The earliest knowledge about astronomical X-rays came from studying the Sun, and the earliest efforts to study solar X-rays used sounding rockets as a platform to obtain short observations in space. With the space age, it became possible to perform detailed and systematic studies of high-energy sources both near and far. In particular, a variety of astronomical telescopes have been dedicated to the Sun and have elucidated the physical processes at work in solar flares and coronal mass ejections. These powerful sources of space weather have the capability to, when Earth-directed, disrupt power grids, damage spacecraft, and cause radiation hazards, meaning that study of their solar origins has an impact both on astrophysical knowledge and on society at large. While many aspects of the evolution of flares and eruptions have been unraveled, there are remaining important mysteries, such as how particles are so efficiently accelerated by flares and what role flares may play in heating the solar corona. Modern high-energy instrumentation aims to answer these questions by utilizing direct-focusing hard X-ray instruments. This colloquium will cover some of the fundamental physics investigations enabled by these new instruments and, in the spirit of the origins of X-ray astronomy, will describe a new way to chase flares using sounding rockets.