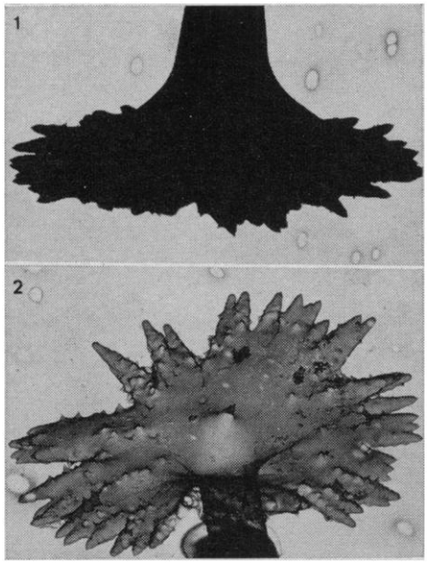

Fig. 1. Rotulate end of a birotulate microsclere from a gemmule of the freshwater sponge *Heteromyenia* sp. (× 3000). Fig. 2. Carbon replica of a rotulate end similar to that in Fig. 1. The surface appears smooth, and the microspines are clearly seen (× 3000).

Much of sponge taxonomy relies on spicule structure for identification of different taxa. Because many spicules are composed of amorphous silica, they are difficult to examine rigorously in the light microscope due to inherent chromatic and spherical aberrations. The microspines in Fig. 2 are not clearly seen with even oil-immersion phase contrast. Because of the importance of spicule structure in sponge taxonomy, precise images of spicules are essential for definitive classification and identification. This technique offers a convenient means of obtaining accurate pictures of spicules. It has also been used with great success to study frustule structure, shell structure in foraminifera and radiolarians, and opaline phytoliths in higher plants. It can probably be used to study any siliceous particles of biological origin and perhaps siliceous minerals as well.

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References and Notes

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3. I thank Dr. W. D. Hartman, Yale University, and Dr. T. L. Simpson, Tufts University, for valuable discussion regarding this work.

5 June 1967

Irradiated Parabiont Animals

The report by Carroll and Kimeldorf (*1*) interested me because they are apparently surprised by finding "a remarkable degree of survival for irradiated members of parabiont rat pairs if the partner were shielded." While the details of their experiments differ somewhat from those obtained in our laboratory, we have been working with such parabiont rats and taking advantage of this protective effect for some 17 years.

Our first mention of protection of irradiated parabiont rats by their shielded partner was made in the "Semi-Annual Progress Report of the New England Deaconess Hospital to the United States Atomic Energy Commission November 30, 1950." Edwards and Sommers reported from this laboratory (*2*) that in irradiated rats protected by parabiosis there was increased resistance of parabionts to radiation when one of the pair was shielded.

Warren, Chute, and Farrington (*3*) demonstrated protection of the hematopoietic system in irradiated rats by parabiosis and demonstrated that leukocytes were supplied temporarily by the shielded partner.

It is of interest that Carroll and Kimeldorf have used a pathogen-free strain of rats and that they have used a skin-to-skin anastomosis rather than the coelomic one which we employ.

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6 June 1967

We were aware of the two published papers cited by Warren but not of the semiannual progress report from the New England Deaconess Hospital to the AEC. The two published papers are relevant from the point of view that the investigators used parabiosis to analyze for the existence of a toxic factor affecting radiation-induced pathology.

The work of Finerty and his colleagues (see *1*, for example) could have been cited as well. Indeed, Barnes and Furth (*2*) used parabiosis in mice to study radiation injury as early as 1943. Some degree of protection may be inferred from all of the studies cited, although none have described the remarkable survival rates, noted by us in our report, over the much higher dose range of 1200 to 2400 roentgens. The major point of the results and discussion in our report was that parabiosis could be used to prolong survival and even override the gastrointestinal syndrome that leads to death within 120 hours after irradiation.

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14 June 1967

Contamination of Planets

The concern expressed by Horowitz *et al.* (*1*) is sufficiently important to the scientific community and the taxpaying public to warrant further examination. We were primarily concerned with the probability of growth of a terrestrial microorganism on Mars (P_m, Sagan-Coleman model).

While it is true that Horowitz *et al.* used the latest information regarding the physical environment of Mars, their data regarding the growth of organisms in a simulated Martian environment are limited. The question of whether a terrestrial microorganism will grow in the environment is the cardinal point regarding the possibility of contamination; it's importance demands more comprehensive treatment than theirs (*1*).

One must recognize that all interpretations of P_m are based on a limited number of organisms; it is possible that the sampling has omitted the organism that will tolerate the environment. Several observations not cited (*1*) must be taken into account before the probability of growth is established at a lower level than was originally suggested.

Studies (*2*) have demonstrated that *Bacillus cereus* survives but does not grow in a simulated Martian environment under the following conditions: 100-percent CO_2 at 10 mb; diurnal temperature cycle, with 20 hours at