processing, without question, has always come from the weapons program. Weapons designers, be they physicists or engineers, come to us with requests that to them seem exceedingly simple and to us almost impossible, at least at first glance. For example, the physicists wouldn’t hesitate to ask us for structural air, that is, something with no density but enormous strength. Faced with sophisticated problems for years and years, we’ve learned how to tailor-make many special materials.

We have also done some basic research in materials science, and in the past few years we have begun to apply our understanding of materials on an atomic level to materials processing. One example is rapid-solidification-rate technology to make amorphous metals with high strength and good corrosion resistance. Another is ceramics processing; we are attempting to make materials for high-temperature environments, such as composites containing single-crystal ceramic whiskers.

LANDT: Electronics is another field that combines ideas and applications; it’s partly software and partly hardware, and it’s a crucial part of future technologies. I would like to put before you a statement by Dr. DeLauer, Undersecretary for the Department of Defense. Dr. DeLauer insists that electronics is the most critical of all technologies for the maintenance of peace, and he claims that “Further development of the electronics technology base of the United States is as important to defense today as the atomic bomb in World War II.”* I think it’s time the Laboratory took its electronics seriously.

BAKER: There are, however, a lot of good electronics firms.

LANDT: We are working on several projects that could make significant contributions in electronics—areas that private industry is not touching. These include high-speed electro-optic switches and thermionic integrated circuits that have important military as well as commercial potential. We are also developing high-power microwaves from lasers. This is research that could not be done without the exceptional computer and experimental facilities at Los Alamos.

SCIENCE: Since we have mentioned speaking freely, I’d like to ask Steven whether there’s anything he can tell us about weapons design work.

HOWE: Most of what we do is classified, but I can say that we work to get better codes, better computational abilities to describe the processes in the weapon, to put in the things we do know so that the things we have to extrapolate can be better estimated. In the year I have been here we have come up with several interesting pursuits. One is in low-energy nuclear physics: there is a process that we think exists in the weapon but that we don’t account for in the codes. This particular development is interesting because we have shared it with Livermore, and we have collaborated with them in getting it into the codes and making estimates. We also do secondary design work on weapons materials, attempting to understand basic processes. Generally we aim to satisfy the military requests and to come up with smaller, more efficient devices. We are continually looking at new