for an approximately constant calibration factor despite variation in local physical conditions. It is encouraging that workers using very different methods now seem to disagree by only a factor of 2 to 3. It seems clear, however, that the wealth of detailed data now becoming available will ultimately require models with enough physics of the actual emitting regions to accurately predict line intensities. It is clear from many of the papers in this volume that such work is under way.

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Vignettes: A Discovery and a Solution

One day when the whole family had gone to a circus to see some extraordinary performing apes, I remained alone with my microscope, observing the life in the mobile cells of a transparent star-fish larva, when a new thought suddenly flashed across my brain. It struck me that similar cells might serve in the defence of the organism against intruders. . . . . I felt so excited that I began striding up and down the room and even went to the seashore in order to collect my thoughts. I said to myself that, if my supposition was true, a splinter introduced into the body of a star-fish larva, devoid of blood vessels or of a nervous system, should soon be surrounded by mobile cells as is to be observed in a man who runs a splinter into his finger. This was no sooner said than done.

There was a small garden to our dwelling, in which we had a few days previously organized a "Christmas tree" for the children on a little tangerine tree; I fetched from it a few rose thorns and introduced them at once under the skin of some beautiful star-fish larvae as transparent as water.

I was too excited to sleep that night in the expectation of the result of my experiment, and very early the next morning I ascertained that it had fully succeeded.

That experiment formed the basis of the phagocyte theory, to the development of which I devoted the next twenty-five years of my life.

—Elie Metchnikoff, as quoted by Alfred I. Tauber and Leon Chernyak in *Metchnikoff and the Origins of Immunology* (Oxford University Press)

Hilde Proschold . . . had been given by Spemann the assignment to transplant the blastoporal lip of a *Triturus* gastrula into the belly side of another gastrula. This she did in several hundreds of cases, but only some five of them survived . . . .

Spemann himself had no remedy for this high mortality rate. Well, I found a cure for it, and that was simple enough. Obviously, the denuded and defenseless embryos died of bacterial infection. Therefore, following the example of the medical profession, I proceeded to sterilize the instruments and glassware we used and to raise the embryos in a sterile medium. In addition, I devised an appropriate culture medium . . . . Having observed that embryos with open wounds disintegrated quickly in plain water, even if the water had been sterilized, I reasoned that water was strongly hypotonic, hence toxic, for the embryonic cells. This led me to experiment with salt solutions of different concentrations until I found an apparently isotonic, balanced salt solution which turned out to be an ideal culture medium (my "life elixir") for our experimental embryos, even for isolated fragments of the embryo. Under the label "Holtfreter solution," it became a widely used medium for explantation experiments. It amused me later to observe that it was this solution, perhaps more than anything else, by which I became known among the embryologists.

—Johannes Holtfreter, in *A Conceptual History of Modern Embryology* (Developmental Biology, vol. 7, Scott F. Gilbert, Ed.; Plenum Press)