Ruth Allen Award

In 1965, the Ruth Allen Memorial Fund was established by means of gifts from the executor of the will of Ruth Allen, Cecil Yarwood, and from her heirs: Sam Emsweller, Mabel Nebel, Hally Sax, and Evangeline Yarwood. The award, consisting of a certificate and the income from the invested fund, is to be given for outstanding contributions to the science of plant pathology. The 1972 award was announced at the 1972 Annual Meeting in Mexico City, Mexico.

RUSSELL L. STEERE is honored with the Ruth Allen Award because of the potential of his freeze-etch and freeze-fracturing techniques for revealing ultrastructure in biological specimens in the electron microscope. Both methods provide three-dimensional information not readily obtained from thin-sections. In the freeze-etch (frozen replica) method, published in 1957, the tissue is frozen at -65 to -75 C, then fractured or planed to expose material at the desired level. By manipulation of the specimen in a vacuum at temperatures of -95 and -190 C, the sublimation of water from the frozen specimen is controlled so as to etch the surface to a desired depth. After shadowing with a film of metal and superimposing a carbon replica film, the biological components are dissolved away with acid or alkali, and the remaining carbon and metal replica is examined in the electron microscope. It should be noted that the replica can be examined free of the electron opacity of the biological material itself.

Besides being simpler and less expensive than the freeze-etch equipment developed in Switzerland following Steere's initial work, Steere's new freeze-fracturing and freeze-etch unit and techniques have several outstanding advantages. They permit the preparation of replicas of both surfaces of a fractured specimen, and several specimens may be fractured at the same time. Steere is now obtaining stereo electron micrographs which can be projected in such a way that the viewer can visualize them as three-dimensional objects. Complementary surfaces of the fractured specimens are routinely examined in 3-D. This permits, for example, the identification and examination of the topography of opposed surfaces of a split membrane or of a series of membranes so that interpretation of their natural order and spacing is possible. The fruitful application of this technique in many biological fields is already apparent.