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REPORT ON A RECENT SHARK ATTACK OFF SAN FRANCISCO, CALIFORNIA¹

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INTRODUCTION

The great white shark (*Carcharodon carcharias*) is considered by some experts to be the most dangerous species of shark—as far as man is concerned. During this century, this species has fatally injured at least 14 victims and incapacitated many others (Gilbert, 1964). Two such fatalities occurred in central California, one in 1952 (Bolin, 1954) and the other in 1959 (Gilbert *et al.*, 1960). The victim of the 1952 attack died within a few minutes after being severely bitten. The 1959 victim expired 2½ hours after he was taken to a hospital. The causes of death in each case were shock and severe hemorrhage. This report deals with a similar, but non-fatal attack, on Jack Rochette of Burlingame, California, which occurred on January 11, 1964.

PARTICULARS OF THE VICTIM

The victim, a male Caucasian, was 21 years of age, 6 feet 1 inch in height, and weighed approximately 175 pounds. When attacked he was wearing a black neoprene exposure suit with yellow striping. Accessory diving equipment included yellow swim fins, black face mask, and twin, 42-cubic-foot, white, compressed-air tanks. He was also carrying a two-band spear gun.

LOCALITY OF ATTACK AND ENVIRONMENTAL CONDITIONS

The victim, a member of a party of about 15, was SCUBA diving from a boat with five others one-quarter mile off the west side of Southeast Farallon Island, some 30 miles west of San Francisco at approximately long. 123° W., lat. 37° 42' N. The attack occurred at 12 noon. The sky was clear, the air temperature 18° C., and the water temperature 13° C. The depth of the water was 50 feet, with a visibility of 40 feet. The bottom was generally flat, with many rocks and caves, and no kelp or other large dominant algae were present. A very strong surge prevailed and whitecaps were present on the sea surface. The wind was north-by-northwest, between 10 and 20 knots.

DESCRIPTION OF THE ATTACK AND RESCUE

Rochette had switched to his reserve air supply (enough for about 5 minutes diving) shortly before spotting a yellow-and-black-colored

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rockfish swimming around an outcropping of rocks. He cornered the fish in a small crevice, but rather than discharge his spear, he poked the spear gun into the crevice and stabbed it. At that time his reserve air supply became exhausted and he had to surface immediately. The moment he surfaced the shark attacked him. At first, he thought that one of his diving partners had grabbed him by the legs; however, upon glancing down he saw that a shark had both of his legs, from his thighs to the middle of his calves, in its mouth. Rochette was lying on his stomach in a horizontal position on the surface and the shark's lower jaw was across the front of his legs while its upper jaw extended across the back of his legs. The shark appeared to vibrate all over, shaking him fiercely. Rochette slammed his spear gun, point first, onto the shark's snout, whereupon it released its grip and swam off. He then took the rockfish off his spear and let it sink to the bottom. The shark turned and made a second advance toward him and he retaliated by slamming it on the snout with his spear gun. This was repeated several times over a period of approximately 4 minutes. Each time the shark would circle clockwise, advance to about 3 feet directly under him, receive a blow on the snout, then retreat below him some 10 feet. In order to keep the shark in view, Rochette floated horizontally on the surface and paddled in a continual circle while moving gradually toward the boat. Once, the water became so bloodstained that he had to swim away from that immediate area in order to see the shark. Rochette said that during one advance by the shark, he dove under the water to meet it head-on. He placed his right hand on the ventral side of the shark, just below the gill slits and then placed his left hand, which held his spear, on its back and pushed away. Rochette stated, "As the shark swam past, its dorsal fin was higher than my spear gun was long." Apparently the shark then spotted Rochette's five diving companions on the bottom, for it suddenly swam toward the bottom, abandoning its advances on him.

At about this time, Jack Bolger, a member of the skindiving-party, who had been with another group in a different area, climbed aboard the boat and saw the shark circling Rochette, who appeared to be in trouble. He stripped off his SCUBA tanks and face mask, dove over the side, and swam some 130 feet to aid Rochette. He gripped the victim's air tanks and towed him to the boat. Meanwhile, after leaving Rochette, the shark cornered two of the five divers in a cave. It would circle the cave and then swim toward the other three. It kept all five pinned to the bottom for about 5 minutes longer before leaving the area.

Upon boarding the boat, Rochette was given immediate first aid, and the U.S. Coast Guard was radioed for assistance. A Coast Guard helicopter arrived at 12:25 PM, lowered a basket into which Rochette was placed and flew him directly to the U.S. Public Health Service Hospital in San Francisco.

DESCRIPTION OF INJURIES AND TREATMENT

Although Rochette was only bitten once, he had multiple lacerations of both legs. The most severe of his injuries was a 10-inch laceration on the dorsal side of his right thigh (Figure 1). This laceration extended through the *tensor fascia lata* muscle to the femur. A laceration on the dorsal side of his right calf penetrated fairly deep into the *gastrocne-*

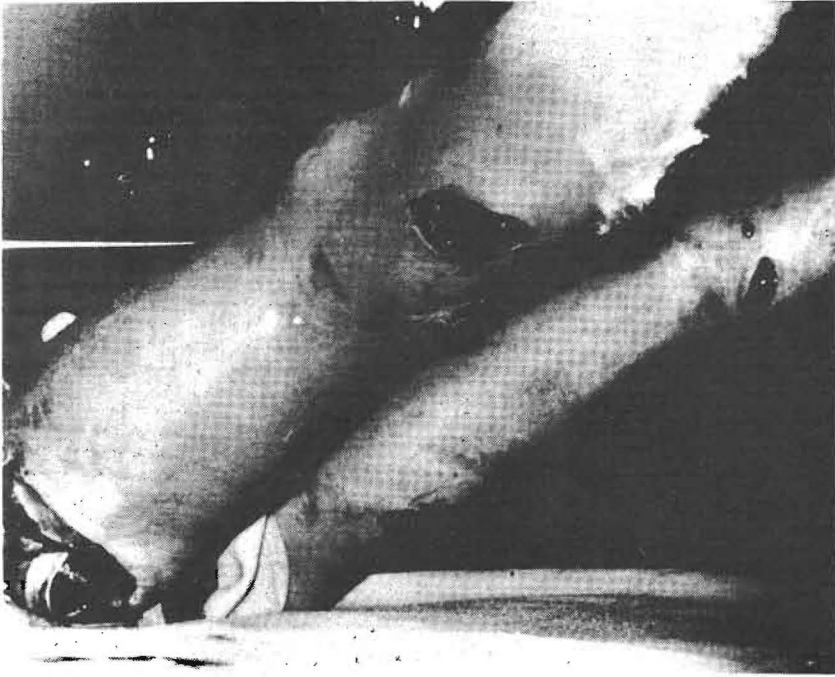


FIGURE 1. The extensive damage to the back of Jack Rochette's legs, caused by an attacking great white shark at the Farallon Islands, California, in January 1964. Photograph Courtesy United States Public Health Service Hospital.

mius muscle, severing a nerve, thus impairing his ability to manipulate his right foot. Lacerations also were present on the ventral side of his right calf, and on the dorsal side and inner portion of his left calf. Three large lacerations also were inflicted to the ventral surface of his left thigh.

First aid treatment, both on the boat and in the helicopter, was immediately concerned with controlling the profuse bleeding. Rochette, upon arrival at the hospital was alert, oriented, and not in shock. He was taken immediately to the operating room. During the operation, which lasted 4 hours and entailed the services of seven surgeons, he received three units of whole blood. He returned to the operating room on the fourth postoperative day for secondary closures of his lacerations. Prior to this second operative procedure he received two units of whole blood. He has since completely recovered.

IDENTIFICATION OF SHARK RESPONSIBLE FOR THE ATTACK

During surgery, a 17.2 mm tooth fragment (Figure 2) was extracted from the injury on the dorsal side of his upper thigh. Since the tooth is triangular with serrated edges it is quite evident that it came from a great white shark. W. I. Follett, California Academy of Sciences substantiated my identification. Although the victim and the witnesses agreed that the shark appeared to be between 20 and 25 feet long, it is

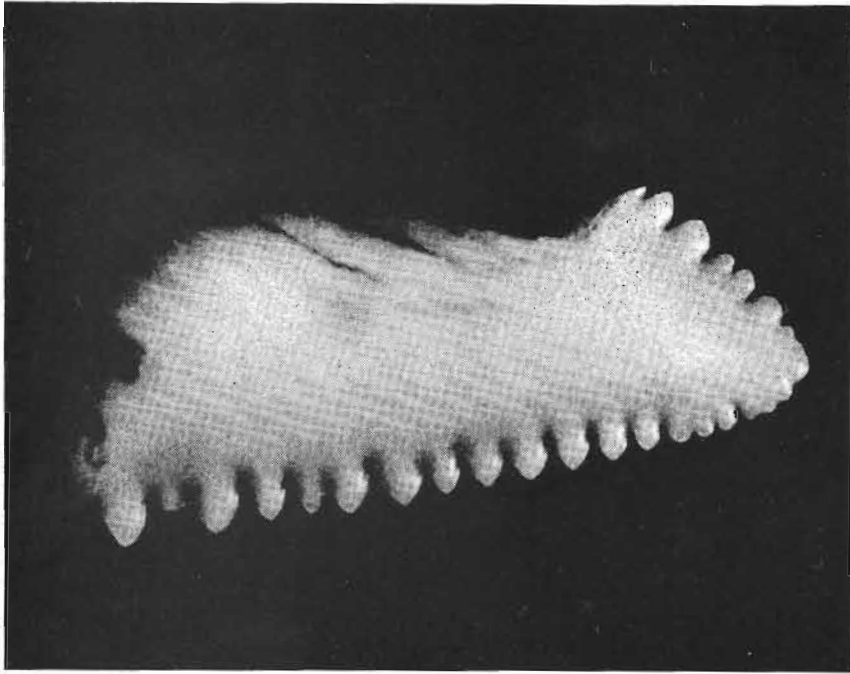


FIGURE 2. *Carcharodon carcharias* tooth fragment extracted from dorsal right thigh injury on Jack Rochette. The fragment was 17.2 mm long. Photograph by W. I. Follett, 1964.

possible that the prevailing emotional circumstances may have caused them to overestimate its length slightly. Nevertheless, the nature of Rochette's wounds indicate it was a large specimen.

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