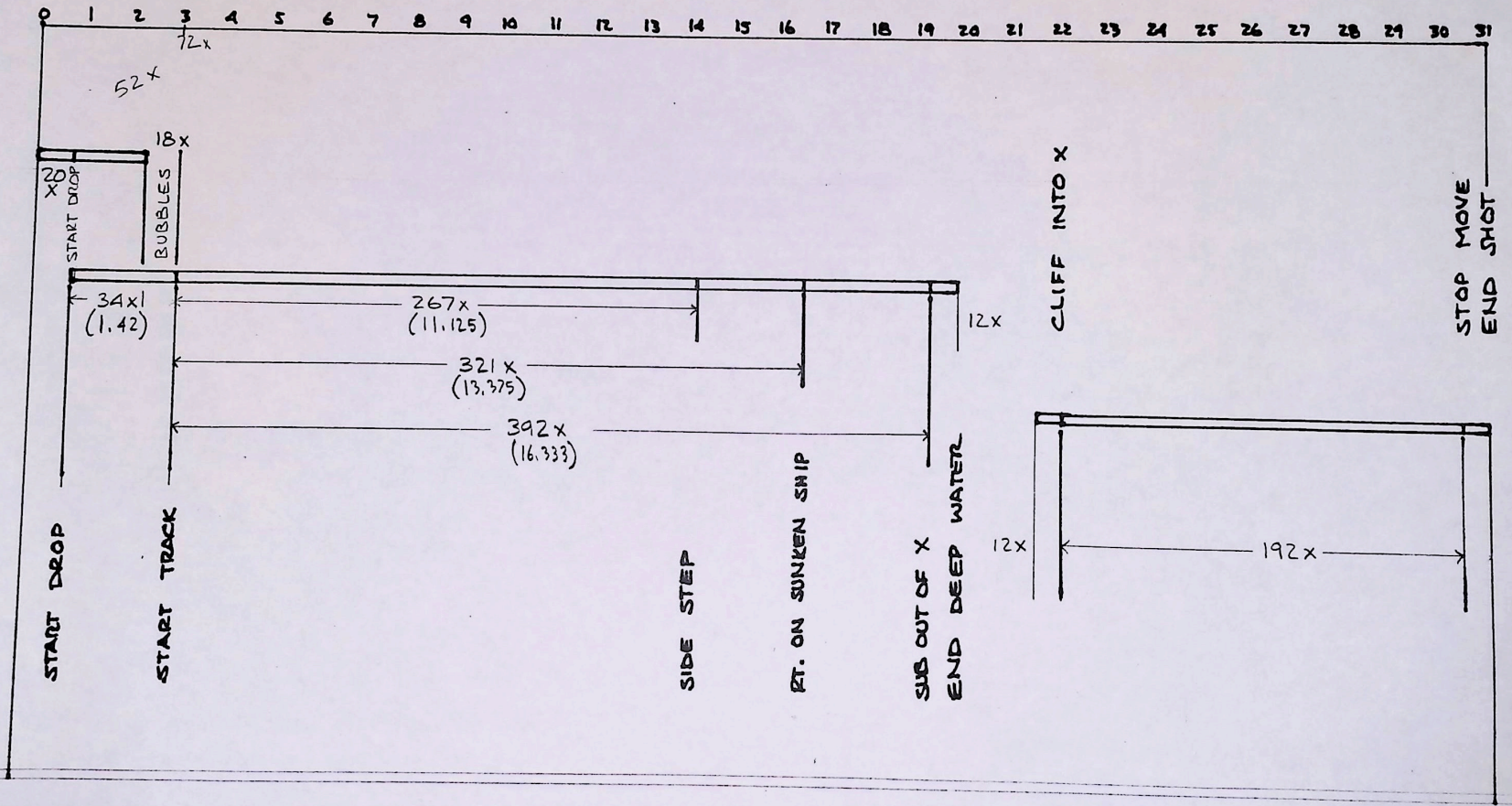
27-8 = 440 x
24-8 = 392 x

8

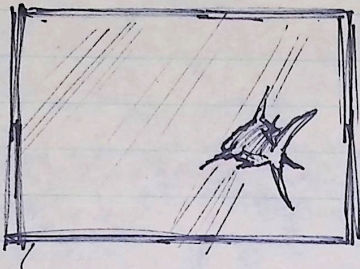
22

FLOATING CITY LAYOUT

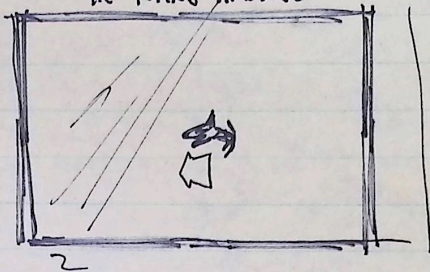
31 SEC. = 744 x



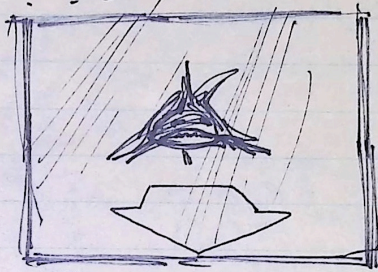
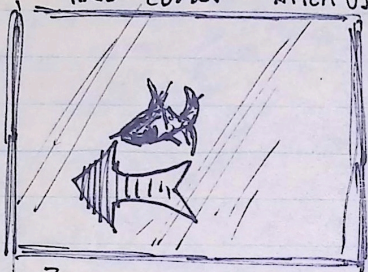
WE COME UPON A SHARK



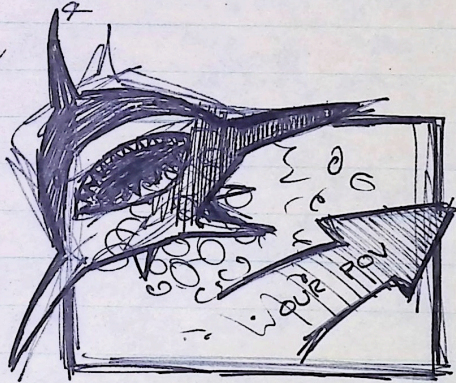
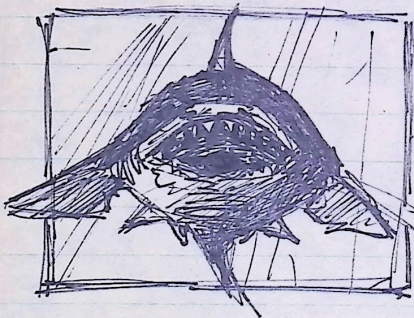
HE TURNS AROUND



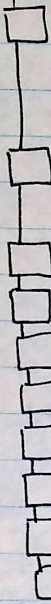
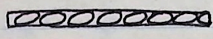
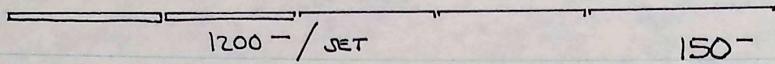
AND COMES AFTER US -



OPENS UP TO EAT US!



...OR KILLER WHALE OR GIANT SQUID
OR RUSSIAN SUB



CONSTRUCTION CREW

4 ~~MEN~~ MEN ~~4~~ 4 WKS.

10 HR DAYS @ $12 \frac{11}{12}$ / HR 666.05

FOAMING

2 WKS

@ 792.69 / WK

2 MEN

2 WKS

@ 600- / WK

COST OF FOAM - \$1800-

GUN RENTAL - \$125 / WK

OH.

EB.

CHICKEN WIRE 50-

ALUM. FOIL 50-

FOAMCORE 400-

WOOD @ 15- BUNDLE FOR 16 BUNDLES

~~256-~~

484.40

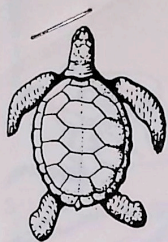
519.60

181.65

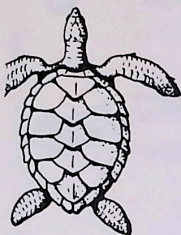
194.85

666.05

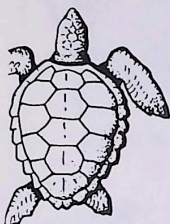
714.45



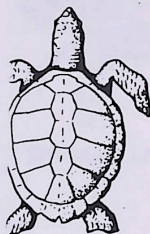
GREEN TURTLE



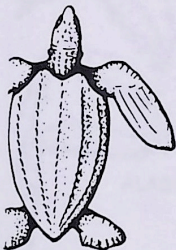
HAWKSBILL TURTLE



LOGGERHEAD TURTLE



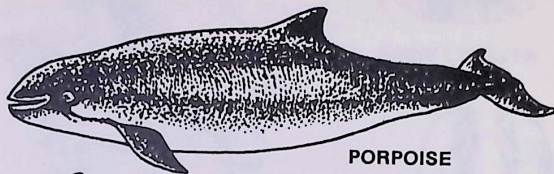
LEATHERBACK TURTLE



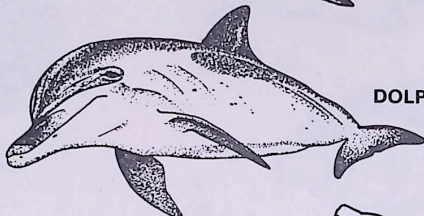
FLATBACK TURTLE



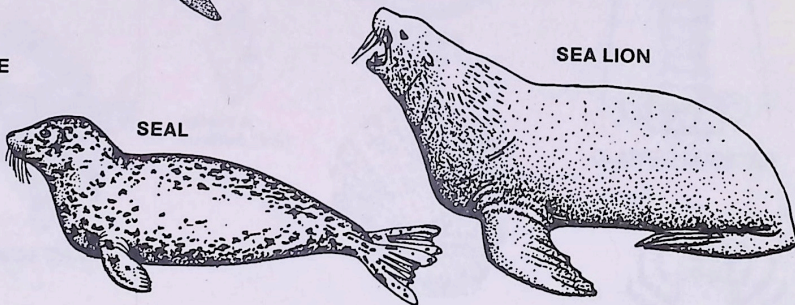
KILLER WHALE



PORPOISE

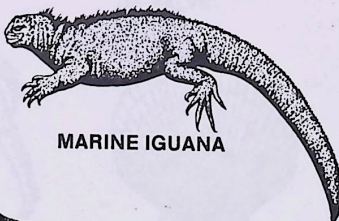


DOLPHIN

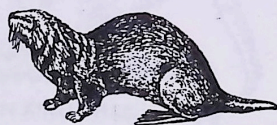


SEAL

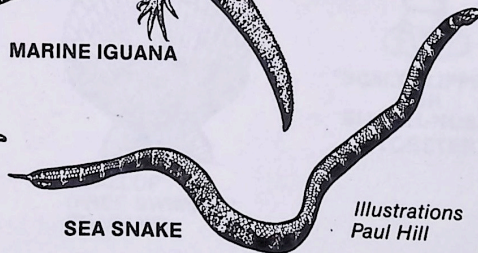
SEA LION



MARINE IGUANA

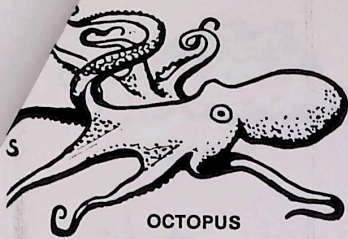


SEA OTTER

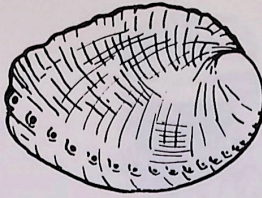


SEA SNAKE

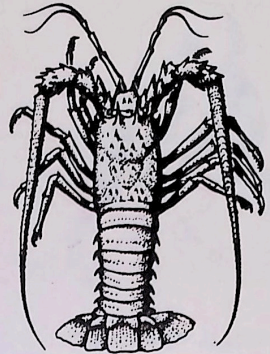
Illustrations
Paul Hill



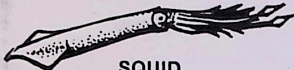
OCTOPUS



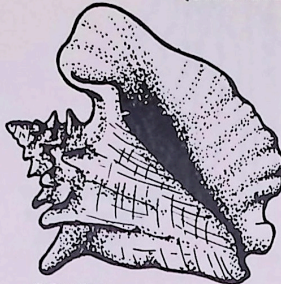
ABALONE
(UNIVALVE)



SPINY LOBSTER



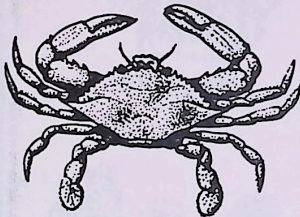
SQUID



CONCH
(UNIVALVE)



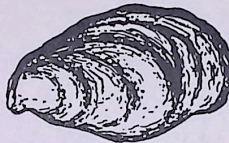
CANCER CRAB



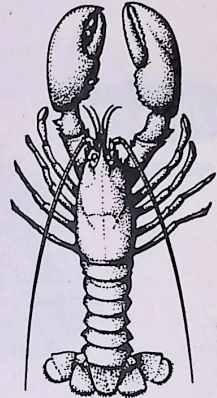
CHESAPEAKE BLUE CRAB



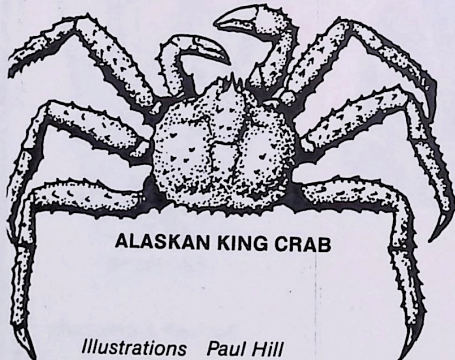
WHELK
(UNIVALVE)



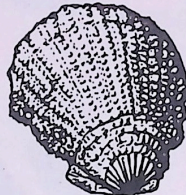
OYSTER
(BI-VALVE)



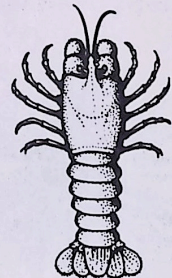
CLAWED LOBSTER



ALASKAN KING CRAB



ROCK SCALLOP
(BI-VALVE)



"SCALY SLIPPER"
OR
"SHOVEL-NOSED"
LOBSTER



SCALLOP
(FREE SWIMMING)
(BI-VALVE)

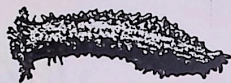
Illustrations Paul Hill



SEA HARE



NUDIBRANCH



SEA CUCUMBER



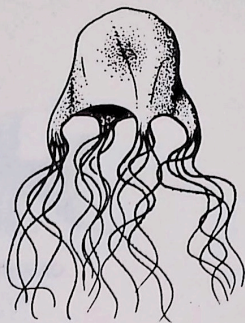
SEA ANEMONE



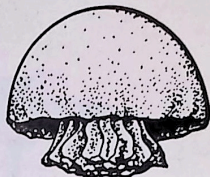
SPONGES



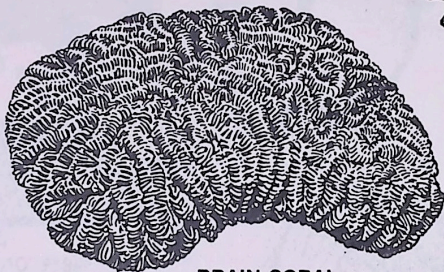
"PORTUGUESE
MAN O' WAR"
JELLYFISH



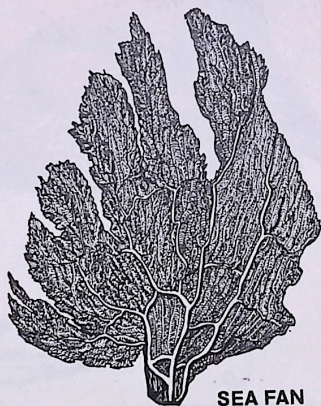
"SEA WASP" JELLYFISH



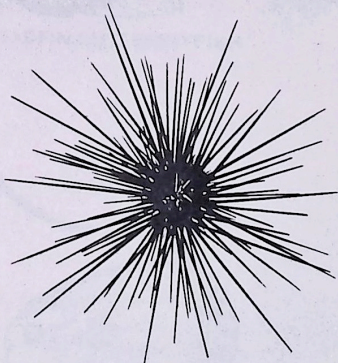
JELLYFISH



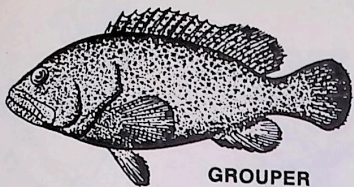
BRAIN CORAL



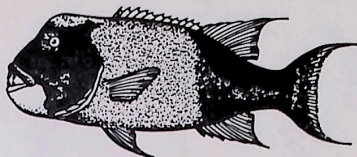
SEA FAN



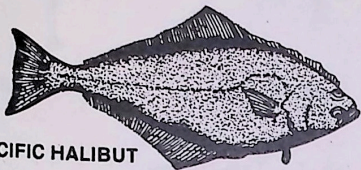
SHARP SPINED
SEA URCHIN



GROUPE



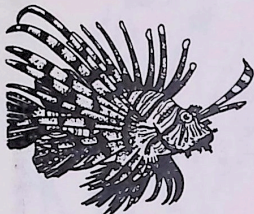
CALIFORNIA SHEEPHEAD



PACIFIC HALIBUT



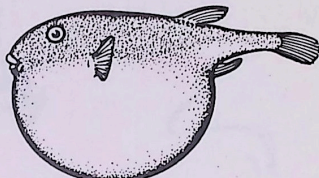
PUFFERFISH—DEFLATED



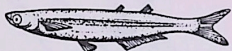
ONFISH OR ZEBRAFISH



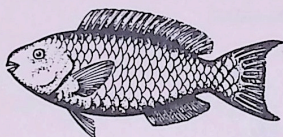
SCORPION FISH



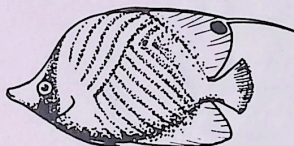
INFLATED



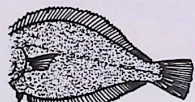
GRUNION



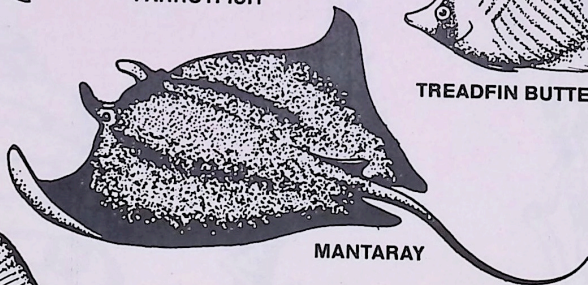
PARROTFISH



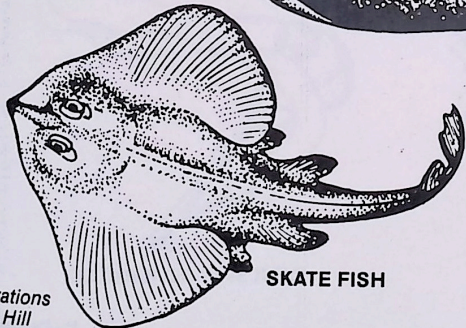
TREADFIN BUTTERFLYFISH



SANDDAB



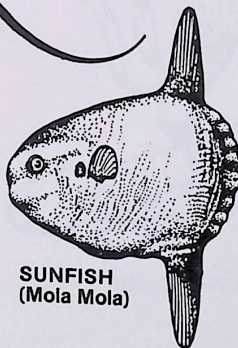
MANTARAY



SKATE FISH



SEAHORSE



SUNFISH
(Mola Mola)

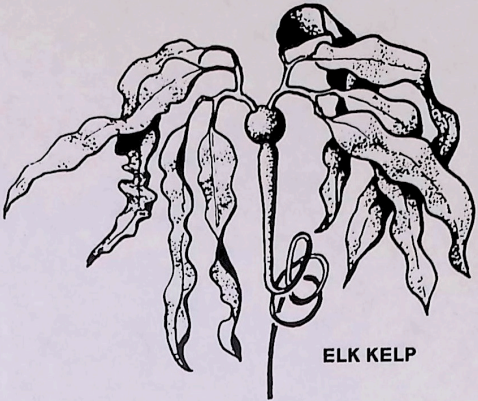
trations
il Hill



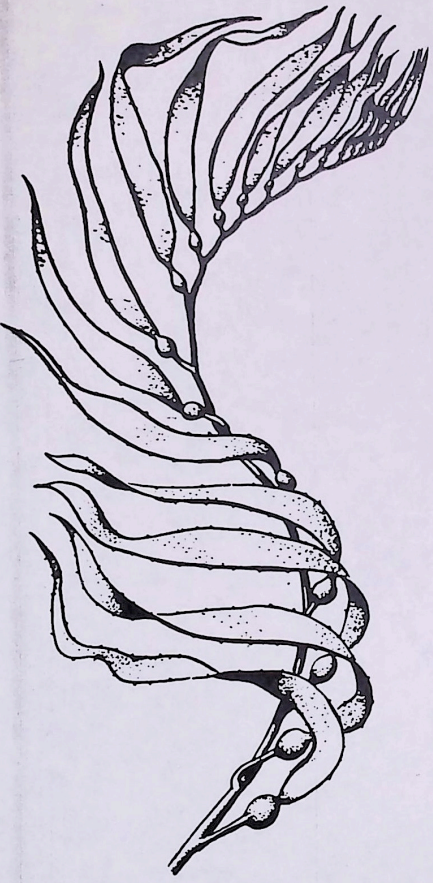
ROCKWEED



DULSE



ELK KELP



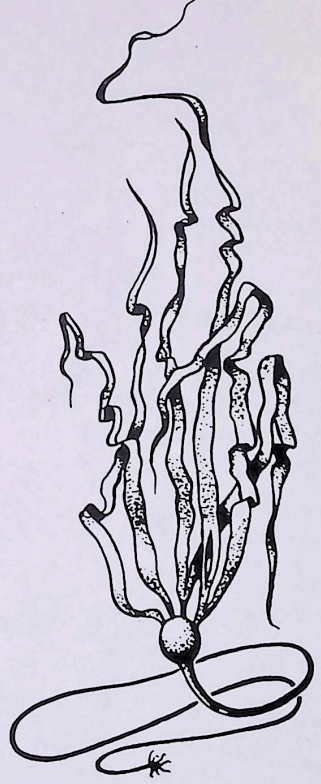
BLADDER OR VINE KELP



IRISH MOSS



SEA LETTUCE



SEA PUMPKIN

Illustrations
Paul Hill

MARINE VEGETATION

FOR THE OCEAN

✓ HOW MANY MOLDS?

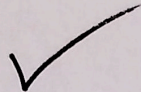
HOW MANY DIFFERENT FISH?

HOW MANY PLANTS? , & WHAT PLANTS?

HOW MANY OF EACH FISH DO YOU NEED?

HOW MANY PLANTS DO YOU NEED?

UNDERSEA (3)



I have:

8 finished dolphin (painted)

1 dolphin mold

about 10 finished tuna

1 tuna mold

1 tuna GANG mold (5)

~~1 1/2 fish mold~~

1 mold of 4 small fish

2 molds of large fish

1 mold of barracuda

1/2 mold of shark

1 custom made giant octopus

1 " " gruper

1 " " Mermaid

several " " fish of various size

9 different types of fish (was that your question?)

COAST 7:30 TOM & TREVOR

MON. AUG. 16, 82

JOHN NELSON & DOUG EISELSTROM
WILL BE HANDLING ~~FEATHER~~^{TDL} CONSTRUCTION
OF R.P. SURROUND FOR THE UNDER~~WATER~~
WATER R.P. SCREEN
KATHY WILL SET-UP MEETING

~~CALL PAT HARRISON - VAN DEER VEER'S~~
~~841-2572~~

TOM PIERCE - COSTUMES - W.E.D. (DISNEYLAND-4770)
• WET SUITS

GENE JOHNSON -

MCGINNIS IS HAVING THIS REDRAWN TO
WORK BETTER.

THE DIVING SUITS DONT HAVE TO BE
REAL WET-SUITS BUT CAN BE ANY
MATERIAL.

~~SHERREY - RANDY BRIGHTS HM. ADDRESS~~

GEORGE TRIMMER NEEDS MOUTH
PIECE SIZES FOR HELMET

5 PM 10-28-82

SET going BACK IN PLACE
FOR 2ND SLOT

NOTE: THIS IS AFTER THE
FLOATING CITY HAS BEEN
MODIFIED AND HUNG.



© Walt Disney Productions

Dave Jones

INVOICE

FERGUSON'S MARINE SPECIALTIES
 617 NORTH FRIES AVENUE • WILMINGTON, CALIFORNIA 90744
 PHONE (213) 835-0811

SOLD TO

SHIPPED TO

DISNEY STUDIOS

BURBANK, CA.

DATE	DATE SHIPPED	SHIPPED VIA	YOUR ORDER NO.	F.O.B.	TERMS	INVOICE NO.	
18-82	SAME	W/C				000318	
QUANTITY	DESCRIPTION					PRICE	AMOUNT
8	LACE CORAL					.75	6.00
6	BRANCH CORAL					2.00	12.00
50	BABY MUSHROOM CORAL					.20	10.00
30	BABY STAR FISH					.06	6.00
10	ROSE CORAL					1.00	10.00
						44.00	
TAX.							2.86
TOTAL							\$46.86

PAID

PD. CHK # 1239

THANK YOU

DUPLICATE

6/25

FLOATING CITY - NEED DESIGN OR
OR TO DESIGN OUR OWN
BASED ON CONCEPT

SEASCAPE ARRIVE DEPART - NEED FIRM OR TO
START.

WORKER/RECOVERY BEE (TO WORK AROUND SUNKEN
SHIP/LIFTEK AROUND
FLOATING CITY.)

SHUTTLE BUS - NEED DESIGN OR OR TO DESIGN
OUR OWN.

FISH

DIVERS - HOW MANY

BUBBLE TANK - NEED TUBE OR TUBE FACE
BUBBLE MAKER. - ETC.

VEGETATION - NEED P.O. # TO TAKE
DELIVERY ON FIRST BATCH
ORDERED FROM LOCAL
SUPPLIER

DRIVING MONEY - BOB, RAY, RICK, LESLIE

OUT 0 - 145 MAN & DOLPHIN ^{SUB} SURFACE
145 TO 170-5 NG.

* OK BEST 170-5 } OCEAN BOTTOM, MAN & DOLPHIN
TO
213-8 }

213-9 } DOLPHIN & MAN AT ^{SUB} SURFACE
TO
267-3 }

MAYBE 267-4 MAN & DOLPHIN ON SANDY BOTTOM
TO
336-15

336-15 } NG,
TO
359-10 }

* BETTER ~~OK~~ 359-11 MAN & DOLPHIN SANDY BOTTOM OK
TO & UP TO SURFACE
472-15 NICE ROLL-OVER

* BETTER 473-0 } MAN & DOLP W/ BOTTOM
TO
551-7 }

551-8 NG,
TO
551-~~5~~

Form RMWL

FOR HAND OR
TYPEWRITER USE
MAIL IN STANDARD
WINDOW ENVELOPE

REPL
MESSA

To

SHG/MURRAY

SUBJECT

Lab Dip Samples-Ord 45920 No 876

MESSAGE

Enclosed find lab dip samples for your order

Lab Samples as identified as "a"- "B"- C"

Kindly advise as soon as possible.

SIGNED

SIGNED

DATE

LAB DIP-"A"

LAB DIP-"B"

LAB DIP-"C"

SEND PARTS 1 AND 3 WITH CARBON INTACT. PINK COPY WILL BE RETURNED WITH REPLY.

Form RMWL

FOR HAND OR
TYPEWRITER USE
MAIL IN STANDARD
WINDOW ENVELOPE

REPLY
MESSAGE

SEND VIA
 Regular Mail
 Air Mail
 Special Delivery

To SHG/MURRAY


From DAZIAN'S
40 EAST 29th STR
NEW YORK, N. Y. 1
(Area Code 212) 686-

SUBJECT Lab Dip Samples-Ord 45920 No 8767 DATE 7/21/82 FOLL

MESSAGE Enclosed find lab dip samples for your ord # 45920-104" Desized-Flpd- Colo

Lab Samples as identified as "a"- "B"- C"

Kindly advise as soon as possible.

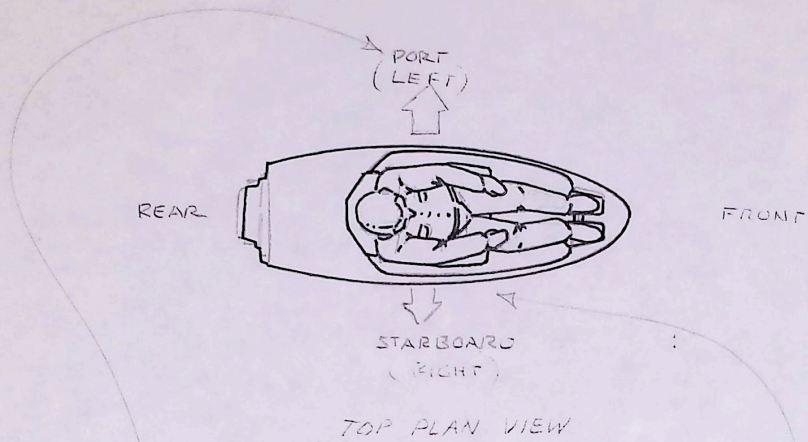
Murray 

SIGNED

SIGNED

DATE

SEND PARTS 1 AND 3 WITH CARBON INTACT. PINK COPY WILL BE RETURNED WITH REPLY.



12

STARBOARD

21

PORT



- RANDY BRUGAT
- DON HENDERSON
- DANIELLE VERUSE'

1ST HALF OCEAN SET

NOV. 1ST 82

CONSTRUCTION CREW

GANGBOSS 1 @ 714.45/WK x 4WK 2857.80
 FOREMEN 3 @ 666.05/WK x 4WK 7992.60

FOAMER 1 @ 714.45/WK x 3WK 2143.35
 CRAFT SERVICE 1 @ 600.00/WK x 3WK 1800.00

LABOR

14,793.75

FOAM COST 1800-

FOAM GUN RENTAL @ 125/WK x 3WK 375-

FOAM CORE 400-

WOOD 256-

ALUMINUM FOIL 50-

CHICKEN WIRE 50-

MATERIALS

2931.00

EMPLOYEE BENEFITS @ 28% ON \$14,793.75 = 4142.25

SUB TOTAL 21867-

OVERHEAD @ 25% ON \$21867 = 21833.75-
 29433.25

1ST OCEAN SET.

~~\$ 21,867~~
 \$ 29,958.75

HANDRAIL RENTAL @ 300/WK - 7 WKS 2100-

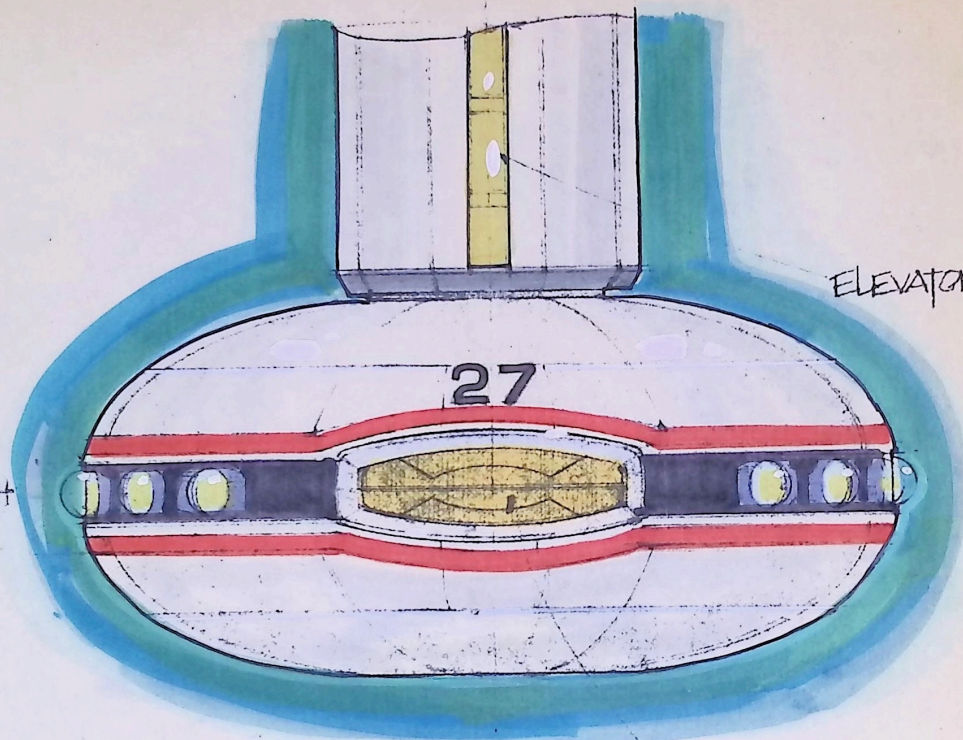
UTILITIES



10-
 25¢/DOLLAR = \$7,500-
~~1893.45~~

DOESNT INCLUDE PAINT & DETAIL
 SUPERVISOR TIME, MODEL TIME

35'-0"



ELEVATOR DUCT

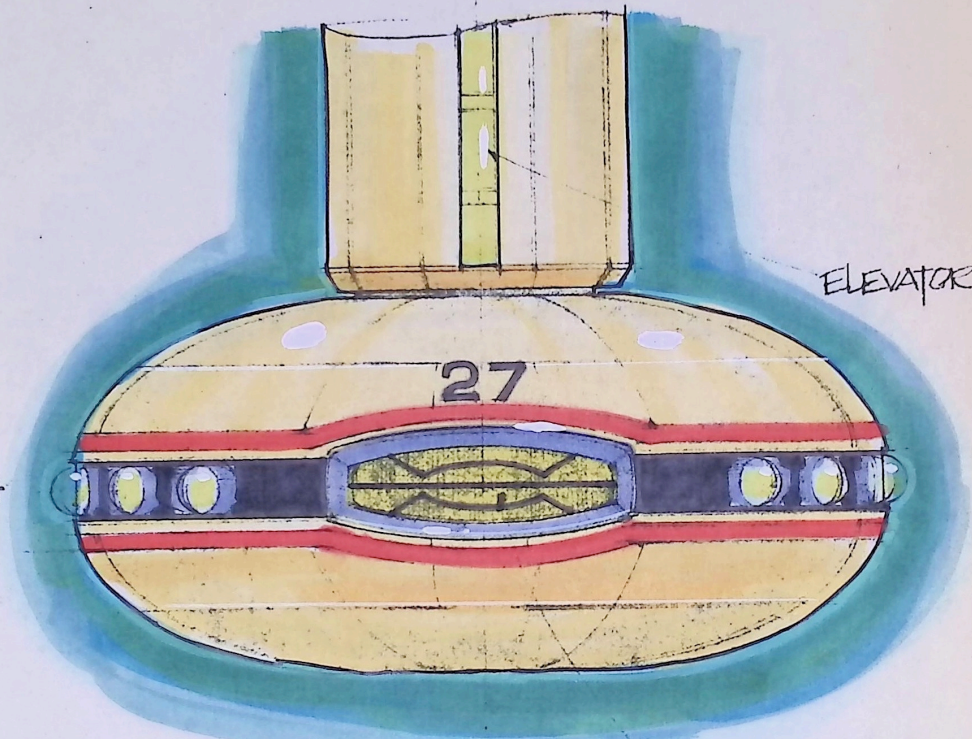
27

ELEVATION

SUB-LAUNCHING HATCH

color scheme 1.

35'-0"



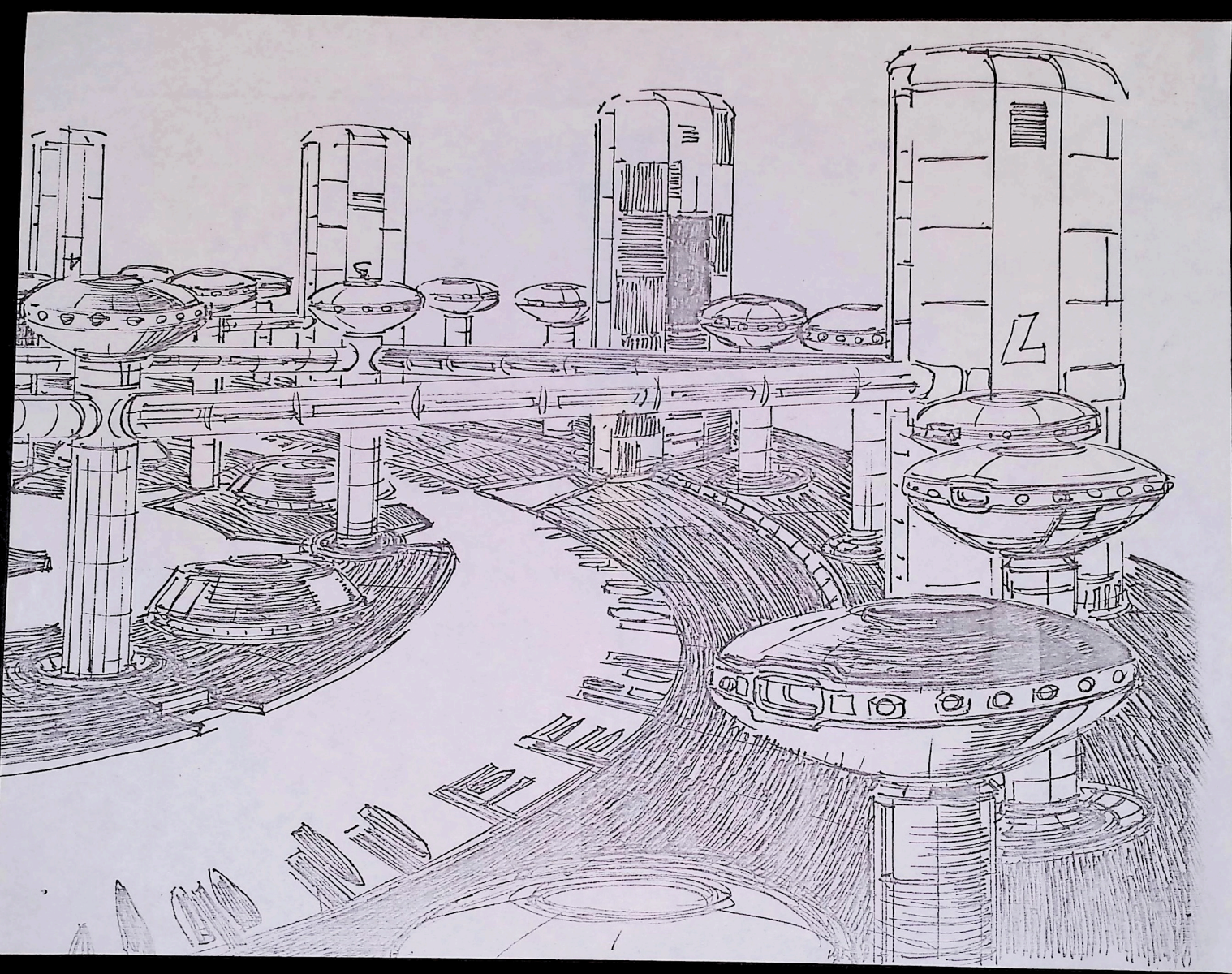
ELEVATOR DUCT

27

ELEVATION

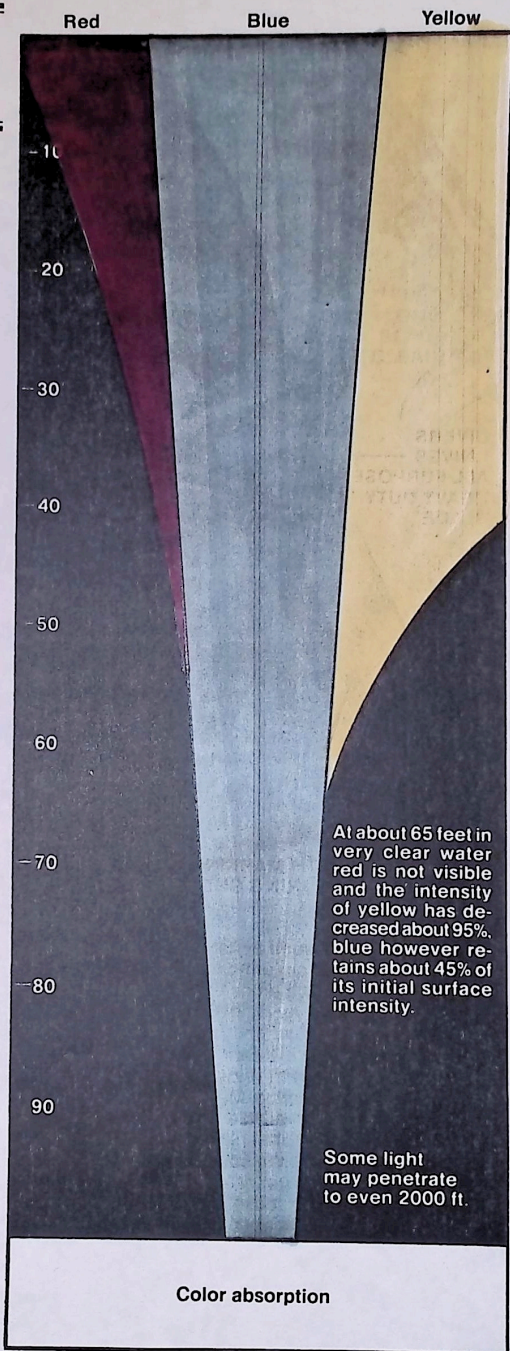
SUB. LAUNCHING HATCH

Color scheme 2



Part TWO SUPPLEMENT Technical Notes & Comments

1. At midday in clear water illumination from the surface is reduced to approximately 25 percent at 15 feet and 12 percent at 50 feet.⁶⁷ Surprisingly enough, however, some light even penetrates to depths of over 2000 feet!¹⁶
2. A little over 3 feet of distilled water absorbs 12 percent of the red but only 1 percent of the blue rays. Therefore at about 65 feet even in very clear water, red is not visible and the intensity of yellow has decreased by about 95 percent. At the same depth however, blue appears 40 to 50 percent of its initial surface intensity.²
3. As long as the sun is at least 48.6 degrees above the horizon, the loss due to reflection on calm water (flat surface) is only 2 percent. As this angle decreases between 45 and 20 degrees, the loss increases to about 13 percent; at 10 degrees, 35 percent of the sunlight is reflected?
4. Refraction occurs because light travels at different velocities in different mediums (e.g. air and water). A light ray entering water at any angle other than 90 degrees, slows down and is refracted toward an imaginary line perpendicular to the surface. The degree of refraction is directly related to the speed of light in the new medium. The ratio of the velocity of light in a vacuum to the velocity of light in sea water determines the refractive index of seawater (i.e. $\frac{186,282 \text{ miles/sec}}{138,842 \text{ miles/sec}} = 1.34$). The cornea of the eye has a refractive index similar to that of water; but air does not. Underwater light entering the eye is not bent sufficiently to project a clear image on the retina; the "image" is formed more than 1 inch behind the retina.⁶⁴ By placing a pocket of air (i.e. a mask) between the water and the eye, the light is refracted twice—once when it enters the air and again as it enters the eye; a clear image is now focused on the retina. Due to this imperfect correction, however, objects appear about 25 percent closer and, as a result, the retinal image is larger. Objects now may appear more than 25 percent larger because of the larger than normal retinal image. In reality the visual distortions caused by the mask vary considerably with the viewing distance and are not as clear-cut as stated above. For example, at distances of less than 4 feet, objects appear closer than they actually are. However, over estimation occurs at distances greater than 4 feet, and this error increases in turbid water.⁵⁶ Other perceptual distortions are also apparent. Stationary objects appear to move when the head is turned from side to side.³³
5. A snorkel or a tube of longer length will not permit breathing underwater because the muscles of respiration cannot work against the force of the water. In only 4 feet, the water pressure on your chest is less than 2 psi. (For every foot of depth the pressure increases by approximately 0.444 psi;



REMEMBER 30 FPS VIDEO

HARRIS VIDEO SYSTEMS, INC.

NON-DROP FRAME

#	RL#	AV	SOURCE IN	DURATION SOURCE OUT	RECORD IN	RECORD OUT	TRNS	WIPE	PTN	PS	KEY	
012	BLK	1V	00:00:00:00	00:00:08:17	00:02:01:13	00:02:10:00						USED 60 FILM FRAME DROP
FLOATING CITY 1B												
013	BLK	1V	00:00:00:00	00:00:01:13 00:00	00:02:10:00	00:02:10:00						ROI
LAUNCH BAY SUB ROOM - 1A HELD FOR DURATION OF 1B												
014	BLK	1V	00:00:00:00	00:00:01:13	00:02:10:00	00:02:11:13						
LAUNCH BAY SUB ROOM - CONTINUING TO WIPE TO SC 2												
015	BLK	1V	00:00:00:00	00:00:00:19	00:02:11:13	00:02:12:02						R 09 RO8
SC 2 AT 24 FPS												
016	BLK	1V	00:00:00:00	00:00:14:27	00:02:12:02	00:02:26:29	<u>D012</u>					DISSOLVE
TO WIP TO WIP 5 TIPS TRANSITION												
SC 2L AT 30 FPS												
017	BLK	1V	00:00:00:00	00:00:05:05	00:02:26:29	00:02:32:04	<u>D010</u>					DISSOLVE
SC 3 - DOCKING												
018	BLK	1V	00:00:00:00	00:00:08:26	00:02:32:04	00:02:41:00						
019	BLK	1V	00:00:00:00	00:00:10:00	00:02:41:00	00:02:51:00						

ADDITIONAL HORIZONS FILM ELEMENTS

* OF MY CONCERN

"UNDERSEA INDUSTRY" SC. 23

AS OF DEC 1, 1981

UNDERWATER SCENE, JUST AFTER AQUA RESTAURANT.

TO BE R.P. ON A 20X16 FOOT SCREEN 15 FEET

FROM AUDIENCE. IT WILL BE IN VIEWING RANGE

FOR 13.3 SECONDS. IT SHOULD REPRESENT 50 TO

80 FEET UNDER WATER. WITH MINIATURE FLOOR

WALKER-SUBS AND RECREATIONAL SUBS. ALSO PEOPLE

AND POSSIBLY FISH. SURFACE WILL BE IN DISTANCE.

INFO WILL BE AVAILABLE FROM PAUL HUDSON'S DWGS.

~~DEC. 1, 1981~~

- THURS. DEC 3, 81 - PAUL HUDSON ASKED IF WE COULD HAVE SMALL SUBS DROPPING OUT OF LAUNCH TUBES OFF IN THE DISTANCE. CHECK THIS WITH GEORGE & TOM,

SHOOT FOR 15 SECONDS?
LOOP

Seaweed power

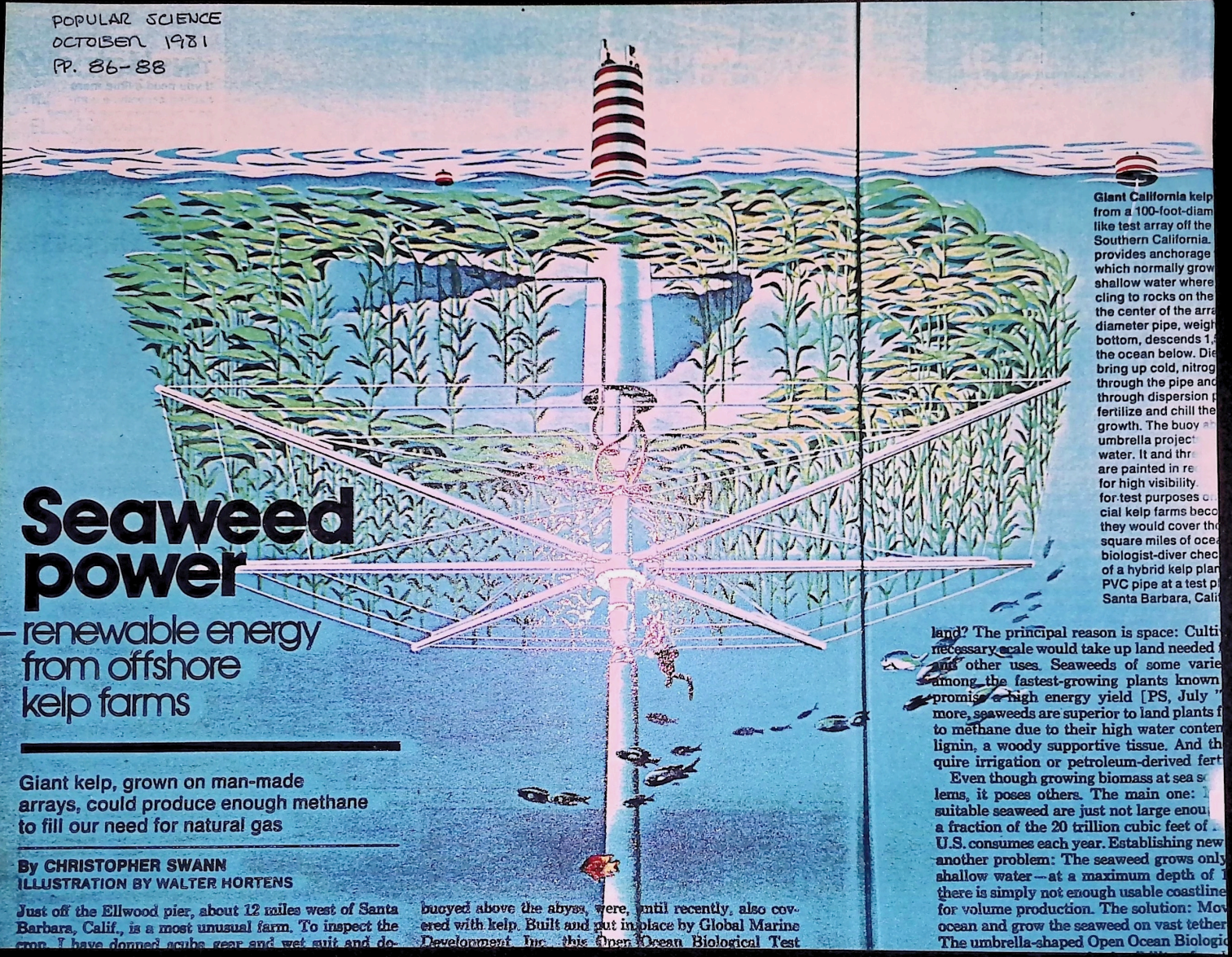
— renewable energy from offshore kelp farms

Giant kelp, grown on man-made arrays, could produce enough methane to fill our need for natural gas

By CHRISTOPHER SWANN
ILLUSTRATION BY WALTER HORTENS

Just off the Ellwood pier, about 12 miles west of Santa Barbara, Calif., is a most unusual farm. To inspect the crop, I have donned scuba gear and wet suit and de-

bucyed above the abyss, where, until recently, also covered with kelp. Built and put in place by Global Marine Development, Inc., this Open Ocean Biological Test



Giant California kelp from a 100-foot-diam like test array off the Southern California. provides anchorage which normally grow shallow water where cling to rocks on the the center of the array diameter pipe, weigh bottom, descends 1, the ocean below. Dis bring up cold, nitro through the pipe and through dispersion p fertilize and chill the growth. The buoy an umbrella project water. It and thre are painted in red for high visibility. for test purposes ocial kelp farms beco they would cover the square miles of oce biologist-diver chec of a hybrid kelp plan PVC pipe at a test p Santa Barbara, Cali

land? The principal reason is space: Cultiv necessary scale would take up land needed and other uses. Seaweeds of some varie among the fastest-growing plants known, promise a high energy yield [PS, July 7] more, seaweeds are superior to land plants f to methane due to their high water conten lignin, a woody supportive tissue. And th require irrigation or petroleum-derived fert

Even though growing biomass at sea s tems, it poses others. The main one: M suitable seaweed are just not large enou a fraction of the 20 trillion cubic feet of U.S. consumes each year. Establishing new another problem: The seaweed grows only shallow water—at a maximum depth of 1 there is simply not enough usable coastline for volume production. The solution: Mov ocean and grow the seaweed on vast teth The umbrella-shaped Open Ocean Biologic

OCEAN CITY.

MARCH 16, 82

IF THE BOARDS THAT GEORGE GAVE ME ARE ACCURATE, I MIGHT NOT HAVE TO BUILD MORE THAN 100 FEET OF MINIATURE FOR THE UNDER WATER SEQUENCE.

THIS MIGHT MAKE IT SO THAT I COULD BUILD IT ON THE FLOOR AND SHOOT IT IN ONE LONG TAKE.


MARCH 31, 82

RE: SUNKEN SHIP

KIT KRAFT (984-0780) CARRIES A LARGE WOOD PLANK MODEL OF THE GOLDEN HIND BY BILLINGS THAT WOULD SEEM IDEAL FOR USE AS THE SUNKEN SHIP. THE HULL AND SOME EXTRA INTERNAL DECKING, WOULD BE BUILT THEN DREMELLED OPEN TO LOOK LIKE AN OLD SHIP WRECK. IT WOULD BE QUITE AGED BUT NOT AS BAD AS IN REAL LIFE SO THAT IT WOULD BE A LITTLE EASIER TO RECOGNIZE AND A LITTLE MORE ROMANTIC TOO. THE KIT RUNS ABOUT \$90⁰⁰ AND I FIGURE 1 MAN 3 TO 4 WKS TO BUILD IT.

\$5017.60 INCL. E.B. & O.H.

IT IS ABOUT 39" LONG AND LOOKS LIKE $\frac{1}{50}$ TH SCALE.



FRIDAY

CALL SECRETARY

SET UP FOR HANGER TUES. VISIT

DWGS. FROM GIL

DWGS FROM SHIM

BOOK THRU LIBRARY

• STEVE MILIOTIO

STEVE

CORAL PIECES

RICHARD RUSH STUDIOS
168 N. CLINTON ST
CHICAGO, ILLINOIS 60606

• RICHARD

(312) 263-2928

STAG HORN

ELK HORN

SPUNGES

GORGONIAN SEA FANS

APRIL 27, 1982

UNDERWATER - MAJOR STUMBLING BLOCKS

- CONCEALING THE OVERHEAD PRODUCTION LIGHTING - IM HOPING THAT THE FOG WILL BLANK OUT THE SOURCE LIGHT EFFECT BUT I PROBABLY HAVE TO TURN THE LIGHTS ON AS WE PASS UNDER THEM SO THAT THEY ARE OFF WHEN IN THE CAMERA'S FIELD OF VIEW.
- HOW TO SUPPORT THE FLOATING CITY. WHEN THE CAMERA GANTRY SWINGS OVER OR UNDER IT. THERE IS A POSSIBILITY THAT I MIGHT SHOOT THE FLOATING CITY STRUCTURE ON A SECOND PASS AND MATTE IT IN. A LESSER POSSIBILITY OF DOING A SPLIT SCREEN.
- HOW TO GET AN OVERHEAD RIPPLE LIGHT EFFECT FROM THE SURFACE. ROTATING, REVERSE COLOCATIONS.
- HAVE THE EFFECT OF OUR "HEADLIGHTS" BRINGING THE TRUE COLOR TO CLOSE-UP OBJECTS. PAINT TO BE ALMOST NORMAL COLORS. LIGHT OVERALL WITH BLUE-GREEN - THEN HAVE WHITE FOCUSED HEADLIGHTS MOUNTED ON THE CAMERA.

fish-net balloons, which were now filled with clusters of seaweed and great quantities of shellfish, such as shrimp and lobster.

Off to the left, other divers were using their sharply pointed poles to dig more shellfish out of the coral. Ned Land and Conseil were with this group.

Suddenly Ned threw down his pole and scrambled up on a nearby coral ledge. He peered beyond it, then motioned wildly for Conseil to join him.

to get too far from the others. But Ned grabbed his arm and practically forced him down the other side of the ledge and across the sand.

Captain Nemo saw the two men moving away in the direction of the wreck.

But Aronnax, a few steps behind Nemo, did not see them. He was watching a great hermit crab burrowing deeper into the ocean's sandy floor.

In a very few moments, Ned and Conseil reached the galleon. The ship lay deep



THE POSSIBLE RATE OF DISINTEGRATION OF THE WRECK

← swell, wind and current

CANNONS

CARGO
BALLAST

at time of wreck

20 years

50 years

80 years

100 years

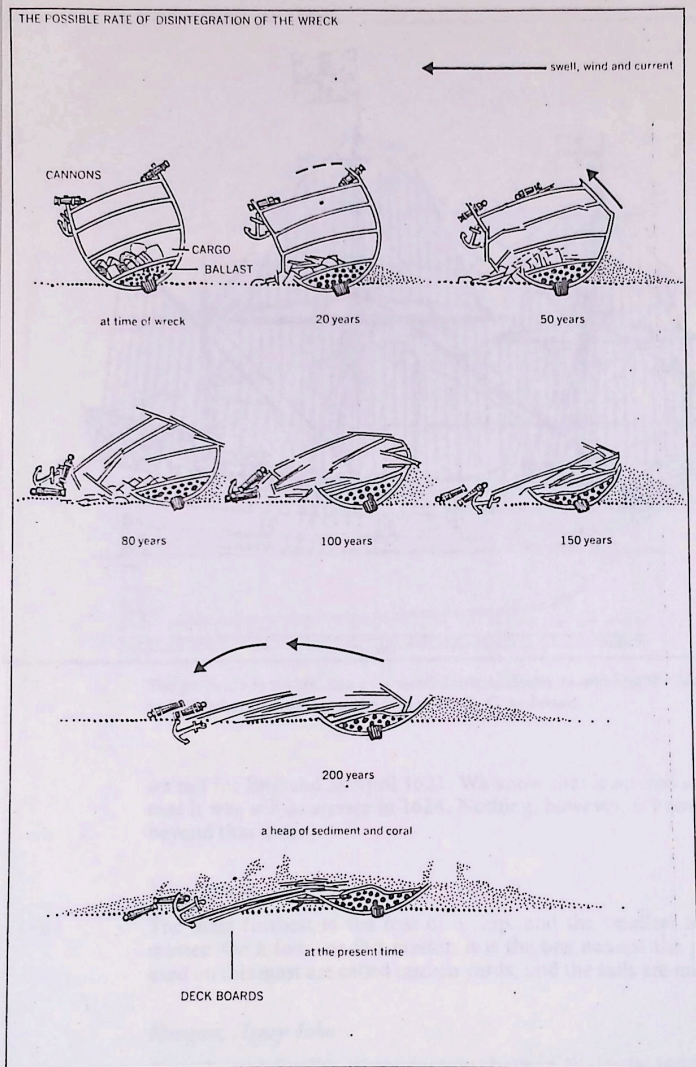
150 years

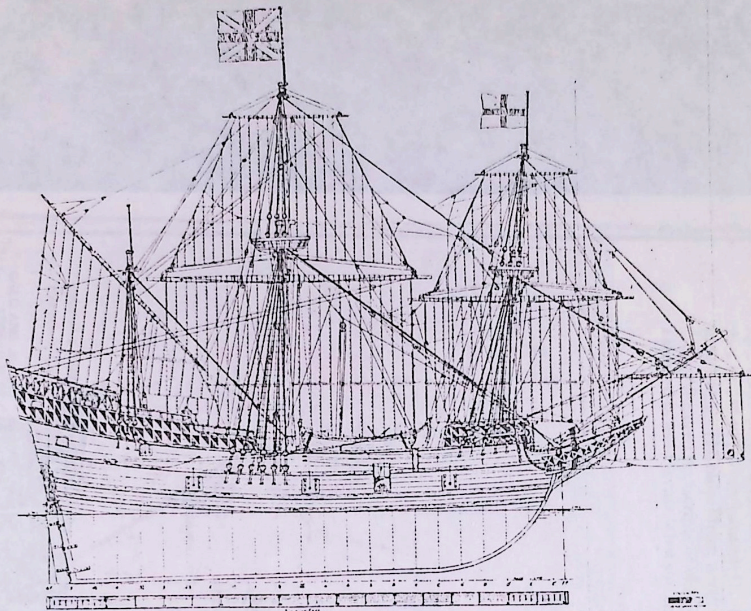
200 years

a heap of sediment and coral

at the present time

DECK BOARDS





The probable reconstruction of a merchantman, closely resembling the *Mayflower*. Drawing by L. Pritchard, according to the plan of Dr. R. C. Anderson.

set sail for England in April 1621. We know that it arrived safely there, and that it was still in service in 1624. Nothing, however, is known of its history beyond that date.

Mizzenmast

The mast furthest to the rear of a ship, and the smallest mast on a three-master. On a four- or five-master, it is the one nearest the poop. The yards used on this mast are called mizzen yards; and the sails are mizzen sails.

Morgan, Henry John

A celebrated English pirate captain, born in Wales in 1637. He died at Jamaica in 1690.

in respect to 1701. He was lost on the 31st day of July in company of the Galleons and the Flota, and he was lost on Wednesday the 31st, at two o'clock in the morning, because of a hurricane which came on from the east-northeast so strongly that although he has sailed the seas for many years and suffered through many tempests he has never seen another like it for violence, and his ship and all the rest were lost, some before and some after Palmar de Ays, at 28° 10' [North Latitude] . . . in an area nine leagues [27 miles] from north to south."

As I fingered transcripts of old documents, I seemed to feel Havana's hot sun on my back.

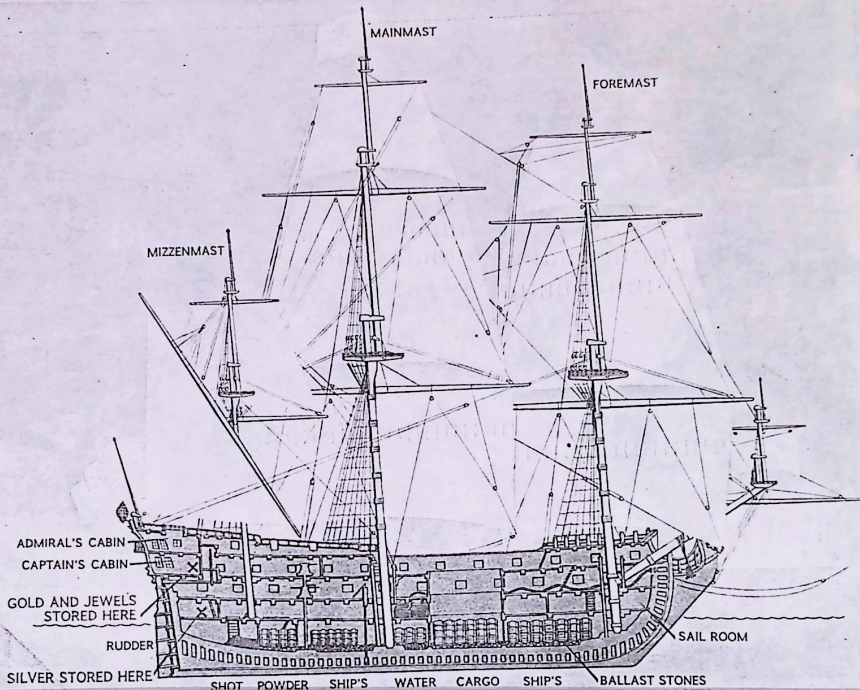
braced round. The combined fleet of Gen. Don Juan Esteban de Ubilla and Gen. Don Antonio de Echeverz is under way.

A handsome sight, these 11 vessels, as they heel to the wind in the pull of the deep blue Gulf Stream. The high-pooped vessels roll up past the Keys under a cloudless sky.

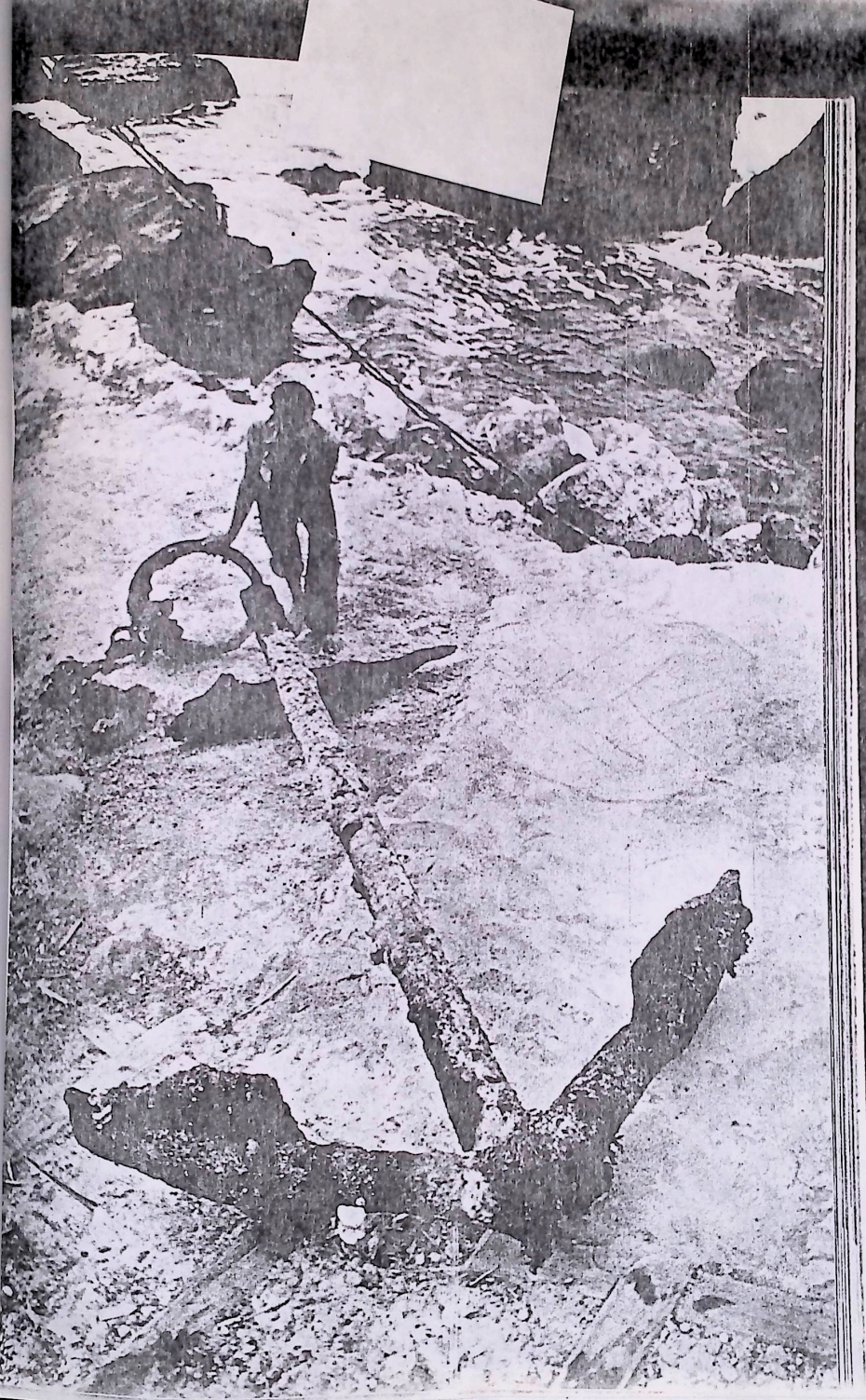
Monday, July 29. Seamen look distrustfully at the sky. The sun still shines, but there is a slight haze. The heavy galleons roll in the long swell of a glassy sea. Under their lee are the sharp-toothed reefs and treacherous shoals of the low Florida coast.

Tuesday, July 30. By noon the wind dies.

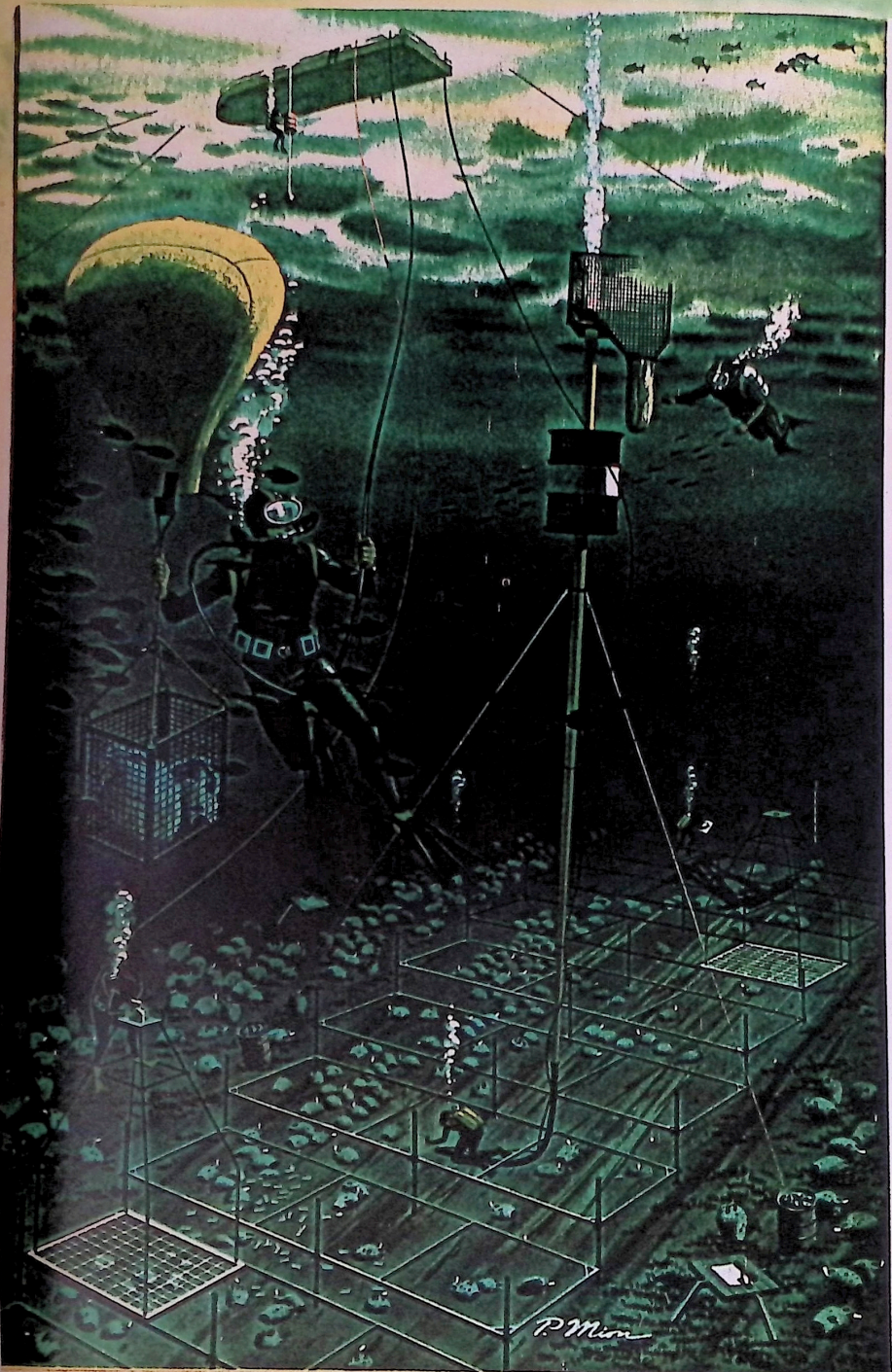
PAINTING BY ROBERT W. NICHOLSON, NATIONAL GEOGRAPHIC ARTIST © NATIONAL GEOGRAPHIC SOCIETY



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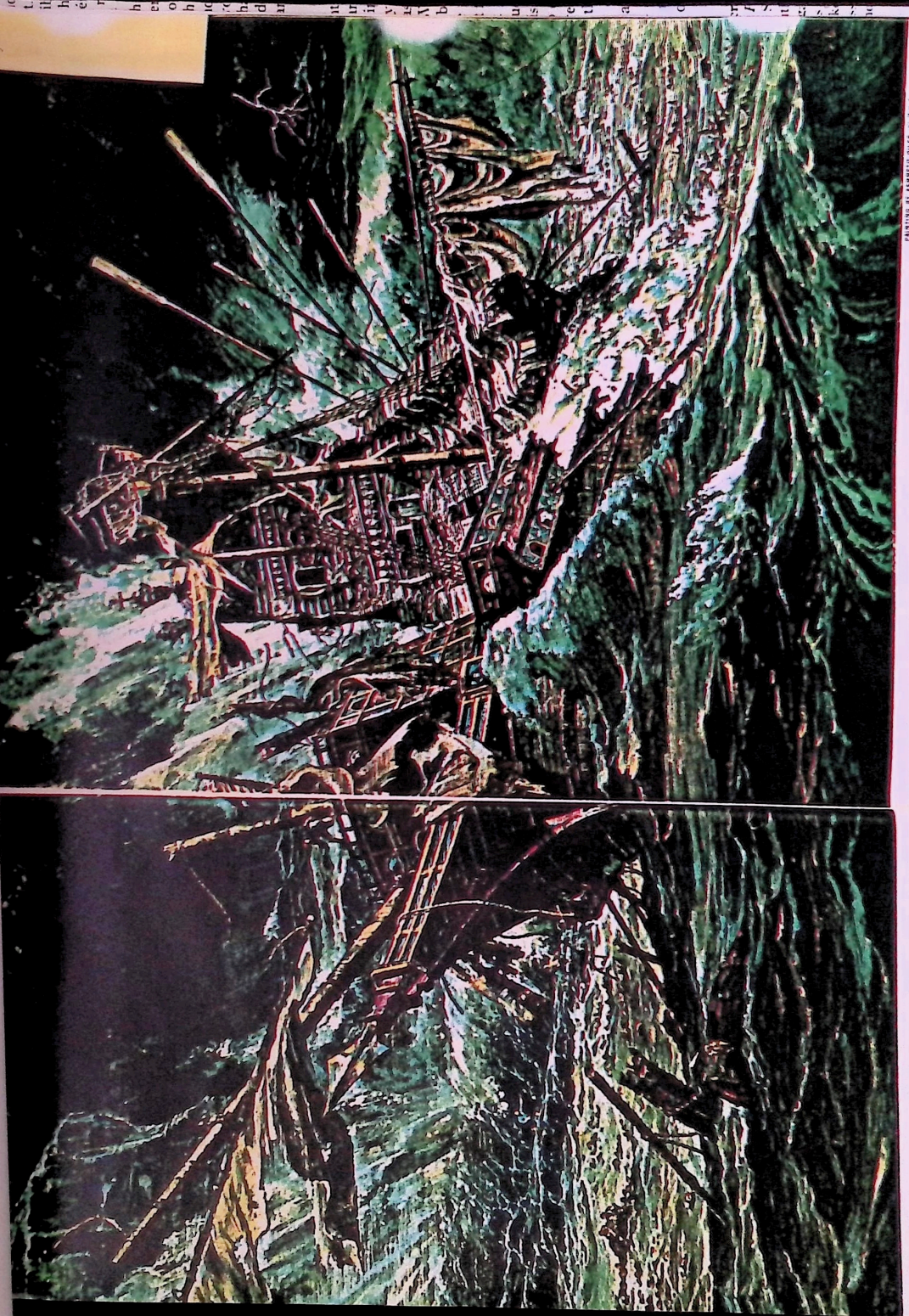
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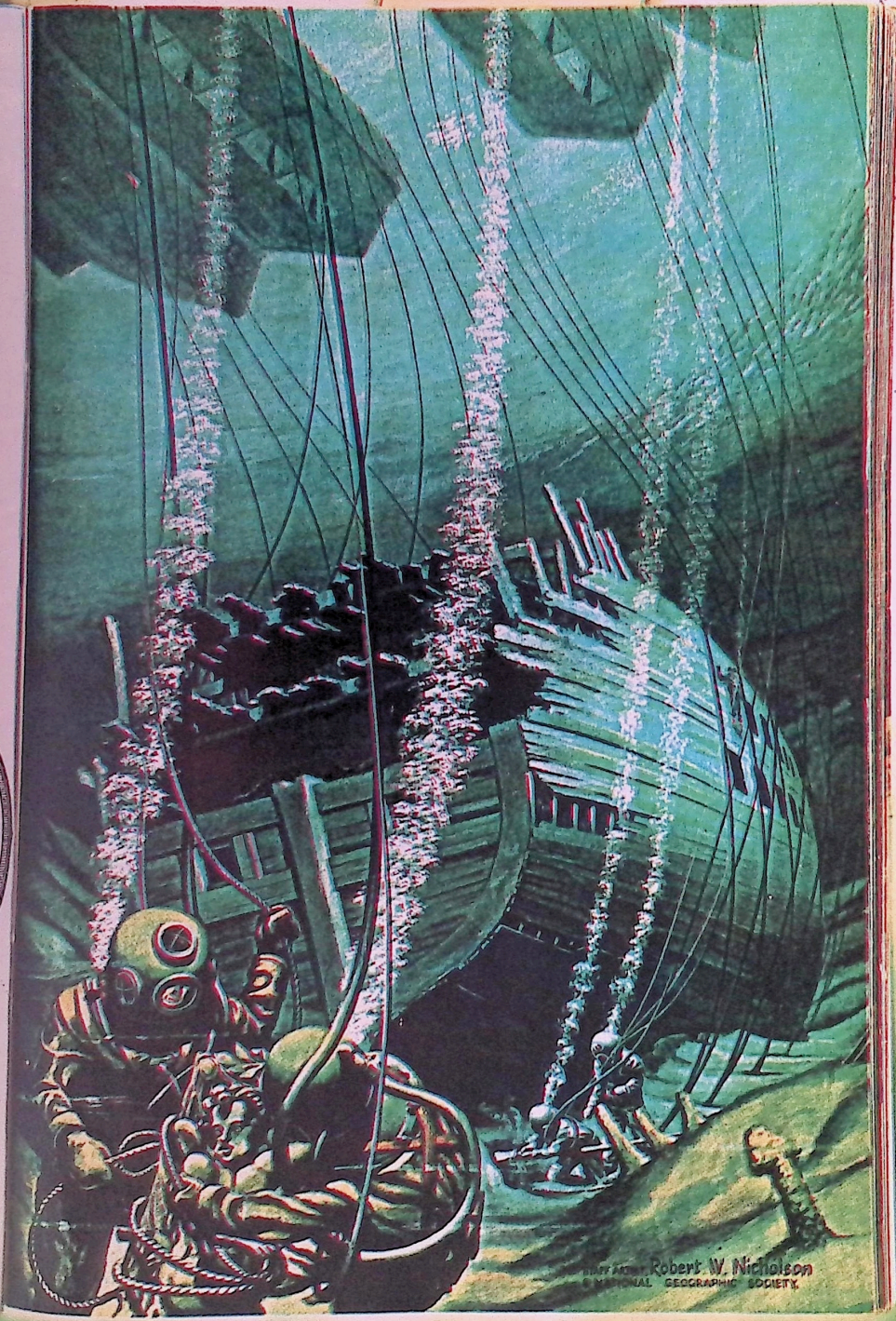
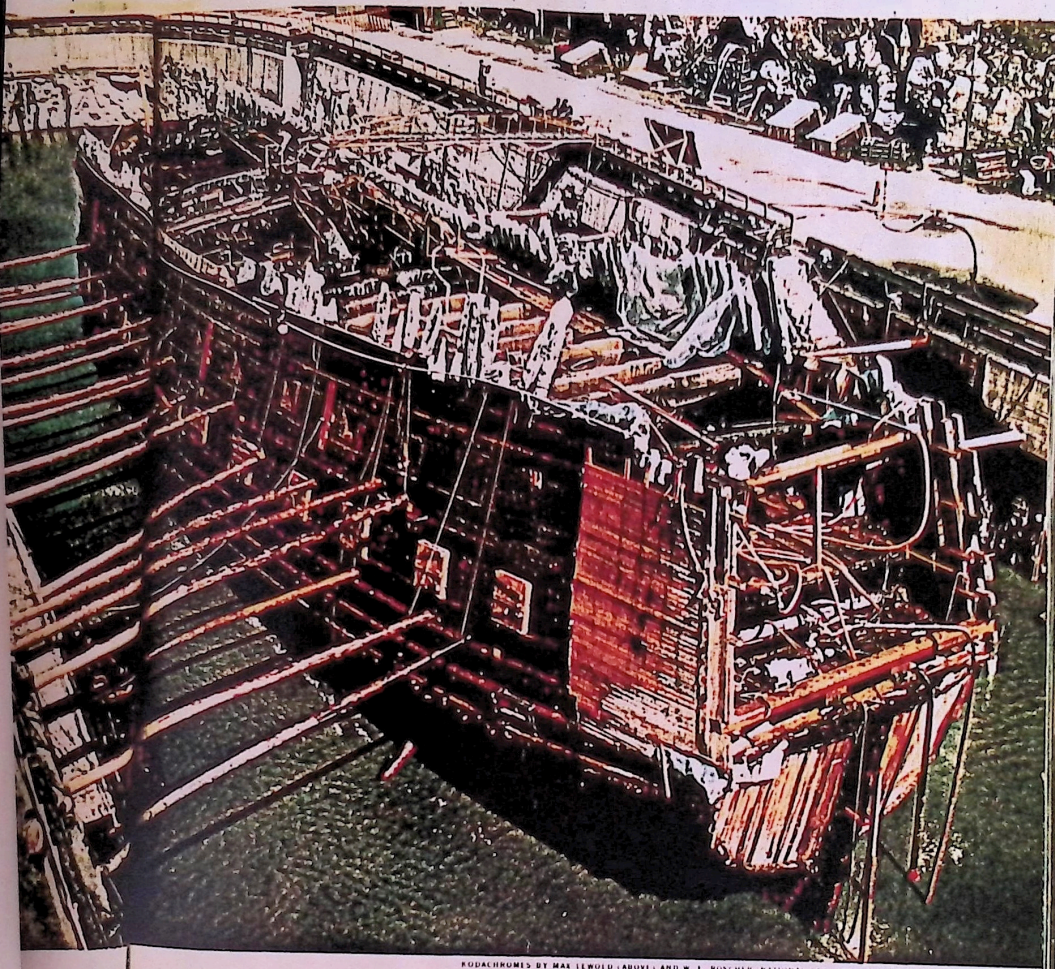


Illustration by Robert W. Nicholson
© NATIONAL GEOGRAPHIC SOCIETY



KODACHROMES BY MAX LEWOLD (ABOVE) AND W. I. ROSSNER, NATIONAL GEOGRAPHIC STAFF. C. N.G.S.

Divers brought the first guns to the surface in April, 1664. Some of the guns from the deck beneath were then recovered by fishing them out through the gunports.

Official Report Furnishes Vital Clue

Von Treileben and Peckell salvaged more than 50 cannon before departing. Then, for almost three centuries, *Vasa* rested in her grave, virtually forgotten by all but a few historians. Eventually even the exact location of the ship was forgotten.

By 1954, however, I had amassed a huge amount of research data and was ready for an all-out attack. Using borrowed and hired

motorboats, I began a systematic sweep of the bottom with grapnels and wire drags. Crews aboard harbor craft became accustomed to the sight of a lonely figure engaged in a strange kind of fishing. They laughed when I brought up old bedsteads, tires, stoves, Christmas trees, and the like.

Poring over a contour map of the bottom, drawn for engineers who planned a bridge across the harbor, I noticed that echo-sounding gear had traced a large hump 300 feet south of the navy's Gustaf V Dry Dock on Beckholmen. The engineers told me that the mound no doubt was debris from the dry dock, blasted out of solid rock years before.

...appointed him *adelantado* (com-
mander) of Florida, and told him to drive the

...meet was still with him. A special disaster was
the disappearance of his supply ship. He had
started with 1,000 soldiers and settlers; now
he had 600.

St. Augustine, the nearest suitable har-
bor. But he knew Ribault would not
be far behind. The enemy he had come
so far to demolish now threatened to
demolish him.

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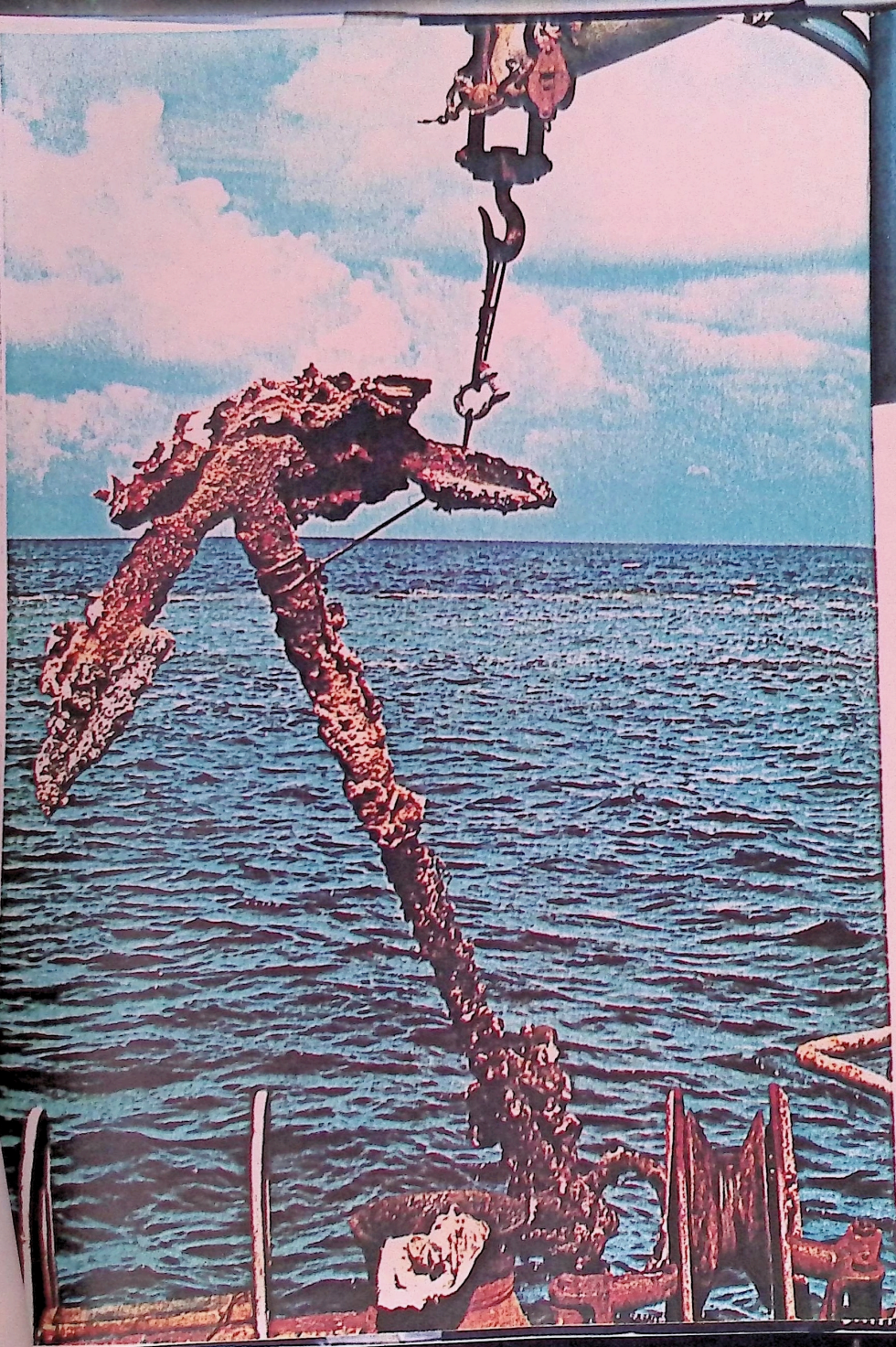
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