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Massive Aggregations of Large Rays and Sharks In and Near Sarasota, Florida

EUGENIE CLARK

Cape Haze Marine Laboratory, Sarasota, Florida

(Plates I & II)

RAYs PHOTOGRAPHED

REMARKABLE photographs of an aggregation or school of over three thousand rays recently were presented to me by Lionel Murphy, a professional photographer in Sarasota. Mr. Murphy and a pilot, Harry Louden, observed the rays from a plane while on an assignment to take aerial photographs on July 18 or 19, 1959. At about 2:30 p.m. the huge school of rays was sighted in water less than five feet deep over a sand bar in Big Pass, Sarasota, Florida, about one-third of the way across the Pass on the north of Lido Key side. The plane circled the rays for at least ten minutes and Mr. Murphy took two photographs of the school from a height of about 300 feet above the water. One of these is reproduced here as Plate I.

Mr. Murphy estimated the wing span of the individual rays comprising the school at about three feet. A solitary larger ray (possibly a manta or spotted eagle ray) with a wing span of about seven feet can be noted to the lower left of the school in Plate I. Mr. Murphy noted that this ray swam apart from the school and never swam into the school during the time he watched. The school as a whole did not appear to be moving in any one direction but waves of movements of individuals within the school were noticeable.

The photograph of this remarkable school has been studied on a 15 by 20-inch enlargement print of the 4 by 5-inch negative. Because the rays in the central region of the school are arranged in at least two layers, it is impossible to make an accurate count. By counting all individuals clearly discernible, however, it can be recorded with certainty that the school was composed of at least 3,050 rays, and it is estimated

that at least 1,500 more could be safely added to this total from areas of overlapping fish that could not be seen as separate entities. It is possible that the school consisted of as many as 6,000 rays. From studies of enlargement prints, the dark areas in the central portions of the school are not thought to be shadows but dense concentrations of rays. Individuals at the perimeter of the school near the water surface are clearly seen to cast no appreciable shadows.

The direction of the individuals as seen in the photographs suggests schooling behavior. The projecting head is easily seen in most of the rays discernible and the fishes appear to be headed in the general direction of the upper left of the photograph, probably westward considering the position of the reflected sunlight of the water ripples and the time of day. As in large schools generally, there tend to be sub-groups heading in somewhat different directions. In fish heading into a current, sub-groups may result from responses to vagaries in flow. This phenomenon also occurs in large schools of fish in still waters for intrinsic reasons (Breder, 1960). The greatest angle of deviation of an individual ray from the general direction of the school is about 42°. Since this aggregation of rays as a whole did not appear to be moving, it was considered possible that the school-like alignment of the individuals was the result of the rays maintaining a position against a tidal current in the Pass. On checking, however, it was found that the tide was ebbing at this time. Tides before and after the time the photos were taken of the school were: high 10:03 and 11:11 a.m. and low 6:46 and 7:29 p.m. respectively for July 18 and 19, 1959, in Sarasota Bay. If the direction in which the rays were headed was westward, as surmised above, the rays would be headed in the same direction

as the current flowing out of Big Pass. It is considered remotely possible that the rays were facing into a countercurrent eddy over the sand bar or were in an area of relatively still water.

Big Pass is approximately 2,000 feet across with shallow sand bars covering over half of its width. The deepest part of the Pass is 22 feet. The wide and narrow diameters of the roughly oval-shaped school measure approximately 350 and 180 feet and therefore covered a sizeable portion of the sand bar area in the Pass. Parts of this sand bar, the shape of which is notorious for its changeability, are out of water except at very high tides. This sand bar is also known to have, at various times, large beds of the bivalve *Chione* on which the school of rays may have been feeding.

From the protruding, rather pointed heads of these rays it was thought at first that the school was composed of the spotted eagle ray, *Aetobatus narinari* (Euphrasen), one of the common large rays in the area. The spotted pattern of this species probably would not have been recorded by the camera at a distance of 300 feet. A school of many hundreds of individuals of this species has been reported by Coles (1910) as passing swiftly under a yacht three feet below surface near Cape Lookout, N.C., on July 20, 1909. Further enlargement prints of sections of the photographs (Plate II), however, show protruding but blunt heads on some of the rays. This fact, together with the following reports gathered locally, indicates that the school photographed by Mr. Murphy more likely consisted partly or wholly of cownose rays, *Rhinoptera bonasus* (Mitchill).

OTHER RAYS SEEN

Aircraft pilots, commercial and sports fishermen, and charter boat captains, who are familiar with this coastal area, and fishing editors of local newspapers, were questioned about sightings of large schools of rays. None had seen or heard about any large schools of spotted rays in this area although several had seen large schools of other kinds of rays, all of which could have been the cownose ray which, according to Bigelow & Schroeder (1953) and Springer & Woodburn (1960), is known to form large schools.

Mr. Jay Odell of Venice, Florida, reported one of these observations to me. Mr. Odell was on a boat with its owner William Ward, also of Venice, when they saw a huge school of rays in the Gulf of Mexico about one-half mile offshore of Venice in an area about 16 miles south of Big Pass, Sarasota. This occurred during the last week of July or the first week of August in

1956. The boat was heading south and the school of rays approached from the north. At first the observers thought the dark mass in the water was a cloud shadow but they then noted that there were no clouds above. The mass soon overtook the boat and passed directly under it, traveling south in the same direction as the boat. The observers figured the time of day must have been between 11 a.m. and 2 p.m. They recalled that the school appeared to be several hundred feet in diameter, that the individual rays were solid brown in color and about 3 or 4 feet wide, and were swimming close together in several layers. None of the rays was seen to break the surface; the uppermost fish seemed to be about 2 feet below the surface. The water was about 18 to 25 feet deep. The lowermost rays could not be seen through the dense mass which probably was composed of thousands of rays.

Mr. and Mrs. Fred Logan of Sarasota reported having seen at least six large schools of cownose rays in this area in the past ten years. These were observed from the Logan's boat usually in mid-summer and in each of these cases the school was observed to remain in one area on one of the sand bars located on the north side of Anna Maria or Big Pass. The largest school, which Mr. Logan estimated as considerably smaller than the school of rays in the accompanying photographs, was composed of perhaps a thousand individuals and was seen just outside Anna Maria Pass, about 20 miles north of Big Pass, in water 10 or 12 feet deep just at the edge of a sand bar. The rays were swimming close together and appeared to be about eight layers thick in the center of the school. In the spring of 1952, the Logans observed a smaller school of several hundred individuals just outside Big Pass and took 8mm. movies of this school. They harpooned several individuals which weighed between 35 and 40 pounds each and were about 3 feet in wing spread, and could definitely be identified as cownose rays. All the individuals in this school appeared to be of uniform size.

Mr. John Klauck of Sarasota reports having seen several hundred rays swimming under the second Ringling Causeway bridge in Sarasota Bay at about 7 a.m. on two consecutive mornings in June, 1959. The rays were about 2½ feet across, plain gray, but Mr. Klauck could not remember the head shape.

Mr. Dan Byrd, who operates the fish camp at New Pass, reports having seen schools of several hundred cownose rays at least six times in the past 15 years, although he cannot recall what times of the year they were seen. These were rays 2 or 3 feet wide, swimming back and forth

parallel with the bridge across New Pass. Occasionally a manta or several spotted eagle rays were seen near the school of cownose rays. The rays, which stayed in the area for sometimes as long as two weeks, were often hooked ("snitched") from the bridge by fishermen. One of these fishermen, Jack Matthias, who hooked more than eight rays from a school under New Pass bridge in the summer of 1958 when he worked at Byrd's Fish Camp, confirmed Mr. Byrd's observations that the rays were about 2½ feet wide and definitely cownose rays. Mr. Matthias estimated that the school consisted of 300 or 400 individuals. The rays swam back and forth at the speed of a man's slow run, and the uppermost rays stayed about 2 feet under the water surface. They swam close together in formation and were in several layers. The water under this bridge is 15 feet deep. This school stayed in this area about 2½ weeks. Several spotted eagle rays, each about 4 feet wide, stayed near the school of cownose rays.

BONNETHEAD SHARKS

Occasionally groups of up to about a dozen sharks have been observed swimming close together in this area. On November 1, 1961, I observed from an airplane eight sharks which appeared to be full-sized adults of the dusky shark, *Eulamia obscura*, between 10 and 11 feet in length, swimming in a loose aggregation on the sand bar just outside Longboat Pass, north of Sarasota. Fishermen have several times reported groups of about a dozen bonnethead sharks, *Sphyrna tiburo*, swimming in groups in the bays and close to shore in the Gulf.

We have only one detailed report, however, of a massive aggregation of sharks in this area. This unusual case was reported to us by L. A. "Red" Stanley, a local commercial fisherman. On the night of November 22, 1962, about 8 p.m. Mr. Stanley and his helper spotted what they thought was a huge school of Spanish mackerel churning the surface in water about 8 feet deep in the Gulf of Mexico about 200 yards from the rock jetties off Lido Key, Sarasota. The fishermen put their net overboard and encircled the mass of fish. The net, a standard gill net for catching mackerel, was 9 feet deep and about 350 feet long, and had a mesh opening 3½ to 4 inches stretched.

In one hour the fishermen began pulling in the net. They found it to be full of bonnethead sharks, *Sphyrna tiburo* (Linnaeus), which locally is called "shovelnose shark," distinguishing it from any of the other hammerheads. Mr. Stanley estimates that well over 700 sharks were

gilled and it took the two men six hours to remove them. The hands of the men were sore and raw from handling the sharks even though they were practically all dead and hardly moved when handled. The sharks were between 2 and 3 feet long. Unfortunately none were saved. Three other unidentified sharks about 3 feet long and of a typical *Carcharhinus* body shape were tangled in the net along with 300 pounds of mackerel weighing about 1½ pounds each. The fishermen were disgusted with their poor catch but a few days later thought to report it to us.

Mr. Stanley, who has been a local commercial fisherman for over forty years, regularly has seen, at least once or twice each year, schools of bonnethead sharks comprised of about 50 to 75 individuals. He informs me that large schools of bonnethead sharks, comprised of hundreds of individuals, were not uncommon before the severe "blooms" of *Gymnodinium brevis* ("red tide") in 1946-47. These large schools of sharks occurred often enough, though at no particular time of year he can recall, so that mackerel fishermen were cautious to inspect carefully what appeared to be a large school of mackerel, in order to avoid netting a mass of these sharks. Since 1946-47, however, this caution was relaxed as large schools of sharks no longer were seen until the present case reported above.

SUMMARY

Two exceptionally large aggregations of elasmobranchs are reported from shallow water on the Gulf Coast of Florida at Sarasota. Rays, probably *Rhinoptera bonasus*, were photographed from a plane at New Pass in July, 1959. A study of the photograph reveals about 4,000 to 6,000 individuals in school-like formation.

Over 700 bonnethead sharks, *Sphyrna tiburo*, were caught by commercial fishermen in a gill net near Lido Key in November, 1962. Observations of other aggregations or schools of these species are reviewed.

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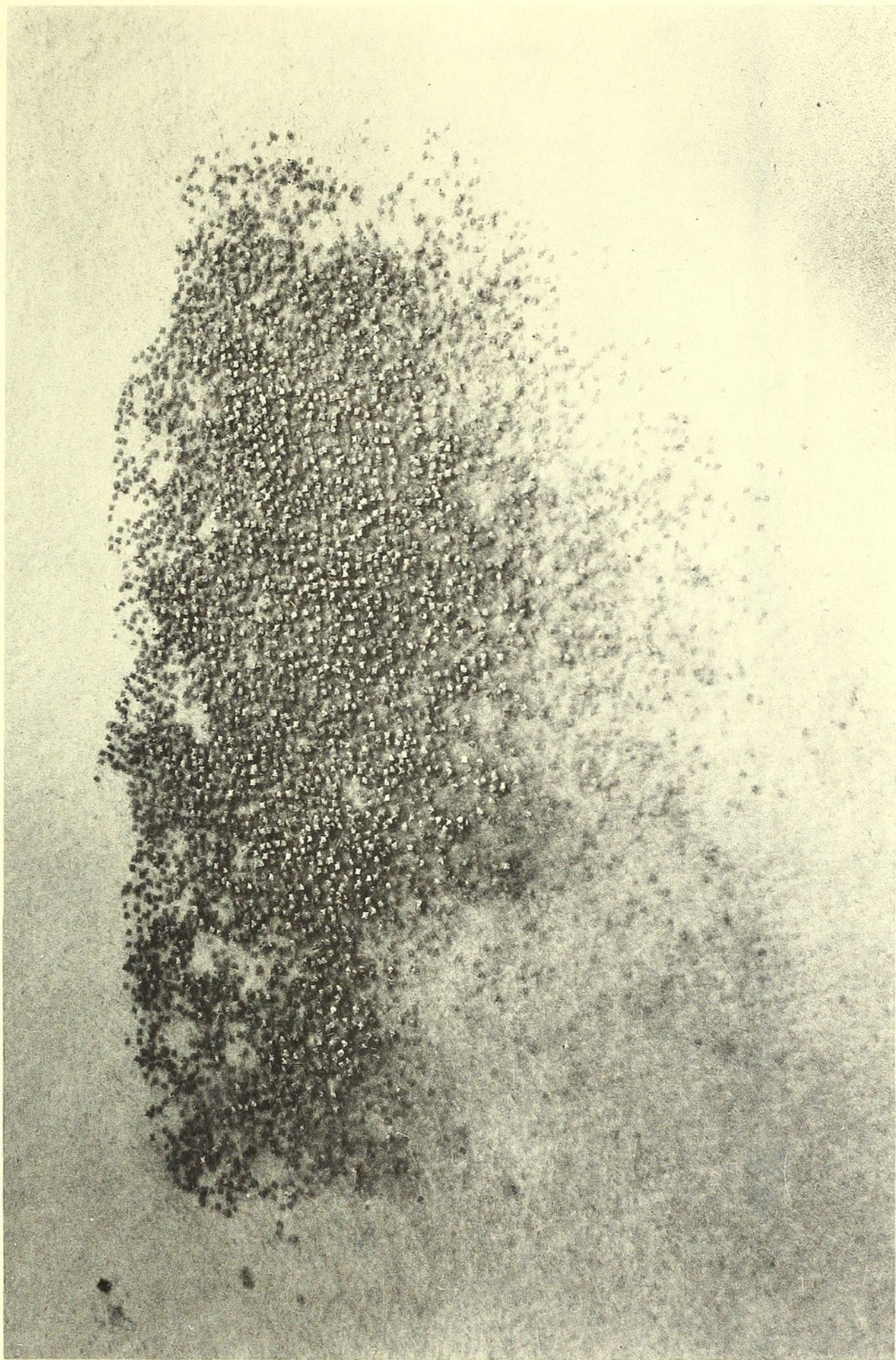
EXPLANATION OF THE PLATES

PLATE I

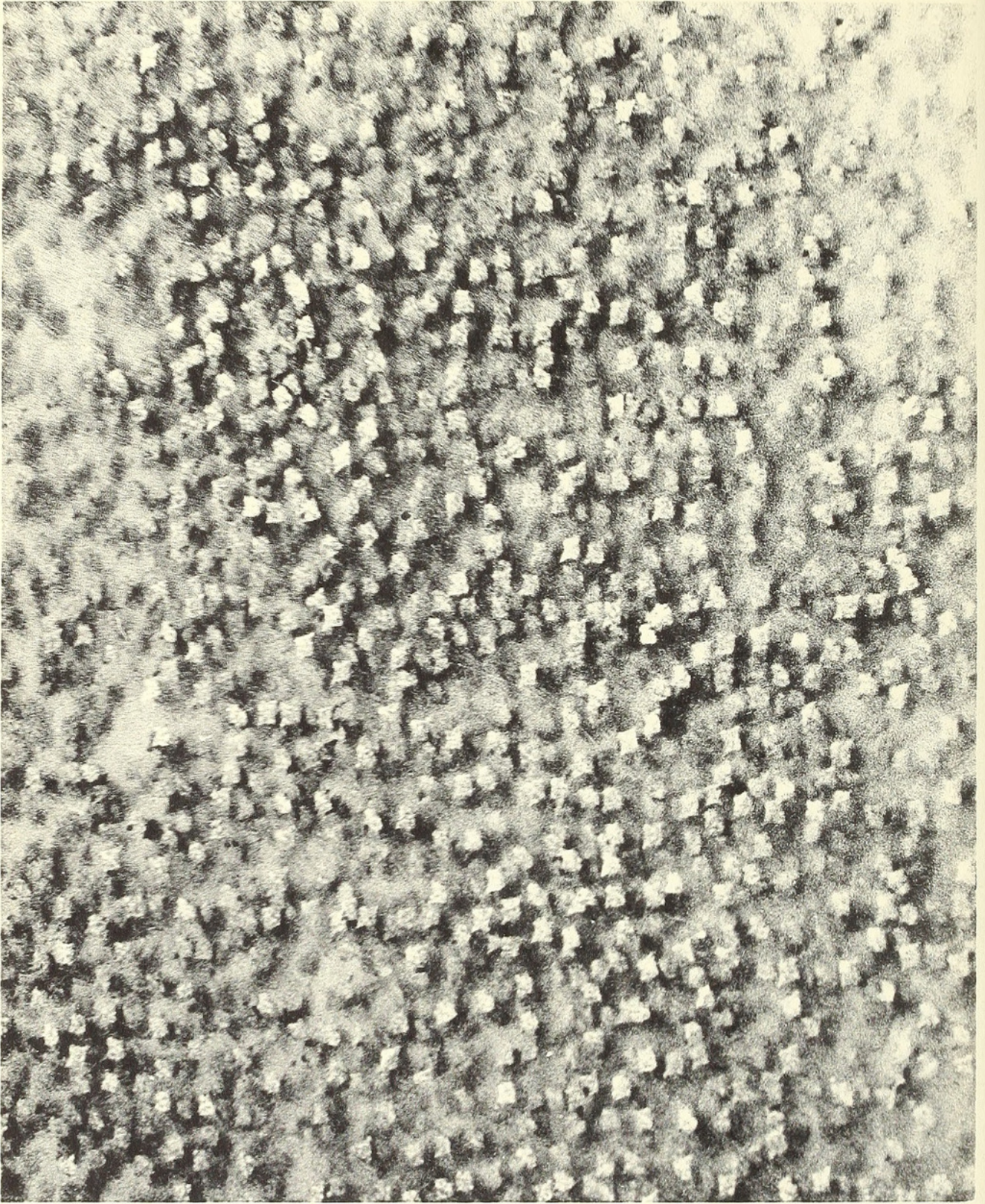
- FIG. 1. Aerial photograph of a dense aggregation of rays, probably *Rhinoptera bonasus* (Mitchill), in Big Pass, Sarasota, from a height of approximately 300 feet. (Lionel Murphy, photographer)

PLATE II

- FIG. 2. Enlargement of a central area of the school of rays.



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