rare-earth atom can be seen in the depression of the superconducting transition temperatures. The results are given in Fig. 1.

For rare earths dissolved in pure La the maximum depressions occurred for Ce and Gd, reaching 6°K/atom percent at Gd. For rare earths dissolved in ZrB_{12}, on the other hand, there is only one very pronounced maximum which occurs for Pr, reaching close to 13°K/atom percent. The magnitude of this maximum points to a virtual bound *f*-level in Pr, very near to the Fermi surface. This leads us to expect that Pr in ZrB_{12} will also exhibit a resistance minimum, and this is verified in Fig. 2.

Based on an extrapolated lattice constant for hypothetical PrB_{12} of 7.53 Å, the pressure at the Pr site in ZrB_{12} is roughly 200 kb, if we assume that the compressibility of ZrB_{12} is the same as that of pure crystalline boron. At this pressure, Ce is tetravalent and no longer magnetic; this is evidenced by the small depression of the superconducting transition temperature and the lack of any resistance minimum. However, Pr could be either tetravalent with a virtual bound f^1 configuration or trivalent with a virtual bound f^2 configuration. We expect an f^1 configuration to have an effective magnetic moment of ~2.5 Bohr magnetons, whereas an f^2 configuration should have an effective magnetic moment of ~3.6 Bohr magnetons. Inverse magnetic susceptibility versus temperature follows a clean Curie law and gives a value of close to 3.6 Bohr magnetons, thus favoring the f^2 configuration.

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Destruction of Pacific Corals by the Sea Star Acanthaster planci

Abstract. Acanthaster planci, *a coral predator, is undergoing a population explosion in many areas of the Pacific Ocean. Data on feeding rates, population movements, and stages of infestation were collected along coral reefs of Guam and Palau. Direct observations on destruction of Guam's coral reefs indicate that narrow, fringing reefs may be killed as rapidly as 1 kilometer per month. In a 2½-year period, 90 percent of the coral was killed along 38 kilometers of Guam's shoreline.*

Goreau (*1*), in seeking causes for impoverished coral growth in areas of the Red Sea, suggested that predation by a large, sixteen-armed, spiny sea star, *Acanthaster planci* (Linnaeus), the "crown-of-thorns starfish," might be sufficient explanation. Barnes and others (*2*) reported that the same species was destroying large tracts of living coral along the Great Barrier Reef in Australia. Recently *A. planci* was reported from several Pacific islands (*3*). A severe infestation on the reefs of the U.S. Territory of Guam has led to the establishment of a control program under the direction of the University of Guam. Available information indicates that recent population explosions of *A. planci* are occurring almost simultaneously in widely separated areas of the Indo-Pacific Ocean and that these are not short-term population fluctuations of the type reported for numerous other marine invertebrates (*4*).

Although *Acanthaster planci* is a Linnaean species and has been known for a long time, it has been regarded as a great rarity until about 1963, when large swarms were reported by local residents from the Great Barrier Reef near Cairns.

Since 1967 this starfish has killed well over 90 percent of the living coral along 38 km of the coastline of Guam from just below low spring tide level to the depth limit of reef coral growth (about 65 meters). After the death of the coral polyps, the coralla are rapidly overgrown with algae. Most fish leave the dead reefs, with the exception of small, drab-colored, herbivorous scarids and acanthurids.

Other animals feed on coral (*1*), but none so efficiently as *A. planci*. Caged, starved specimens ate mollusks and other echinoderms, but observations showed scleractinian corals of any configuration as the primary diet of undisturbed specimens. Hydrocorals and octocorals were eaten only after the madreporarian corals were gone. *Acanthaster planci* feeds by everting the gastric sac through its mouth, spreading the membranes over the coral, and digesting the soft tissues in place (*1–3*). The skeleton left behind stands out sharply as a patch of pure white until overgrown with algae. On reefs with low *A. planci* densities, feeding was nocturnal and specimens were cryptic during daylight. On reefs with high densities, many animals were found feeding during the day (Fig. 1).

Although *A. planci*, 60 cm in total diameter, were collected, those in the infested areas of Guam averaged 24.2 cm across the arms and 13.8 cm across the disk. The daily feeding rate was observed to be twice the area of the disk. Coral is therefore killed in areas of infestation at a mean rate of 378 cm^2 per animal per day or about 1 m^2 per month. In some localities, with population densities as high as one animal per square meter of reef, all living coral would be eaten in 1 month.

Before 1967, *A. planci* was not common on Guam (*5*). In early 1967, the starfish became abundant on reefs off Tumon and Piti bays (Fig. 2). They were observed feeding actively at depths of 3 to 10 m. The numbers of sea stars increased rapidly, and they were observed in deeper water. Large parts of the reef were completely stripped of living coral before the sea stars moved to adjacent areas. By spring, 1968, almost all of the coral off Tumon Bay was dead. In September of 1968, *A. planci* had spread to Double Reef, and in November divers removed 886 animals from 90,000 m^2 of reef at that locality. At that time, half of the coral of this reef was dead. Coral to the north of Double Reef was alive, although *A. planci* was present in limited numbers. Hazardous weather prevented surveillance of this area from December until late March. By then, the reef was dead for another 4 km, and the main concentration of animals had moved to an area extending 3 km southeastward from Ritidian Point.

Strong wave surge along this northern shoreline prevented the sea stars from entering shallow water until late