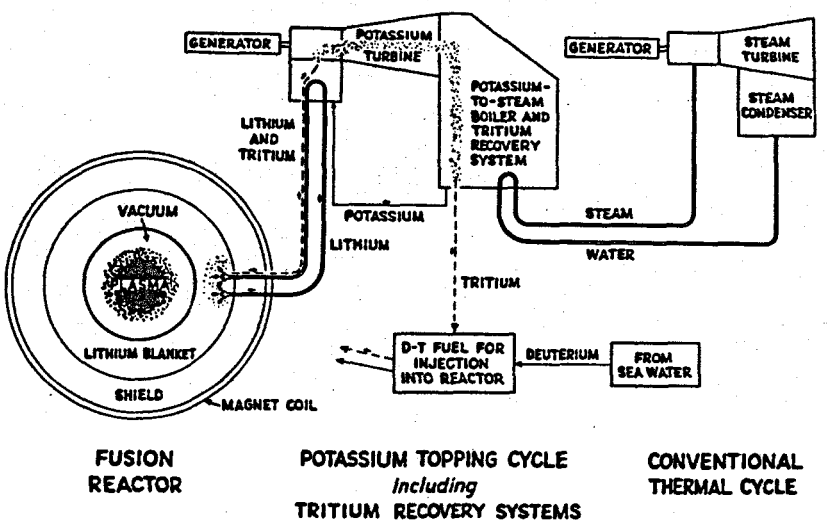
lies before them is that a combination of all criteria must be met in a single machine.

When we have arrived at that point, what do we do to transform this enormous release of energy into manageable forms of heat and electricity? In other words, what is a controlled fusion reactor and how does it operate?

Figure 2 illustrates the major components of one type of fusion power plant and the system's operation. This is a system based on a deuterium–tritium fuel cycle. In this D–T cycle plant, neutrons from the fusion reaction are absorbed in a lithium "blanket" and heat the blanket, maintaining it in a molten condition. Thus the lithium acts as a heat-transfer medium, a means of generating tritium for further use in the fuel cycle, and as a source of additional thermal energy. The molten lithium is then passed through a heat exchanger, where it gives up its energy, along with some tritium, to potassium vapor. The potassium vapor drives a turbogenerator and then exits into a combined tritium recovery system and heat exchanger. This heat exchanger transfers much of the remaining energy in the potassium to water and generates steam for a steam turbine. The overall system thermal efficiency has been estimated at 60%. Of course, part of the electrical power produced is needed to run vacuum pumps and liquid-metal circulation



FUSION REACTOR

POTASSIUM TOPPING CYCLE *including* TRITIUM RECOVERY SYSTEMS

CONVENTIONAL THERMAL CYCLE

Figure 2. D–T fusion power plant.