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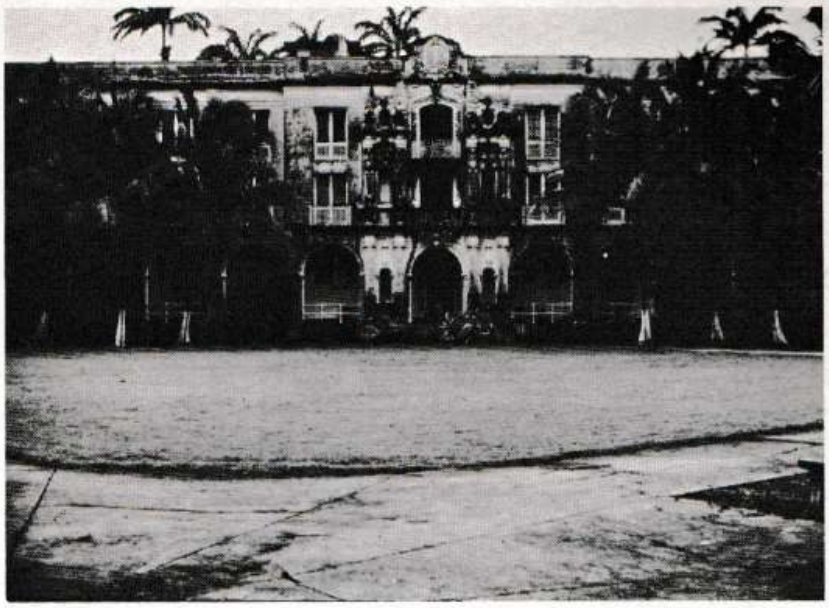
contents

cover photograph

Henry Kalb came across these beautiful Anti-TB Seals from Mexico, and thought that Journal readers would enjoy seeing them. Mr. Kalb says that the TB Seals come in sheets of 50 stamps showing 50 different fish in full color, and are priced at 40¢ per sheet, plus 10¢ mailing and handling charge for each three sheets or portions thereof; and 15¢ for flat mailing. If interested, write Dr. A. W. Bork, Latin American Institute, Southern Illinois University, Carbondale, Illinois.



Further Peruvian piscatorial adventures
by the author and his intrepid companions

Coffee, Tea or Milk?

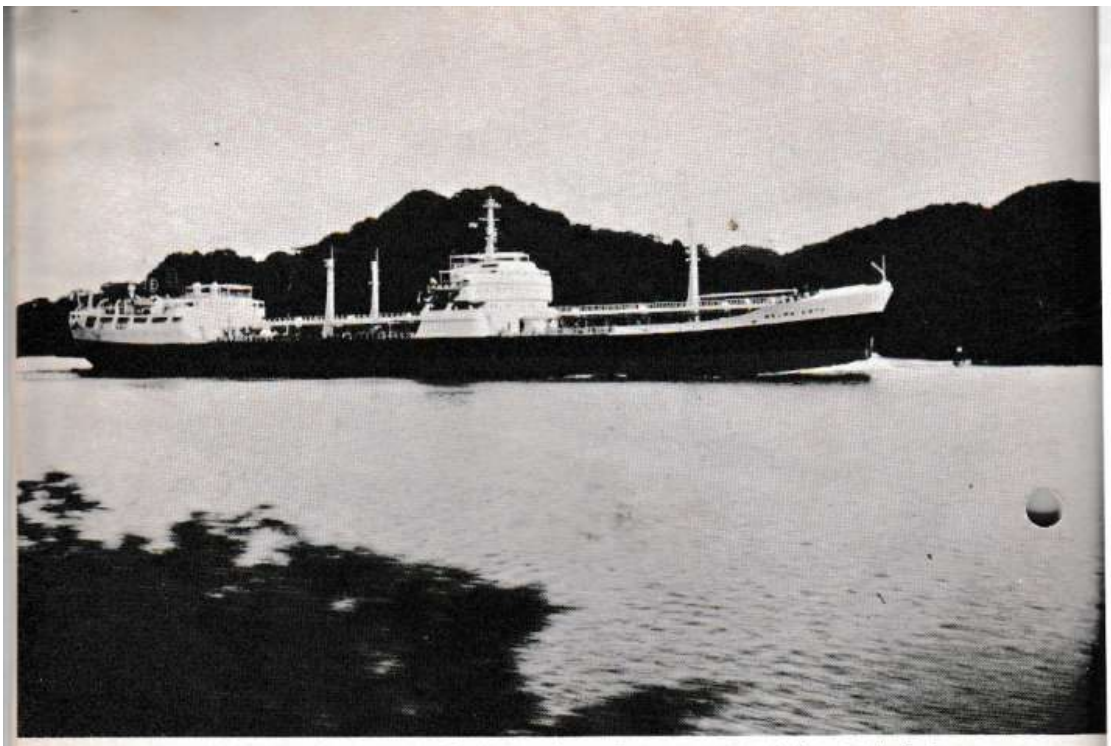
PART III

Albert J. Klee, F.A.K.A.
West Chester, Ohio

WE RADIOED to the U.S. Air Force stationed in the Canal Zone for help and fortunately, contact was made. The first comforting thing that we heard was that they were sending out a C-46 to try to find us, in order that when we ditched they would be able to fix our position and relay it to rescue boats. Jerry and I did not kid ourselves, however. The violent storm had whipped the waves below into a frenzy, and we knew our chances of surviving a ditching was like that of a new-born guppy in a tank full of zebra cichlids. The Air Force had us in their radar, however, and they attempted to guide us to the Panamanian coast.

I didn't know what was in Jerry's mind during all of this . . . we didn't do much talking. It helped somewhat to shift the nose cone cargo to the right, with us on the left, so that when we crashed, the cargo would propel forward through the plexiglass, missing us in the process. We also discussed our strategy after hitting and we agreed that if the nose cone

Photo: The ancient Hotel Washington in Colon, Colombia, where our intrepid expedition stayed the night. All photos by the author.



went under water, we would wait until it had almost completely filled with water before trying to get out. There was no sense in fighting the rush of water through the hatch. All our calculations, of course, were assuming that we were still conscious after we hit the water.

Just then Jerry, who was somewhat in front of me, shouted, "Land . . . land! I see land!" True enough, we were over the coast of Panama. We could even see lights from isolated buildings since the plane was no higher than 400 feet from the ground. At this point, the Air Force suggested that we land at one of their airports on the Atlantic side but there was a 2800 foot hill in front of it, something we just could not negotiate on one engine. As an alternative, they described a World War II landing strip in the jungle known as France Field. It had no tower, no lights, no nothing (it was used only for occasional Ranger training) but it had the one thing we needed desperately . . . it was at sea level.

By a stroke of luck we found the field on our first pass. Unfortunately, our one engine developed very little hydraulic power and our landing gear took too long to get down. Jon had to gun the left engine to miss the trees at the end of the strip. The plane cleared these by 15 feet, went out over the ocean and almost collided with a ship! When a plane nearly hits a ship, you know that is flying low! Jerry and I, being in the nose cone, saw everything first and closest and believe me, it did nothing for our morale. We were now at 200 feet of altitude, unable to get any higher. The waves were lapping at the plane and the two of us were having what might be called a "joint hemorrhage"!

The second time around, Jon lined up the B-25 on the strip perfectly. The Air Force, Military Police, Customs, . . . everybody who was able to help, had

Photo: A freighter making its way through the Panama Canal.

their cars up on each side of the strip with lights on. This helped considerably. Then, at this very moment, all gas gages indicated empty! Although we did not know whether the landing gear would lock in place in time, we had no choice. Jon flipped the gear lever and set the plane down. Fortunately for us, the gear locked just before the wheels touched! The old blacktop strip was wet and with only one engine for control, the plane skidded to a stop at an awkward angle. Normally, Jerry and I would have waited for a ladder to be brought up to the nose cone but he ripped off the hatch cover and jumped approximately 12 feet to the ground, and I followed suit!

We looked around and saw ambulances, fire engines, and people in all sorts of uniforms and gear. They pressed forward to congratulate us on our narrow escape. "Thought you guys were goners!", was the typical remark. I remember getting quite a bit of dirt in my mouth, kissing the ground that day! The others piled out of the plane and wonder of wonders, it stopped raining. The whole thing seemed like a nightmare, especially for Jerry and me, but there had been one "amusing" incident. It seems that Win and Zeke, who had been in the tail, slept through most of the excitement! During the last few minutes of violent maneuvering, however, Win woke up and noticed that there was no vibration from the right side of the plane. He then looked through a gap in the left loading hatch and saw waves below, concluding that we were in trouble. At that time, there was no communication setup to the tail, so Win woke Zeke up and confided his fears. The landing at France Field had been very smooth in spite of it all (Jon was complimented highly on his flying by several Air Force Officers) so Win and Zeke actually did not know that we had touched down safely. Jon asked Bill to shut off the left engine after we had

Photo: The B-25 made it down alright, but at a slightly unorthodox angle!

stopped but he was so nervous (weren't we all?) that he revved it up instead. Jon just reached over and shut the engine down. But in the tail, Win and Zeke heard the gunning of the engine, and then utter silence. Win, thinking that we had lost the other engine remarked to Zeke, "Now we're really in trouble!" They waited for the plane to crash, all the while we were safely on the ground. We tapped on their hatch and told them to come out!

The right engine had been shut down and its props feathered because its oil gage indicated zero pressure. If there had been no oil to the engine and we had continued to run it, it would have torn off its motor mounts within 60 seconds, and probably taken the wing with it. Jon had no choice but to shut it down. However, after we had all quieted down, it was noticed that there was no oil either on the right engine nacelle or on the right rudder. This was puzzling because if an oil line had broken, there should have been oil all over the plane on that side. Leaving Bill and Jon to ponder this, the rest of us were driven by M.P.'s into Colon, the nearest town. The Desk Sergeant told us that we would have been billeted in the local Y.M.C.A. but due to anti-American rioting, this building was burned to the ground a scant two weeks before our arrival. Our luck was holding true to form! After warning us not to walk about Colon unless we were in pairs, one M.P. drove us to the Hotel Washington. This is situated on the Caribbean and some 50 years ago, was one of the most famous hotels in Pan-

Photo: (Top) Zeke and Win being given some pointers by Sergeant Davidson at the Air Force Survival Training School.

Photo: (Below) A large tree shading the Survival School headquarters. The strange objects hanging from branches are birds' nests!

ama. When we arrived, however, it looked ready for Urban Renewal.

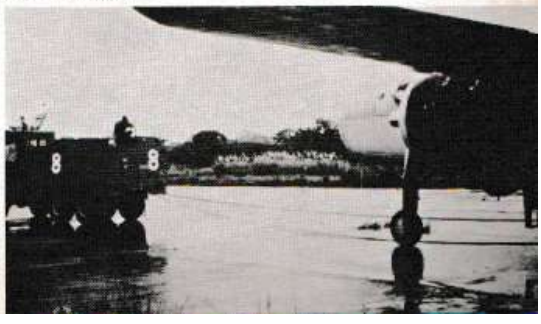
We checked into the hotel, three to a room. It felt good to lie on a bed once again. Also, it helped to quiet our nerves. After a brief rest, we washed up and went down to dinner. There we met Jon and Bill with some good news. There was nothing wrong with the right engine! All that had happened was that the oil pressure indicator line had broken, a 20-minute repair job! Still, I doubt that many of us tasted our food that night.

The next day, Jon and Bill went out to the plane while the rest of us explored our surroundings. Within a few minutes, Jim and Zeke had caught some *Bufo marinus*, a sort of toad, right on the hotel grounds! Jerry, Win and I explored the shore of the Caribbean, catching marine crabs and other interesting creatures. Right off the sea wall behind the hotel, we found hundreds of gorgeously-colored marine tropicals. It hurt deeply that we couldn't bring any back home with us. Then, Win, Zeke, Jerry and I decided to explore Colon. Remembering the warning of the Desk Sergeant, we contrived to speak loudly in German whenever we passed a corner full of young toughs. It worked and we spent some pleasant hours exploring the market, the shops and the streets.

Returning to the hotel, we found Jon and Bill waiting for us. The Air Force had flown them to their machine shops to fix our instrument line, then had flown in 200 gallons of gasoline so that we could proceed to Tocumen airport on the Pacific side. It was decided that:

Photo: (Top) One specimen of **Bufo marinus** in hand!

Photo: (Below) Due to its awkward angle of landing, the B-25 was unceremoniously towed off the airstrip by a fire engine!



(1) The nose cone was too dangerous and therefore we would shift cargo at Tocumen . . . no one would ride in the nose any more.
(2) Communications would be installed from cockpit to the tail.

Jim and Dick volunteered to fly with pilot and copilot to Tocumen and shift the cargo. The rest of us opted to take the train across the isthmus of the Canal Zone and rendezvous with the others at the airport at 11 p.m. that evening. We proceeded to get rid of our Panamanian money by using the slot machines that were placed in a room at the hotel but it wasn't easy. We kept winning! Finally, we left for the train depot.

The train ride across the isthmus, from one ocean to the other, costs but $1.25 and takes about 2 hours. On the Caribbean side it runs along the Panama Canal and where in Colon we could only see the ships lined up to go through the Canal in the distance, now we saw them close up. Our train accommodations were not exactly first class but then, nothing was first class on this trip so far (more like 5th class!). However, we enjoyed ourselves immensely. I had not realized before how hilly the isthmus really was. It got even more mountainous as we approached the Pacific side. The Canal and the Panamanian jungle were wonderful to behold.

Upon arrival in Balboa Heights, Zeke remarked that he knew the director of the Air Force Survival Training School located there. We had become quite interested in survival recently and seconded the motion that we try to wrangle an invitation to the school. Although Zeke's friend was not in Panama at the time, Sgt. Davidson came down to the station, picked us up and drove us to the school. No classes were in progress at the time but he showed us around for several hours. The survival school has imported all sorts of plants and animals from Asia, South America and Africa, and they were most interesting to see. They even had an electric eel in their outdoor area! Sgt. Davidson told us that for lunch on the first day of school, each class gets a meal of fried caterpillars! The final exam is also interesting. The student is dropped into the jungles of Panama equipped with nothing more than the clothes on his back. If he doesn't get back within 6 days, he flunks the course!

After supper in Balboa Heights, we rented a cab and took off for the airport. ◄

(To Be Continued)

★ IDEAS ★

BY HOBBYISTS

The Journal will pay $5.00 for original ideas published. Keep less than 200 words. Send your idea today!

Quieter Pump

Many aquarists are annoyed by noisy vibrator pumps. To remedy this, suspend the pump from two cords or two hooks connected with two large rubber bands around the pump. For safety, the rubber band can be taped to the pump. Make sure the pump does not come in contact with any other objects. Watch the rubber for signs of aging (small cracks) and don't let oil contact the rubber. — *Dan Otto, Uhrichsville, Ohio.*

AT FIRST BLUSH it often seems as though men have the entire tropical fish hobby sewed up in their back pockets. The names that lead the field in outstanding accomplishments tip down the scale heavily on the masculine side.

FINNY FOLKS

By Diane Schofield

But on the opposite portion of this same scale marked "feminine" there is a name of a most remarkable lass. This has absolutely nothing to do with casting aspersions at the lady's age, but Kay Ragand is one of the "old timers" in the hobby.

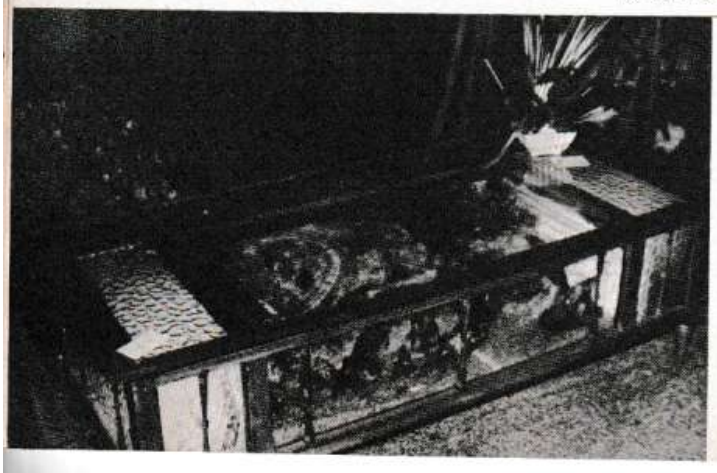
Through her various contacts and services during many years, Kay now holds a rather unique position in aquarium show annuals. She is the only woman to manage several open aquarium shows each year on a professional basis. These are all tropical fish displays that are a part of The Home Show, The Skin Divers' Show and the Hobby Show, which are large important undertakings themselves in and around Los Angeles. In the mixer for 1965 are two new ones to be added to this list—one that is as yet untitled but which will be held at one of the main exhibition halls of Hollywood, the Pan Pacific Auditorium, and a rather fascinating new one that promises all sorts of exciting unconventional potentials for an aquarium show. The Interior Decorators' Convention is going to be held at the blue-blooded Beverly-Hilton Hotel in Beverly Hills. A very different switch on this show is that in all of the model rooms there will be an entry for the show. The aquarist competing will be told the decor, the color to be used and he or she will be required to fit this tank harmoniously into such a setting.

Photos: (Top) Kay Ragland. **(2nd)** A part of Kay's collection of antique fish prints. **(3rd)** A few tank setups at the Los Angeles Hobby Show.

There will, however, be another room for the tanks belonging to hobbyists who do not want to compete artistically in this manner.

No matter which show she manages, Kay has a certain number of ideas that she employs and with which the management of the various enterprises cooperate. She believes that all dealers in the Los Angeles area should have an equal chance to profit financially. Therefore at each show she masterminds, a different one is given a chance to furnish equipment for air supply, paid for, of course, by the show management. The dealers are, incidentally, never permitted to compete either with each other or with non-commercial aquarists, although they are encouraged to put in displays and appropriate advertising. As Kay says, "A small dealer simply isn't equipped to compete with some of the larger ones and the average hobbyist certainly can't compete on an equal footing with most of the dealers—therefore, it only makes hard feelings to pit them one against the other."

A revolutionary new idea that Kay recently started is a Tank Rental Service. Bowing to the knowledge that many aquarists are loath to dismantle one of their tanks at home, drag it down to a show, and run the risk of it springing a leak, she has prevailed upon the show managements to furnish tanks and rent them out to the aquarist. A 10 gallon, complete with reflector, rents for $3.00 for the run of a 10 day show; a 15 for



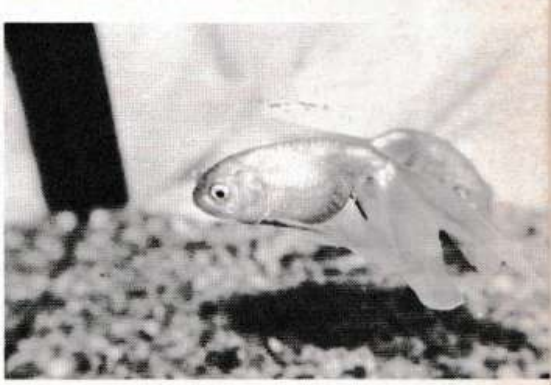
Photos (Left-hand page): First two shots are scenes at the Los Angeles Hobby Show. **(3rd)** A unique tidepool tank that had high and low tides during the day. **(4th)** Combination coffee table-fish tank at the show. **(Right-hand page) Top)** Oriental "temple" display which contained rare goldfish. **(2nd)** This is a Fringetail Celestial goldfish at the L.A. show. **(3rd)** One of Tina Mann's artistic tanks at a recent Florida show. **(4th)** Frank Roberts presenting Tina with trophy.

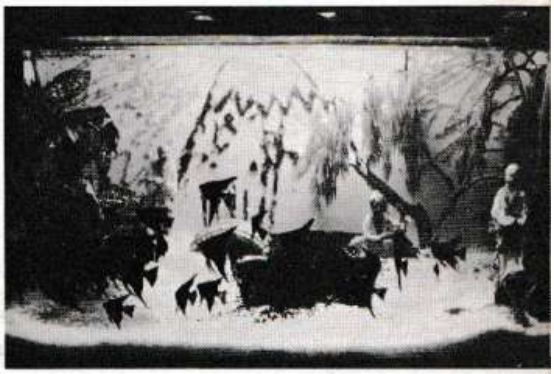
$4.00; and a 20 for $5.00. All the aquarist has to do is to bring the "insides" of the tank, while his tanks at home remain in their untouched pristine and unleaking glory.

One of the recent "open" shows that Kay managed was the Los Angeles Hobby Show. An "open" show is, of course, one which is not sponsored by any specific aquarium society, but is open to all comers. This show saw entries from the members of nine different aquarium societies—Long Beach Aquarium Society, Pomona Valley Aquarium Society, Tri-City Aquarium Society, Los Angeles Aquarium Society, North American Aquarium Ass'n., The Swordtail Society, the Harbor Aquarium Society, California Marine Specialists and The Betta Society. Incidentally, the Betta division of this show was judged under the new Betta Standards which have been recently formulated.

There is usually a high preponderence of goldfish at any of Kay's shows since her leanings have been toward the gold ones for some time. She is the secretary and founder of the National Goldfish Association. It is no surprise then, with this gilt-edged background in mind, to learn that the recent L. A. Hobby Show probably held the rarest collection of goldfish ever seen within the limits of the United States, excluding the Hawaiian Islands. These are excluded because with the influence of the Japanese goldfish breeders there, their goldfish shows exhibit perhaps the most outstanding fish outside of Japan itself.

In the four years that Kay has been managing the aquarium portion of the L. A. Hobby Show, it has been enlarged three times and seems to be headed for a fourth time next year. The 143 entries at the last one left no room for several tanks which had to be set elsewhere. None of these entries paid a penny. On the other hand, passes, worth approximately $1.50 each time they wish to come and go, are given to the participating





hobbyists. Therefore Kay never lacks for people to hang around the exhibit "telling all" to interested passers-by. The fee for judges, as well as all trophies and ribbons, is paid by the show management.

Kay has 18 tanks of her own at home to while away the long hours. She also collects rare antique fish prints and makes superb intricate handiworks that have collected trophies wherever they are shown. On Sundays she dons her track shoes and sprints around to three churches to play the organ. She is also the business manager for two symphony orchestras.

• • •

Add a little seasoning (salt) to a tank and you will just possibly find one whose owner is another outstanding fraulein in the hobby. Tina Mann, of the Aquarium Society of Broward County, Ft. Lauderdale, Florida, is sitting firmly astraddle the fence where marine vs. freshwater fish are concerned. Although it seems a

Photos: (Top) President of the Aquarium Society of Broward County, Florida, Tina Mann, is shown lighting installation candles. **(2nd)** A group of winners in one of the Broward club's shows. **(Below)** A South American catfish in the Los Angeles show.

physically impossible feat, she leans toward both. In her 12 x 24 foot fish room 7 out of 34 tanks are marine.

Little do spawning fish realize the wide reaching effects their act of procreation may have on their owner. This was the thing that ignited Tina's enthusiasm. She says, "I was really hooked when my first angels laid their eggs on an Amazon sword plant in my community tank. Out went all of the other fish and I shortly had angel fry everywhere but the bathroom!" This proved to be only the beginning because, she goes on, "After my first pair of angels I have raised thousands of them. My greatest thrill in breeding was when I had a pair of solid black angels mate and produce 100% black fry with startling regularity every 8 to 10 days for over a year." Once a fishy ball like this got rolling, it became plainly evident what was going to happen. When Tina's son got married recently, he remarked prophetically, "I guess when I come back from my honeymoon my room will be full of fish." He was right. It was.

In this fish room is Tina's piranha who stalks her Siamese kittens. These are not a new kind of baby catfish from Thailand. These are the standard fur-bearing four-legged kind. This is another of her hobbies, raising Siamese cats. These cats have found that deviling piranhas is rather a fascinating pastime, and while her piranha is rather a timid sort as a rule, even reluctant piranhas can be pushed too far. As Tina stated, "My piranha is actually very shy except for the time he took a hunk out of my finger when I was preparing him for a show. He isn't very shy either when he chases my Siamese kittens up and down the tank. The little devils just delight in teasing him from the safety of outside of the glass." Just one word of caution, little catlets—don't ever get the urge to go for a swim.

Tina isn't content with keeping and rearing fish. Since she is employed by two surgeons, she has developed interest in other facets of the hobby. To quote her, "At the present time my interest has turned to medical experiments with tropical marine and freshwater fishes. I have experimented with various types of the so-called tranquilizers and energizers on bettas and found one which is far superior to the "Miltown" used by some. The

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CLUB NEWS

San Francisco Aquarium Society, Inc.

The next regular meeting of the S.F.A.S. will be Thurs., March 4, 1965, at the Morrison Auditorium, California Academy of Sciences at 8:00 p.m., according to Frank Tufo, President.

Featured at the meeting will be the annual Alvin Seale Lectureship, given this year by David Brown, Curator of Mammals at the Marineland of the Pacific in Palos Verdes Estates, California.

"The Amazing Dolphin" will be the subject of Mr. Brown's talk to society members and their guests. Refreshments will be served, according to Joe Zins, refreshment chairman.

There will not be any fish of the month competition at the March meeting, Charles Bange, Chairman, announced.

Join the S.F.A.S.

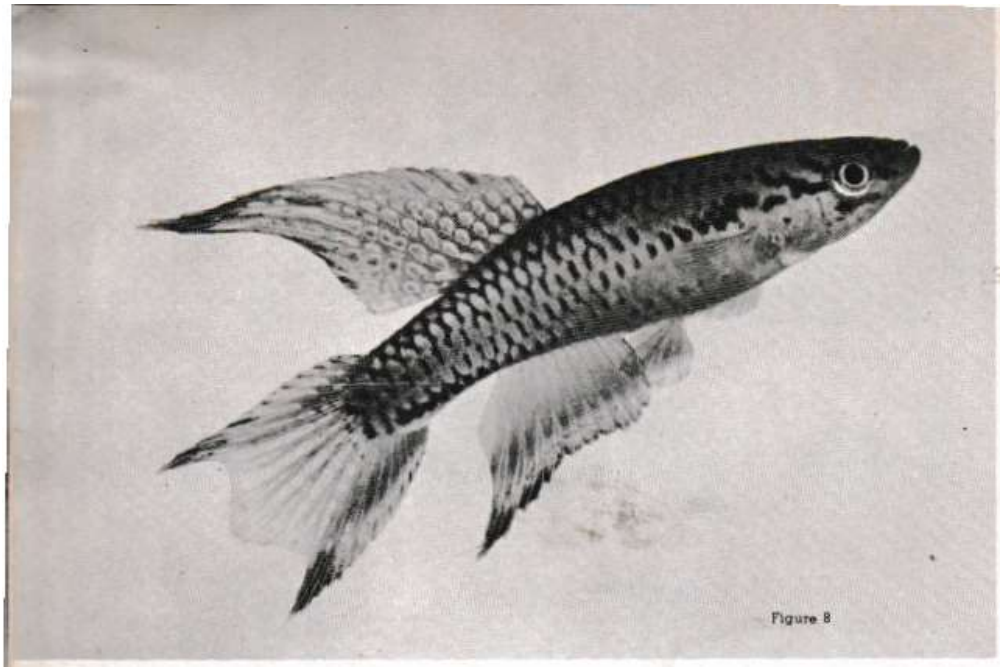

Figure 8

By themselves, they are pretty; hybridized, they surpass even the finest show guppies!

The Bivittatum Group

PART II

Albert J. Klee F.A.K.A.
West Chester, Ohio

CURRENT GENETICAL RESEARCH

JOHN GONZALES, of Philadelphia, has extended Bozhurt's work by experimenting with *bivittatum – multicolor* crosses. No difficulty was encountered in either *bivittatum* x *multicolor* or *multicolor* x *bivittatum* hybridization (see Figures 8 and 9. Although the F_2 generations were fertile, it was difficult to raise any of the F_2 generation (only a few fry were produced). A number of interesting observations were made, however. As a generalization, *bivittatum* boasts extended finnage while *multicolor* boasts the lighter (yellow and yellow-orange) coloration and the more iridescent sheen. By themselves, these fishes are pretty but when hybridized they are simply fabulous. The finest show guppy in the word would look drab next to this cross. They would surpass the guppy in the following areas:

a. *Finnage – It would be "no contest."*
b. *Spectrum of color – as an example, the* multicolor x bivittatum *cross is as follows: Dorsum brilliant orange mixed with red; reddish sides and yellow ventrum; crimson and green markings about gills; anal yellow, orange-green and dark red successive bands; dorsal orange and green successive bands; tail lemon-yellow,*

Figure 8. A **bivittatum-multicolor** cross by John Gonzales. Photo by the author.

orange lobes, lower lobe margined in dark red; pectorals greenish; ventrals bright orange, tipped in green; dark-red or reddish-brown spots on almost all fins.

c. *Glaze or brilliance — all of these colors are influenced by an iridescent sheen not present in the guppy.*

The contrast between the hybrids and the parent forms is brought out by comparing Figure 8 with the ordinary aquarium *bivittatum* of Figure 9.

Another interesting note is that in the F_3 generation, the opposite sex from the *bivittatum* used in the cross is huge. For example, if the cross was *multicolor* x *bivittatum*, the male F_3 was exceedingly large. Furthermore, the color of the hybrid tended to follow the male parent. These observations suggest that the gene for color is linked to the Y-chromosome, while the gene for size is linked to the X-chromosome. However, because of the well-known "hybrid vigor" effect, these are but surmises.

Electrophoresis

In 1961-62, the American Killifish Association pioneered in the development of electrophoretic techniques for use in the identification of aquarium fishes. Since then, these techniques have been used by Col. J. J. Scheel in his study of African killifishes. I quote from Killie Notes, an AKA publication:

"Electrophoresis is a technique whereby high voltages are applied to, for example, a strip of filter paper containing some usually highly complicated organic extracts such as muscle protein. As a consequence of the high voltages, the different components of the extract mi-

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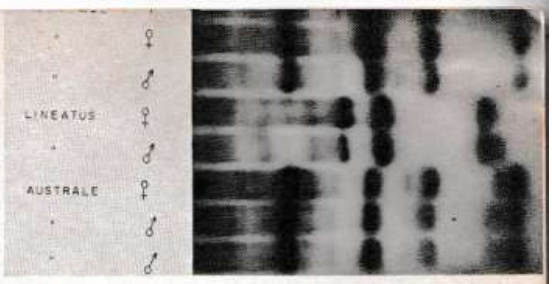


Figure 10

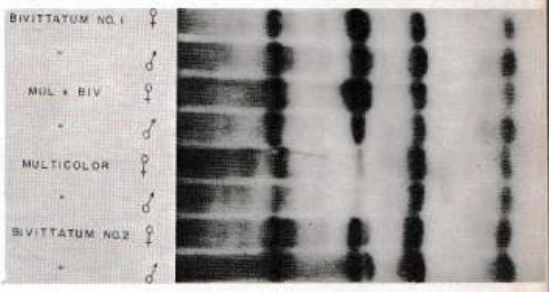


Figure 11

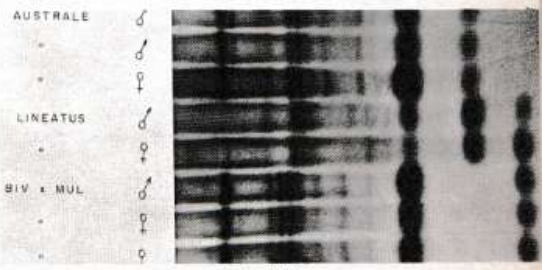


Figure 12

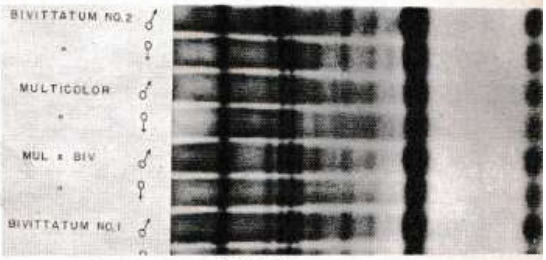


Figure 13

Fig. 9: (Right) Aphyosemion bivittatum. as photographed by Albert J. Klee. **(Above) Figures 10 & 11:** Electrophoretic traces in esterase stain. **Figures 12 & 13:** Electrophoretic traces in protein stain. Photos by Dr. R. Hewitt.

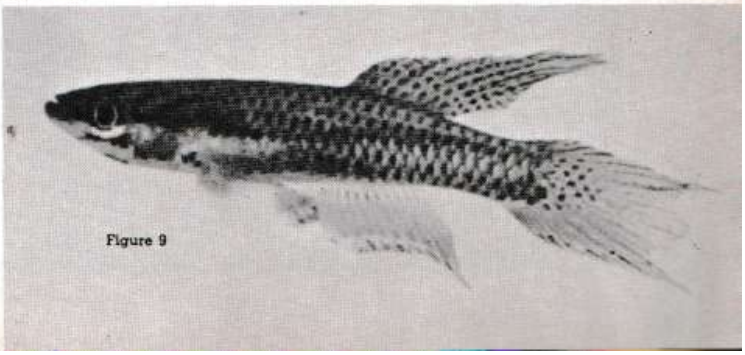


Figure 9

George and Renee Wistreich
North Hollywood
California

Seven colorful fishes of the Indo-Australian basin appear on this special issue of stamps

Singapore's Commemoration

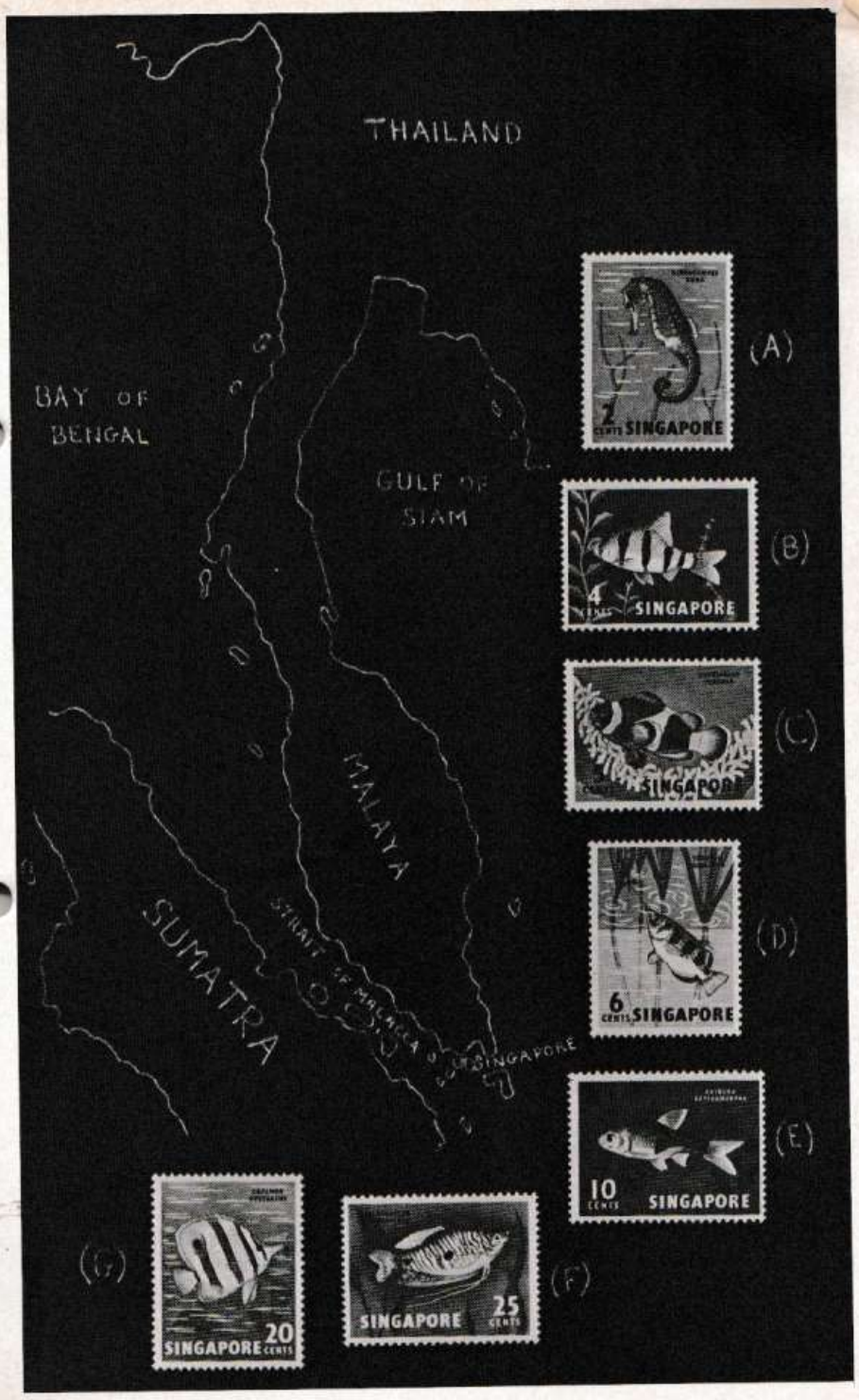
THE UNITED Kingdom House of Commons in July, 1958 passed a bill creating the State of Singapore, which is located on an island off the southern end of the Malay Peninsula. Under a new constitution, in 1959, general elections were held and the State of Singapore with full-internal self-government was fully established. To commemorate the second anniversary of their constitution, the set of fish stamps shown in the figure were issued. The fishes selected as subjects are representative of the treasure of unusual and highly interesting aquatic life naturally found in the Indo-Australian region. A total of seven different aquarium species are shown. These include:

(A) *Hyppocampus kuda* (sea horse): From earliest times, sea horses have been objects of interest and superstition. This probably resulted from the unusual form exhibited by the fishes. Considering the general resemblance of the head to that of a horse and the rather coiled, worm-like appearance of the remainder of the body, the generic name is an appropriate one, i.e. *hippus* (Greek) indicating horse, and *kampe* meaning worm or caterpillar. Through the years seahorses have been used as subjects for ornaments, charms of various sorts, illustrations in books, coins and stamps. In regard to the latter use, the genus is well represented on stamps in comparison to other fishes. To date there are at least five stamps that feature them. The species pictured on the stamp is one of the larger ones and according to Herald (1961) does well in captivity (some have been kept for more than two years in European aquaria).

(B) *Barbus hexazona:* Most aquarists are probably familiar with this variety of barb that is native to Sumatra and the Malay Peninsula. The possession of six vertical green-black bars on the body surface serves as a distinguishing feature of the species, and is also the reason for one of its popular names, namely, the six-banded barb.

(C) *Amphiprion percula* (the clownfish; the anemonefish): This representative is a brilliantly colored small fish that lives in the coral reefs of the Indo-Pacific region, usually around colonial anemones. The clown fish is of special interest to biologists concerned with ecologic relationships because of its association with sea anemones, which are utilized for protection purposes. The unusual nature of this relationship lies in the observation that the anemone fish swims unaffected in and around the tentacles of sea anemones, which are known to possess ". . . explosive stinging cells capable of killing small fishes that are not immune to their venom" (Herald, 1961). An explanation of this phenomenon was revealed by the studies of Davenport and Norris (1958) which showed that mucus secret-

Photo: Outside of the piscatorial beauty, there is no relationship between the Mexican TB stamps on this month's cover and the Singapore government's stamps on the page opposite, as photographed by George Wistreich.


THAILAND
BAY OF BENGAL
GULF OF SIAM
MALAYA
SUMATRA
SINGAPORE
1 CENTS SINGAPORE
(A)
4 CENTS SINGAPORE
(B)
SINGAPORE
(C)
6 CENTS SINGAPORE
(D)
10 CENTS SINGAPORE
(E)
SINGAPORE 25 CENTS
(F)
SINGAPORE 20 CENTS
(G)

ed by these fish prevented the discharge of the stinging cells (Herald, 1961).

The stamp in the series picturing *Amphiprion percula* clearly shows that its color pattern is strongly contrasted with three characteristic white cross bands.

(D) *Toxotes jaculator* (the archerfish): This particular aquarium species is well known for its unusual marksmanship. Diane Schofield in an earlier *Aquarium Journal* article (May, 1960) referred to this fish as "the Wyatt Earp of the aquarium." This label appears to be an appropriate one in light of the statement made by G. Mandahl-Barth (1959) that an adult archerfish can hit a fly at six feet. In addition to its shooting skills, *Toxotes jaculator* is an extremely versatile fish for it can operate under a variety of handicaps. For example, in the case of a cloudy environment, not only can the archerfish raise its eyes above the level of the water, but it can also move them in any direction, except downward (Schofield, 1960). The scene depicted on the stamp emphasizes the ability of the fish to use its "living blowgun apparatus" to register a direct hit on an unsuspecting insect.

(E) *Rasbora heteromorpha*: The small fishes which comprise the genus are found quite commonly throughout southeastern Asia and the islands of the Indo-Australian Archipelago within the limits of the Asiatic continental shelf (Brittan, 1954). The first species of the genus was described in 1822, by Francis Hamilton Buchanan, in his publication concerned with the fishes of the River Ganges in India (Brittan, 1954). Originally, this species (now known as *Rasbora rasbora*) was called *Cyprinus rasbora* (Brittan, 1954). Taxonomically, the genus appears to consist of approximately 46 species. However, according to Brittan (1954) the genus is in an active evolutionary

(Continued on Page 131)

CLUB NEWS

Golden Gate Guppy Group

The G.G.G.G. meets the third Tuesday of each month at the Visitacion Valley Community Center, San Francisco, according to Florees Brown, reporter.

Currently the group is studying guppy judging for the purpose of improving the judging of guppies in the area. The next meeting will be Tuesday, March 16, at 8:00 p.m. ◄

★ IDEAS ★

BY HOBBYISTS

The Journal will pay $5.00 for original ideas published. Keep less than 200 words. Send your idea today!

Bottle Brush

I recently cut my hand rather badly and had to keep it bandaged for a while. My fish tanks could not wait to get messy so I had to figure out some way to clean off the glass. I bought a long handled (plastic) bottle brush with a sponge tip. It did a marvelous job of cleaning off the algae. For cleaning algae off the rock work, and for stubborn patches of algae on the glass I used a long handled brush with a bristle tip. The bigger the tip the more area you can cover at once. This is great for those who don't want to slop around over their elbows scrubbing glass. I will never wet a finger again just to clean algae.—*Karleen Williams, Pacifica, California*

state, thus several lines of evolution are represented by a number of groups and complexes of species.

(F) *Trichogaster trichopterus*: The name of three-spot gourami is also associated with this species, because of the location of three individual spots, one at the base of the caudal fin, a second at the middle of the body, and the eye constituting the third one. Gouramis generally are found in the various bodies of water in Indonesia and the Malay Peninsula, as well as in some neighboring countries. This aquarium species can give a great deal of satisfaction to tropical fish hobbyists because it is one of the most easily bred of the bubble-nest builders (Innes, 1956).

(G) *Chelmon rostratus*. The last stamp in the series pictures the long nose butterfly fish. In 1764, according to Herald (1961), it was incorrectly introduced to the scientific world as the spitting archerfish. This error caused confusion in relation to the water squirting ability of *Toxotes jaculator*.

This stamp issue by Singapore honoring the aquarium varieties well-known to many, adds significantly, not only to the number of stamps depicting fishes, but also to the ever increasing popularity of tropical fishes.

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3. Innes, W. T. (1956) Exotic Aquarium Fishes. Philadelphia: Innes Publishing Company.
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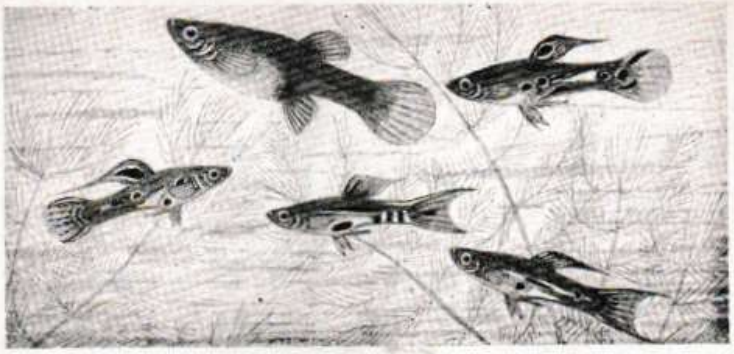
Fish Watching

Many hobbyists get so involved with the "means" of their hobby that they forget the "ends." After all, we keep fish to watch them, to enjoy their grace and beauty, and to delight in their antics. But what do we usually do with our hobby time? Spend it cleaning filters, changing water, trying out new equipment and gadgets, and on and on. This is all part of the hobby, and interesting too, but try to find a little time to just sit back and "watch" your fish. Remember, that was probably what first started your interest in this hobby. Don't limit your fish watching just to feeding time either. In fact, this would be my last choice as a time to watch. For the best performance, try watching early in the morning, before feeding time. Leave the lights off, pull up an easy chair, sip your coffee, and enjoy the show. If your job prevents this, there is always weekends. And if you cannot catch the "early show," there are other performances throughout the morning hours. The evening show is not quite as lively, but it is a perfect sedative for getting you ready for bed. So try "fish watching" again, and find out what all that equipment and work is "really" for.
—Gene Tompkins, Brooksville, Kentucky



Amateurs are equal to professionals when creating new varieties — luck plays a part!

Atomic Age Guppies

Charles O. Masters
Walhonding, Ohio

VARIATIONS in guppies distinguish them one from the other in pattern, color, and size and shape of fins. Today's guppy is sometimes hard to recognize as the one so common in aquaria twenty-five years ago. Those characteristics or modifications which are the result of mutations, to be explained later, are inherited and are of much interest to aquarists. Those characteristics caused by environmental conditions result in some variations too, but they are not inherited and are of little interest to the guppy breeder.

To elaborate about the thrill experienced by anyone discovering a new guppy variety is certainly unnecessary. Such a first gives one much pride and rare joy. To successfully breed guppies and occasionally find new mutations, one may have relatively little in the way of equipment but he should have some knowledge of genetics, much patience and a very deep interest.

Sketch: An early sketch of guppies by the late Fritz Mayer.

New varieties of guppies can best be found in the home aquarium — look for them there. Travel to far-off places is not necessary. After some knowledge of genetics and guppy breeding is attained, it becomes possible to start "creating" new varieties. This is being done by amateurs as well as by professionals. This is true especially since luck does play an important part. In this way (i.e. appearance of new mutations) amateurs and professionals are equal.

Learn something about how guppies grow, how long they live, when they are ready to breed, and how often. Study their sexual process, which is described thoroughly in the aquarium literature. In addition, come to understand simple genetics and the general theory of evolution. Learn a little about

(Continued on Page 151)

SPECIES OF THE genus *Apistogramma* are usually the first ones thought of when dwarf cichlids are mentioned. Actually there are many other genera which are considered dwarf cichlids by experienced aquarists. Examples are *Crepicara*, *Lamprologus*, *Nannacera*, *Nannochromis*, to mention just a few. Of course, not

After eggs are laid the female becomes a veritable tank terror!

Apistogramma ornatipinnis

Richard F. Stratton
San Diego, California

all the species of these genera are small, and thus would not be considered as dwarf cichlids. However, all the *Apistogramma* species—unless there are some giant ones unknown to science—are small, usually measuring around two to three inches at maturity. Most of the *Apistogramma* species are among the least colorful of the dwarf cichlids, but they are quite striking when given the proper conditions, and there is no denying that these tiny perch-like fishes have a special charm all their own.

Unfortunately, there is some question as to the identity of the *Apistogramma* species I wish to discuss here. It has been listed in nearly all the American aquarium literature as *Apistogramma ortmanni*, but as was pointed out to me long ago by Dr. Sylvan Cohen, a long-time aquarium authority on dwarf cichlids, the apparent "real" *ortmanni* has a round tail, whereas the species I want to talk about has a forked or lyre tail. A drawing of *ortmanni* with a round tail ap-

Photo: Three poses of the **Apistogramma ornatipinnis** discussed by the author in the accompanying article. Photos by David Tohir.

PROGRAMS

Readers and societies are invited to submit ideas to The Journal *for Aquarium Society meeting programs, including lectures, slides, films, demonstrations, etc. There is no charge for these listings.*

"Living Fishes," 16mm color sound film. The SCIENCE IN ACTION cameras visit the exotic fishes in the Steinhart Aquarium. A 21-minute tour of the colorful and fascinating underwater inhabitants, conducted by Dr. Earl S. Herald, SCIENCE IN ACTION program host and curator of the Aquarium. Rental: $15.00. For information: Television and Motion Picture Department, California Academy of Sciences, Golden Gate Park, San Francisco 18, Calif.

"Corydoras Genus," includes color slide set of 15 species and a section on breeding Aneas. 53 slides together with a tape recording of the manuscript. Also a written manuscript is included to indicate when to change slide. Rental $10.00. For information: Earle Hamilton, Box 427, Route 1, Lansing, Michigan.

"Sea of Cortez," 16mm color sound film. Members of a scientific expedition explore the beautiful underwater kingdom of the Gulf of California. This SCIENCE IN ACTION program offers a rare glimpse of the marine life in the waters first sailed by Cortez four centuries ago. Dr. Earl S. Herald is host and narrator. 21 minutes. Rental: $15.00. For information: Television and Motion Picture Dept., California Academy of Sciences, Golden Gate Park, San Francisco 18, Calif.

"Story of the Brine Shrimp," a 30-min. color and sound 16 mm film that also covers the tropical fish hobby. Rental: $10. For information: San Francisco Aquarium Society, California Academy of Sciences, San Francisco 18, Calif.

pears in Gunther Sterba's fine book *Fresh-Water Fishes of the World*. A photograph of *ortmanni* with the rounded tail appears in *Regan, Ann. and Mag. Nat. Hist.* (7), 15, 1905. To complete the evidence, the original description of *ortmanni* which appears in *Eigenmann, Memoirs of Carnegie Museum*, 5, 1912, page 506 states that the caudal is rounded. So I feel fairly safe in stating that our fish is not *Apistogramma ortmanni*. Unfortunately, I do not feel as secure when it comes to giving the correct name, although I believe that it is *Apistogramma ornatipinnis*. It is somewhat reassuring to know that advanced aquarists—including such notables as Al Klee and Dr. Cohen—who have studied the situation agree with me. So for the time being, let's call the species *Apistogramma ornatipinnis* rather than stick with a name we know to be wrong.

I got my first pair of *ornatipinnis* several years ago from Dr. Cohen. Previous to that time I had been specializing in the larger cichlids, and had just recently taken up keeping and studying dwarf cichlids. I had kept several species which had spawned for me, such as *Apistogramma agassizi* and *A. cacatuoides*. I also was in the process of raising spawnings of *Nannacara anomola* and *Pelmatochromis kribensis*.

Since I was a little short of tank space at the time, I placed my *ornatipinnis* in a 25-gallon community tank with some full-grown angels and some other dwarf cichlids. I planned to put them in a spawning tank after my young *kribensis* were big enough to move. The *ornati-*

"Parasites of Freshwater Fish," is a 60-slide (35mm) program with written commentary. Rental: $6.00, postage-paid. For information, write: Fred Howard, Aqua Engineers, Box 1, Ortonville, Michigan; or Box 97, St. Basile le Grand, Quebec, Canada.

pinnis were impatient, however, and proceeded to spawn in the community tank. When I first obtained my specimens, the male was about three inches long, close to top size for the species, and the female was no more than an inch long. (In most *Apistogramma* species the female is quite a bit smaller than the male.) Both were dark gray with a bluish sheen, quite attractive. When spawning time arrived, the female turned completely yellow with black eyes, a black marking on the dorsal, and a black spot on her flanks.

Together the two fish cleared one end of the large tank. The female was busy digging a hole—something she was not supposed to do according to the "book" —and it was not an easy task for her. The grains of gravel were so large she could only take one grain in her mouth at a time. But she was determined, and by the next day she had a pit dug clear down to the bottom glass—and the excess gravel had been piled on a nearby swordplant. It was on the bottom glass that the eggs were laid, and it was then that the female became a veritable lioness. She attacked the angels so fiercely that they would have jumped out of the tank if it had not been covered. It was quite a sight to see the large angels so terrified of such a tiny fish. The male *ornatipinnis* helped guard the eggs but he was never allowed near them by the female. He was relegated to patroling the outer perimeter a few inches away from the nest, and that apparently is his assignment in the wild.

I removed the angels and other fish, but I left both parents in the tank because the chief interest in keeping cichlids is in observing their complex brood behavior. The eggs hatched in about three days, and they were kept in the same pit, with the female constantly hovering over them. Occasionally she would pick up a few fry in her mouth, "wallow" them around, and spit them out. This was quite obviously a cleansing action, and of course, she was constantly

fanning them, which also helped keep them clean of bacteria-laden debris.

When the young were free swimming, I gave them newly-hatched brine shrimp twice daily. The female kept the group in a tight little shoal which became less and less disciplined each day. The male continued to guard the outer perimeter and would occasionally catch a stray and spit him back into the shoal.

I have had this species spawn for me many times since I got that first pair, and the spawning site has always been a "cave" underneath a piece of petrified wood or in a flowerpot. But as the above experience demonstrates, cichlids are quite individualistic! ◄

Klee

(Continued from Page 125)

grate at different velocities, producing a series of bands. These bands are then brought out strikingly when stained with a dye specific only to protein. Evidence has been presented to suggest that such bands from groups of muscle proteins may 'fingerprint' the species in question."

Through the kindness of Dr. Richard Hewitt of the Carnegie Institution, Dick Lugenbeel of Washington, D.C., was able to obtain electrophoretic analyses of *Aphyosemion multicolor*, a *bivittatum* strain used in the crosses mentioned (No. 1), a *bivittatum* strain not used in these crosses (No. 2), *bivittatum* x *multicolor*, *multicolor* x *bivittatum*, A. *australe* and *Aplocheilus lineatus* (the last two for another species identification study). Furthermore, analyses were done first using a protein stain and then using an aromatic esterase to bring out the bands (see Figures 10, 11, 12 and 13). The four species are nicely "fingerprinted" by the method and the conclusions are as follows:

(a) Aplocheilus lineatus *differs markedly from the others (as was expected) in both strains.*

(b) A. multicolor *is very nicely separated from* A. bivittatum *in aromatic esterase stain. They are also separable in protein stain but to a less dramatic extent.*

(c) A. australe *is distinguished easily from* bivittatum *and* multicolor *in both stains, via distance from one band to the next, band intensities and number of bands.*

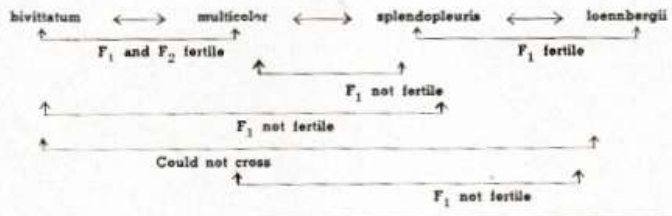
(d) *There are no significant differences between* bivittatum x multicolor *and* multicolor x bivittatum *in either stain.*

(e) *Sex differences as well as strain differences (the latter referring to* bivittatum*) are picked up by this technique and they are about the same order of magnitude. Neither, however, are of the order of magnitude of the species differences.*

(f) *The hybrids have intermediate characteristics in protein stain but are*

FIGURE 14

Hybridization Summary



more like bivittatum *in esterase stain.*

(g) *Replications using different specimens were done on male* australe *and female* bivittatum x multicolor. *The agreement among replications was excellent, proving the power of the method as far as precision is concerned.*

Discussion

The results of these experiments and those of the other investigators mentioned are summarized in Figure 14.

In zoology, a "circle of races" (sometimes referred to as a "Rassenkreis," although this is not accepted by all scientists) is a genetical species with a series of intergrading but distinguishable local populations, occasionally so different that two terminal populations cannot interbreed directly even though still exchanging genes through intermediate populations. We appear (see Figure 14) to be quite close to this state of affairs with our *bivittatum* group fishes. Although I have used the term "*bivittatum*" for common aquarium *bivittatum* stock, there is little doubt that this is not the *bivittatum* of the early days of our hobby. It is rather a form quite close to *multicolor* genetically. The concept of subspecies nowadays is intimately linked with ideas of geographical distribution about which we unfortunately know the least regarding members of the group. This then, even precludes solving our problem by the simple expedient of treating all forms as subspecies with rather definite names such as *Aphyosemion bivittatum loennbergii.*

Nor is there one iota of doubt that there are genetical differences among these forms. Furthermore, aquarists do have means for distinguishing one form from another, provided that they have not been careless in mixing the females. In view of the very questionable geo-

(Continued on Page 151)

Bob Menten
Indianapolis, Indiana

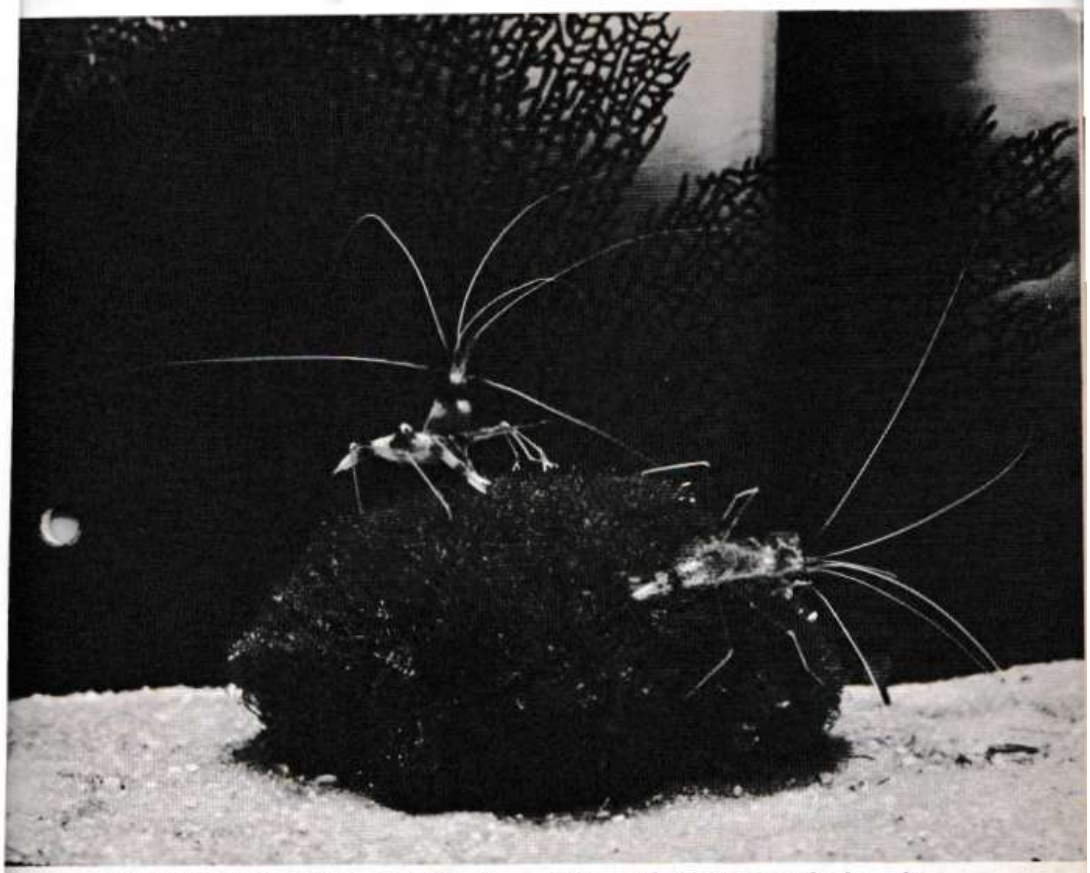
Interesting and unusual animals — they dispose of uneaten food on tank bottom

Marine Scavengers

THE MARINE creatures that can be described as scavengers are all interesting and unusual animals. Because of their novelty and usefulness, some type of scavenger should be considered whenever the marine aquarist selects the roster of occupants for one of his aquariums. A properly maintained marine aquarium should not *require* the service of any scavengers; but, some sort of scavenger can be helpful, by disposing of bits of uneaten food that have been overlooked by other aquarium occupants. A good scavenger will find and eliminate the tiny bits of food that invariably get scattered over the aquarium bottom. This is not to imply that any scavenger can eliminate the need for careful maintenance and feeding care. An efficient scavenger will supplement the normal maintenance given to a marine aquarium but it certainly will not eliminate it.

There are a number of different kinds of marine organisms that can be described as scavengers. Some will acclimate to an aquarium readily, while others may find life in an aquarium unbearable and eventually die. The realm of marine scavengers ranges from somewhat grotesque creatures to beautiful and graceful animals. Regardless of their shape or coloring, they should not be

Photo: White-clawed hermit crab is one of the more colorful hermit crabs from Florida and Bahama waters. Photo by Robert P. L. Straughan.



overlooked by the marine aquarium. All of them have something to offer. The following is a brief description of three types of scavengers that I have had gracing my aquarium. Each of these has something different to offer the aquarist. If the opportunity arises to obtain a specimen of any of these scavengers, the marine aquarist will find them to be a real asset.

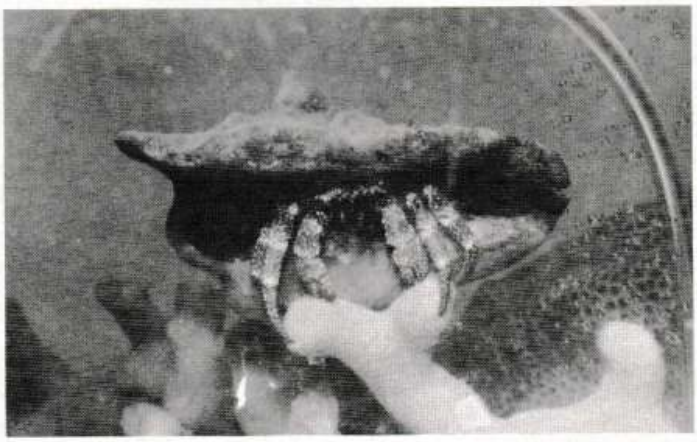
The Horseshoe Crab

The horseshoe crab is a holdover from prehistoric times. Very little change has occurred to it in the past couple of hundred million years. It is not a "true" crab, but is an arthropod, and like the crab it belongs to the same phylium (Arthropoda) as the crabs, but a different class. Arthropoda is the phylum that includes insects and crustaceans. The horseshoe crab belongs to the class Arachnoides and is more closely related to spiders, mites and scorpions than to true crabs. Viewed from above the horseshoe crab shell has a definite horseshoe shape. Its hard shell is "hinged" into two sections and its tail spine is nearly equal in length to its body.

For any aquarist that enjoys the ludicrous, the horseshoe crab (another name is king crab) is certain to be a favorite. Its actions and antics are absolutely ridiculous to me. It swims upside down with short, jerky movements; it is propelled by fast strokes of its legs. It goes so far and then seems to just tire out and falls to the bottom. Invariably it will land on its back. Getting turned right side up, once it is on its back, is a real chore for the crab. It is definitely not the most agile

Photo: Banded coral shrimp (**Stenopus hispidus**) has just shed its skin. The discarded skin is on the lower right. Photo R. P. L. Straughan, courtesy R. S. Barnes & Co., New York.

creature ever created. Somehow by "pawing" the air, bending its back, and using its tail as a lever it eventually manages to turn itself over. When I got my first horseshoe crab, I would help it to regain its footing by flipping it over with a long plastic rod. But, most of the time it would be over on its back again in a very short period of time. So, I finally gave up and just let it "fight it out" by itself.



Although it swims on its back, it walks on its belly. Walk is hardly the correct word—it's more like running. If a horseshoe crab isn't swimming around, upside down, it's probably running around the aquarium, "like a chicken with its head cut off." It appears to have no real destination, it just takes off, swimming. If something happens to be in its path, it just runs into it. It covers a lot of ground in a very short period of time. This is one reason that a horseshoe crab makes an excellent scavenger.

There is one disadvantage to a horseshoe crab as a scavenger; periodically it goes into (for lack of a better word) hibernation. It burrows into the sand or gravel and may remain buried for one or two weeks at a time. If the gravel is very thick, the crab may be completely hidden from sight. The first few times that my horseshoe did this I would probe in the gravel with a plastic rod, expecting to find a little dead corpse. But, when I would find it and touch it with the probe, it would scamper to another spot and dig in again. So actually the horseshoe crab is only a part-time scavenger. However, when it is active and moving around the aquarium, the horseshoe is very efficient.

The aquarist should try to keep track of where the crab is buried. It would be possible for the crab to die and foul the water before the aquarist was ever aware of it. Occasionally prodding would be wise, just to make sure that the crab is still alive.

After awhile I became accustomed to the periodical disappearance of the crab and never gave it much thought. One day I realized that I hadn't seen it for some time and so I went probing around the aquarium bottom. I searched every square inch of gravel. No sign of the crab. There was nothing else to do but tear the aquarium down completely. Everything was removed, right down to the last grain of gravel. Nothing! I haven't the vaguest idea of what happened to the crab. If it had died, I surely

(Continued on Page 147)

Photo: Red-clawed hermit crab is a more common, in-shore variety of hermit crab. Photo by Robert P. L. Straughan.

PART I

Braz Walker
Waco, Texas

"Shocking" revelations about a knifefish research project at this Texas college

Fish Goes to Baylor

MAN, in his egotism, credits himself as the inventor of such miracles as radar and sonar. These "modern" devices, however, are only rediscoveries by man in order to help orient ourselves where our limited senses lack the capability to do so. The old cliché that there is nothing new under the sun is proven once more and we find that a number of fishes, especially in the *Gymnotidae** and *Mormyridae* have been using similar devices for many, many generations.

Even among those who are not interested in tropical fishes of any nature, there are few who have not heard of the famous electric eel of South America which is capable of producing a 650 volt shock and can paralyze a horse or kill a man. Less famous, perhaps, outside of aquarium circles, the South American knife fishes (gymnotid eels) have remained perennially semi-popular aquarium fishes mostly because of their odd

*The **Gymnotidae** are separated by some authorities into four families.

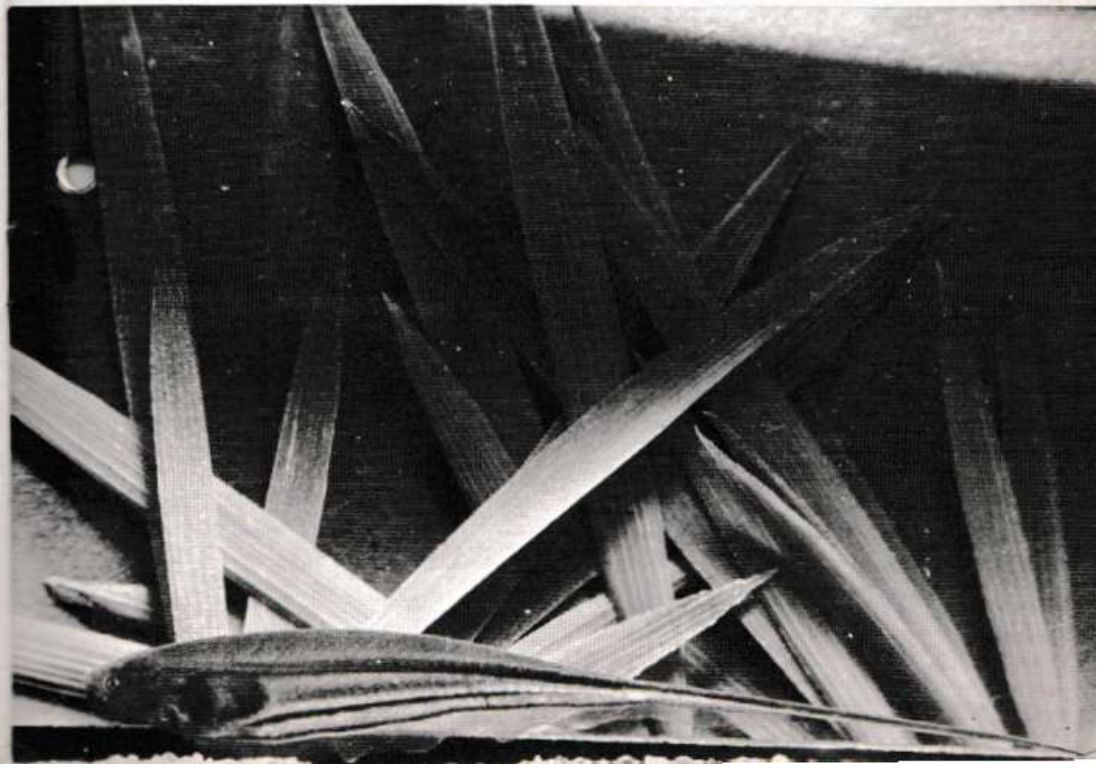


Photo: A South American knifefish, as photographed by the author, Braz Walker.

appearance and the remarkable manner of locomotion, since the rippling wave-like motion of their extremely long anal fins can propel them forward or backward with equal ease and with grace that is hard to imagine. Indeed there are those *(Sternarchus)* which almost seem to prefer not only backing out of situations but backing into them. Sharing the group with the electric eel, more remarkable perhaps than the propulsive system and peculiar form is the fact that they, too, have electrical capabilities. The voltage is so minor in comparison, however, that a number of them although known to possess the "batteries" were long thought to be incapable of using them. It is now known that these electrical properties are used by these nocturnal creatures which often inhabit extremely muddy water, not only to orient themselves and locate food but also to communicate with each other.

Baylor University College of Medicine in Houston, Texas has long been notable for its medical research. Although one can envision cages of guinea pigs, mice and even monkeys, this is perhaps one of the last places a person would go expecting to see row upon row of five gallon aquariums each containing a specimen of either the glass knife fish *Eigenmannia viriscens* or the banded knife fish *Gymnotus carapo* that an oddball enthusiast like myself would give most of his teeth and half of his hair to possess. The reason for these rows of orderly aquariums each equipped with its own heater and filter: research. [*Editor's note: The identity of these fishes as* Eigenmannia viriscens *is uncertain. These are all identified by aquarists and several physiologists as* E. viriscens. *Often such identification is not warranted and many of these fishes cannot be identified with certainty at present.—S.W.*]

Dr. William A. Krivoy, Associate Pro-

fessor of Pharmacology, has developed a way of picking up and recording the natural electricity of these fishes to measure the effects of certain drugs on the nervous system. So far work has been confined primarily to the glass knife fish and the banded knife fish. In the case of *Eigenmannia* which generates a continuous signal of approximately 300 cycles per second, two separate pairs of electrodes are used. The fish is restricted to a portion of his aquarium which is large enough for him to move about freely, and in this compartment one electrode each of one pair is placed in opposite corners. Another pair of electrodes placed closely together are placed in the other compartment of the aquarium. Signals reaching each pair are recorded simultaneously on both channels of a

stereo tape recorder. The electrodes placed at opposite corners primarily record the movement of the fish and the pair placed close together records the changes in amplitude of the signal, which the fish himself controls according to changes in his external environment. After the tape is recorded it is replayed through an information analysis system so that results can be calculated.

An obvious question is, "It sounds like fun but what is it good for?" Dr. Krivoy has found that these fishes respond to a number of drugs in a manner which is very similar to human beings. Possibly one of the most familiar drugs administered to *Eigenmannia* is sodium phenobarbital which is a common ingredient used in various sleeping preparations. Just as your senses are dulled by a sleeping pill containing phenobarbital, the electrical activity of the knife fish decreased in proportion to the amount of phenobarbital given. Other drugs actually improved the learning ability of the fish *(Gymnotus)*. ◄

(To Be Continued)

Photo: Another shot of a South American knifefish, **Gymnotus**, by Braz Walker.

CLUB NEWS

The Guppy Associates

The following officers have been elected by the Guppy Associates International, according to Show Chairman Stanley Mruk, 2226 W. Cermak Rd., Chicago, Ill. President, George Mares; Vice-President, Frank Samp; Treasurer, Ken Asmus; Secretary, Stephen Paul, and Publicity, John Rudack. ◄

Schofield

(Continued from Page 122)

bettas do not fight but they will eat and act normally which I did not find with Miltown. It made them too sluggish to eat or swim." This isn't the end of Tina's experiments either, as she continues, "I have done a lot with antibiotics on marine fish with startling and satisfying results. I use the drugs that we use every day in our treatment of humans, not the variety marketed for treatment of fish. This has become the most interesting part of the hobby to me. I guess this is because of my interest in medicine and surgery, being exposed to it every day. Fish react just as humans do to the drugs, but as yet I haven't tried giving shots in the upper, outer quadrant!" (To the uninitiated—this is the place where one would get a shot of penicillin. A place understandably rather hard to locate on a fish.)

Not only is Tina Mann a piscatorial Madame Curie, she is also one of the few madam presidents of an aquarium club. The Aquarium Society of Broward County is a young progressive club of only three years. In the three years, however, it has drawn unto itself 85 members. With more than a tinge of pride, Tina states, "We are a very active society. Besides our monthly meeting, which is very well attended, we have a collecting trip at Bear Cut (Miami), our annual picnic, the installation banquet and the annual hobby fish show." She goes on in relation to the fish show, "Our shows are judged by the best hobbyists of both marine and fresh water we can obtain. Judges last year consisted of Robert P. L. Straughan, William Stephens (Miami Marine Institute), Dr. Donald de Silva (an authority on sharks, he is also from the Miami Marine Institute), Frank Roberts, Jack Roberts, Bill Hearin and Bill Sternke."

Taking some of these names into consideration, it dawns on one that perhaps many of the tanks that the members enter in the shows are marine, and so they are, according to Tina, "I believe we are the only club in the country whose membership is composed of 50% marine collectors and marine keepers and 50% freshwater hobbyists. We have a very compatible group and all are interested and tolerant of the others' interests."

Tina is also the assistant editor of "Aqua Jewels" (editor-in-chief, Dick Carson). This is also probably one of the only bulletins that has two marine editors. These positions are currently held by Andrew Torony and Dave Owen, while the freshwater editor is Shirley Link. The exchange address is P. O. Box 4332, Sunrise Station, Ft. Lauderdale, Florida. You get more than your money's worth just in editors alone in this bulletin. ◄

Aqua ★ Quotes

Famous Last Words

"I left the cover off of the tank."

"I didn't think he could swallow them!"

"Of course I fed them—three spoonsful five times each day. You say three pinches?"

"That's why I bought them—I thought those little white dots on them were pretty."

"What's wrong with having two male Bettas?"

"Of course I kept my eye on the heater. Every time the little light went out I turned the knob until it came back on again."

"I can't understand it. I had Bill scrub that tank out real good—with soap."

"Certainly read the directions. But if a few drops 'arrest the disease' the whole bottle should cure it."

"Waddaya mean—natural decorations. I think that costume jewelry is real attractive in that tank—brightens it up."

—"*Fin Fare,*" Victoria, B. C.

PRODUCT NEWS

Utah Brine Shrimp Eggs

Fine quality brine shrimp eggs from the State of Utah are now being collected, processed and packed by Brine Shrimp Sales Co., Inc.

The company said that carefully controlled processing methods at its Hayward, Calif., plant are the chief factor in assuring that the Utah eggs reach users

in uniformly high quality. As compared with the standard San Francisco Brine Shrimp Eggs which produce approximately 3½ cc of newly hatched shrimp from 2 cc of dry eggs, the Utah product produces approximately 2 cc of newly hatched shrimp from 2 cc of dry eggs.

Utah eggs are much heavier than San Francisco eggs and, therefore, tend to sink in water, it was explained by James A. Mason, Brine Shrimp Sales' general manager. He said that greater care is required in setting up hatches. Where the hatch tray method is used, he said the Utah eggs require special care in spreading them evenly and lightly on the surface of the water.

Where larger containers are used with strong aeration, the container should be tapered at the bottom toward the air stone, in order to keep the eggs in constant circulation.

The Utah eggs offered by Brine Shrimp Sales are packaged in gallon and quart containers with a new and distinct label, and carry a guarantee of quality.

★ IDEAS ★

BY HOBBYISTS

The Journal will pay $5.00 for original ideas published. Keep less than 200 words. Send your idea today!

Old Nylon Stockings

The last several years I have been using bleached, and well washed nylon stockings, with the tops and feet cut off, as filter material. When I clean the filters, I wash the nylon, and soak it in water with a little bleach, until it is white again, then rinse *very thoroughly* and dry. Having a good supply, I always have clean filter material when I change the filters. It will last much longer than glass wool, and is more comfortable to handle.—*Mrs. C. McWilliams, Tacoma, Washington.*

CLUB NEWS

Suburban Maryland Aquarium Society

The S.M.A.S. recently held a tropical fish show at the Rockville Civic Center,

Rockville, Md. Over 3000 persons attended the show during its 2-day stand, according to Francis J. Clark, President.

Menten

(Continued from Page 140)

would have found the hard outer shell, but not a trace. Perhaps it managed to crawl out of the aquarium, using the air tubing as a ladder. If it ended up on the floor it would have made a tasty morsel for one of our dachshunds.

The horseshoe crab is a very interesting creature. Even with its drawbacks of periodically "hibernating," it can be highly recommended.

The Banded Coral Shrimp

The banded coral shrimp offers the marine aquarist the opportunity to have an efficient scavenger as well as a really beautiful and graceful creature. Its red and white body is supported by three pairs of long legs. A small claw is on the end of each of its legs. In front of the legs is a pair of large claws. On its head are six very long feelers. The shrimp's movements are very smooth and graceful. It appears to float across the bottom of the aquarium. When descending from the top of a piece of coral, it seems to be "gliding" downward. When foraging for food it moves along the bottom very slowly. Its large claws and all of its feet probe methodically into every nook and cranny; searching under every piece of gravel for bits of food. The food is carried up to the mouth area and held there by small paired appendages while it is being eaten. If large amounts of food are collected, the shrimp will retire to a safe retreat until it has consumed it all.

New Aquatic Publications

"The Bay Area Aquarist"

The first issue of this new official publication of six aquarium clubs in the Bay Area, including Alameda, East Bay, Eden, Golden Gate Guppy Group, Napa Valley and Vallejo, was published in January, 1965.

The Board of Editors includes Ann Patrick Cook, Joseph L. Tupper Jr., Neil O. McLean Jr., Florees Bailey Brown, Marie L. Swatts and R. L. Woodworth. The editorial staff: Joseph L. Tupper Jr., managing editor; Neil O. McLean Jr., assistant managing editor; Ann Patrick Cook, secretary; Florees Bailey Brown, treasurer; Curtis E. Wells, business manager and Judy McLean, exchange editor.

Mailing addresses for The Bay Area Aquarist—Business: P. O. Box 121, Oakland 5, Calif. Exchanges: Judy McLean, 1313 Carleton Drive, Concord, Calif.

The publication is off to a splendid start and is a welcome aquatic addition to the Bay Area scene. ◄

"Salt Water Aquarium"

The first issue of Salt Water Aquarium was published in January 1965. Published bimonthly by Coral Reef Exhibits, P. O. Box 59-2214, Miami, Florida 33159. Cost: $2.50 per year in the U.S.A., 40c per copy and $3.50 per year outside of the U.S.A. The publisher and editor is Robert P. L. Straughan. The first issue contains 18 pages of text and advertisements, not counting the four page cover. It has four articles on marine fishes and aquaria, and what appears to be an editorial column by Straughan entitled "On the Reef." This promises to be an interesting running account of Bob's experiences collecting in Florida waters. Also included is a section of questions and answers concerning marine aquaria, fishes, skindiving and collecting. There is also a short quiz section and a letter-answer column. This magazine has great potential for the marine aquarist and we wish it every success in promoting this section of the hobby. ◄

Then it will move out again on another collecting trip.

The fact that the banded coral shrimp picks up food off of the bottom does not mean that it is strictly a bottom feeder. It will "crawl" up the aquarium glass, grabbing at bits of descending food. It will not hesitate to fight it out with its finned tankmates in order to get its fair share at dinner time.

Its co-occupants in the aquarium should be on the gentle side. More aggressive fish may give the shrimp a hard time. The banded coral shrimp is especially vulnerable after sloughing its skin, which it does periodically. At this time the shrimp is weak and virtually defenseless. Plenty of secure hiding places should be provided by the aquarist.

With careful choice of tankmates, the banded coral shrimp is a very satisfactory and interesting addition to a marine aquarium. It is a very beautiful creature and an efficient scavenger.

The Hermit Crab

And then there is the "ole workhorse" of the marine aquarium—the hermit crab. The hermit crab is to the marine aquarium what *Corydoras* is to the freshwater aquarium, and like *Corydoras*, there are many kinds. Probably no better scavenger can be found. Most are extremely hardy and acclimate very easily to aquarium life. A relatively long life can be expected from many of these interesting crabs. A couple of my hermits have been with me for four years.

The following remarks refer to the hermit crabs I have kept, a species found on the eastern coast of the United States. Its hindquarters, from the point where the thorax and the waist join, are very soft; this is the hermit crab's "Achilles'

The Journal will pay $5 for original ideas published. Keep less than 200 words. Send your idea today!

★ IDEAS ★ BY HOBBYISTS

How Not to Cook a Fish

I have found that 1½ watts of heating per gallon of water raises aquarium temperature 10 to 15 degrees above room temperature. Unless you keep your tanks in an unheated garage, this is enough extra heat to compensate for any day-night temperature changes in your home. Yet most of us continue to put a 75 W heater in a 15 gallon tank, running the risk of cooking our fish if the thermostat fails. There are two simple methods for reducing the power rating of a heater, neither of which wastes electricity or alters the heater itself. The first involves inserting a silicon rectifier in one of the power leads. Bargain 750ma 200piv silicon rectifiers, adequate for a 75W heater, are available at nearly all radio stores. Break one of the wires in an extension cord, solder the rectifier in series with the break, and tape the whole thing up. Any heater plugged into this cord will now operate at only half capacity; e.g., a 50W heater becomes a 25W. If you have several adjacent tanks, two heaters may be connected in series. The heaters should be of the same capacity, but only one of them need have a working thermostat. The other may be an old unit with a short thermostat, an ordinary submersible heater, or a regular thermostatic heater with the temperature knob screwed down, so that this heater is always on. Again break one wire of an extension cord, but this time splice in a second socket. Plug one of your heaters into this new socket, and the other into the original socket on the extension cord. The heater with the good thermostat now controls both units, and each dissipates a quarter of its rated power. *Note:* the neon bulb indicator will no longer light, since there is not enough wattage across the unit.—*Chet Opal, Baltimore, Maryland* ◄

heel" and in order to protect itself it wears a "borrowed" shell over its body. Belonging to the order Decapoda, the hermit crab has five pairs of walking legs as all crabs and other decapod crustaceans. In the hermit crab, three pairs of legs are modified, leaving only two pairs that are actually used for locomotion. The first pair, as in other crabs, is modified to form claws. The next two pairs are the actual walking legs. The fourth pair of legs is a withered appearing set that is used to help grip the "borrowed" shell. The last pair is not visible when the hermit is wearing its shell. This last pair of legs is in the shape of small horny hooks which serve as an anchor and makes it practically impossible to forcibly remove the crab from its shell.

In a day's time the hermit crab will make a number of trips around the aquarium searching for bits and scraps of food. Even bits of food that have "hung up" on a piece of coral will be found by the hermit in a very short time. Its claws probe down through several layers of gravel, searching for food. This tends to stir up the sediment somewhat so that it can be picked up by an outside filter.

Periodically the hermit crab will shed

CLUB NEWS

Minnesota Aquarium Society, Inc.

The Ninth Annual Tropical Fish Show sponsored by the M.A.S. will be held at the Minnesota Federal Savings and Loan Association, 601 Marquette Ave., Minneapolis, from April 5 to 9, 1965, according to Dick Larson, publicity chairman.

Albert J. Klee, internationally known aquarist and writer, will be the guest speaker at the May 13 meeting, Mr. Larson said. This lecture will be held at the Minneapolis YWCA, 1130 Nicollet Ave. Sharen Morrison is the chairman. ◄

its old skin; at this time it will be very inactive. Several days before the actual shedding, the hermit crab will find a secluded spot in which to hide. It will remain in this spot, never moving away from it. Most of the time it will be completely drawn up into its shell. After shedding there will be a couple more days of inactivity before the hermit once again starts foraging for food. So with each shedding there is a period of approximately a week when the hermit crab will not perform its scavenger service. The frequency of the skin shedding varies with the size of the crab. The larger the specimen, the less frequent will be the occurrence. Smaller crabs will shed their skins every few weeks, while larger crabs will go for several months at a time. Except for these brief periods, the hermit crab is a very efficient full-time scavenger.

As mentioned previously, the hermit crab in its "birthday suit" is very vulnerable because of its soft hindquarters. Wearing a borrowed shell protects the crab and provides a fortress where the hermit crab can retreat when danger threatens. As the hermit grows the aquarist must provide larger shells for it to occupy. The aquarist's choice of brightly colored or unusually shaped shells can provide a marine aquarium with a very novel attraction.

The process of changing shells is very entertaining to watch. The hermit crab may change back and forth, from old shell to new shell, several times before finally deciding to keep the new shell. If several empty shells, of appropriate size, are kept in the aquarium, this shell-changing bit may go on constantly. The aquarist will never be certain, from one day to the next, which shell he will find the hermit crab wearing.

Occasionally there are reports of hermit crabs catching and killing prized marine fish. But, the aquarist can be certain that if he finds a hermit with one of

his marine beauties—the fish was either already dead or at least fairly well gone.

Hardiness, low cost, efficiency and novelty make the hermit crab an entertaining and valuable asset to any marine aquarium.

There are a number of other creatures that can be kept in a marine aquarium to serve as scavengers. The preceding was just a brief "rundown" on three forms that are most likely to be seen. They can all be highly recommended for any marine aquarium. ◄

Klee

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graphical information that we have, I believe that it serves no useful purpose at this time to revert to subspecific terminology. However, I realize that the *bivittatum* group represents an extremely closely-knit complex of species or near-species, and that in this instance, the classical definition of species leaves much to be desired.

ACKNOWLEDGMENTS

My appreciation is hereby extended to John Gonzales of Philadelphia, Pa., who undertook the painstaking breeding experiments described; Richard Lugenbeel, of Washington, D.C. who arranged for the electrophoretic work; and to Dr. Richard Hewitt of the Carnegie Institution of Washington, who did the actual electrophoretic analyses.

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Masters

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the chemistry of life, including the effects of hormones. Basic texts on biology explain these subjects and one does *not* have to be college trained to master efficient, enlightened guppy breeding. Take notes and keep records; unless you do, your work may all be in vain.

Mutations, or sports, come about spontaneously so that no one can predict when they will occur. The event subsequently gives rise to a new characteristic whether it be color, shape, or size and the hereditary unit responsible is a mutant gene. The mutation of a "normal" gene must take place in either the male or female germ cells that make up a fertilized egg. The egg is then a large cell carrying this mutation. The egg cell then divides many, many times, finally forming the adult fish after growth and development. Every cell in the adult fish is a descendant of the egg cell. Genes control the developmental processes and a mutant gene alters it, producing the sport or mutation such

as a change in fin shape or color difference.

Not too much is presently known as to whether the change (i.e. mutation) occurs in an existing gene or as a "mistake of nature" when the gene is "copying itself" in preparation for cell division. Mutation, however, is not a slow process but takes place all at once and the "mistake" or alteration is then passed from one generation to the next because at cell division of sex cells (or any other cell division), the mutant genes, like other genes, ordinarily copy themselves, passing their pattern and thus their controlling influence on development to the next generation.

To many breeders of animals, the term hybrid is commonly limited to a cross between different species, but it can be used to represent a cross betwen races or varieties of the same species so that the resulting organism will contain two different genes for the same character, whatever it might be, one coming from each parent.

Step number one to successful guppy breeding is to learn enough about their characteristics so that one can recognize new varieties when they occur. This is often possible only through familiarity with the guppy stocks in your possession. Judge what good characteristics are and be on the lookout for them. Resistance to disease and rough handling are good but they can't be seen at a glance. Keep these in mind however. It pays to study guppies in fish stores or in the homes of friends. Pay attention to both sexes and try to establish a "basic strain" by mating a female with one of her sons and thereby, through inbreeding, fixing desirable characteristics. The word, trait, in aquarium circles, is a good one to know. It is, in general, equivalent to the word character, but not quite as specific. For example, one speaks of fish length which may be relatively short or long and skin color which may vary tremendously from the normal even to the point where it is albino.

Genes are exceedingly small but they occupy a definite place on specific chromosomes (which are the inheritance controlling bodies in a cell) and control the passing on to offspring of a single trait or a combination of traits. Each chromosome has many genes or areas controlling specific inherited characteristics of an animal or plant. By controlling the production and action of en-

CLUB NEWS

Lincoln Exotic Fish Watchers Club

The L.E.F.W.C. recently held an election of officers with the following results: Herman Spomer, president; Rolland Wallick Sr., vice-president; Mrs. Bud Schell, treasurer; Rolland Wallick Jr., sergeant at arms, according to the secretary, Mrs. Paul Fitzwater. ◄

zymes in growth, development, and maturity, genes create or tend to create the substances such as carbohydrates, proteins, and other molecules which make up cells, tissues, and organs of which the living guppy is composed. Someday genes may be referred to as chemical groups in the chemical structure of living things but for the present the word gene is sufficient.

Some of the things within the environment which induce the formation of mutations are worthwhile knowing about and might even someday be used advantageously for the production of superior guppies. These influencing factors are not too well understood but they include the presence of certain organic chemicals (even those in the nutritive supply of the fish), virus infections, intense electrical jolts such as those caused by lightning, radiation from X-rays and radioactive isotopes, temperature increases or decreases and high-frequency agitation. Not all cells of which the fish is composed are equally sensitive to these things. However, the reproductive cells are often subject to such influences and therefore the change can be transmitted to offspring. In general, the amount or degree of change is directly proportional to the total amount of disturbing factors. In nature, however, one may be assured that there are many unknown causes for the formation of mutant genes and subsequent production of varieties and species. It is possible, however, for man to experiment with these natural processes a little, at least in one direction. He can purchase very small, and absolutely safe, amounts of radioactive isotopes from the larger pharmaceutical drug manufacturers and expose some of his fish to the rays. The cost should be quite minimal and can be accomplished without an Atomic Energy Commission license. Rest assured it is entirely safe or the chemicals would not be available to the public. It is possible that mutant genes with some very interesting results may follow. At least it is a start in that particular direction. Remember though, once the nucleus of the cell (that part containing chromosomes and therefore genes) is changed by the mutation of a gene, that change will persist. The cell and all following cells will copy that change unless the change itself kills the cell.

It becomes rather obvious then, that the sex cell is the target in all efforts toward new guppy creations. Cells have long been known as the building blocks of all living things. Repetitive action is constantly taking place within each cell so that all parts of an individual remain the same until a change takes place which results in a new variety. If the cells remain constant, succeeding generations remain similar – if the cells change, new varieties are created. ◄

(To Be Continued)