英汉翻译　　练习八

1. An economical method of organizing much of the subject matter of chemical engineering is based on two facts: (1) although the number of individual processes is great, each one can be broken down into a series of steps, called operations, each of which in turn appears in process after process; (2) the individual operations have common techniques and are based on the same scientific principles. For example, in most processes solids and fluids must be moved, heat or other forms of energy must be transferred from one substance to another, and tasks like drying, size reduction, distillation, and evaporation must be performed. The unit-operation concept is this: by studying systematically these operations themselves--operations which clearly cross industry and process lines---the treatment of all processes is unified and simplified.

2. The strictly chemical aspects of processing are studied in a companion area of chemical engineering called reaction kinetics. The unit operations are largely used to conduct the primarily physical steps of preparing the reactants, separating and purifying the products, recycling unconverted reactants, and controlling the energy transfer into or out of the chemical reactor.

3. The unit operations are as applicable to many physical processes as to chemical ones. For example, the process used to manufacture common salt consists of the following sequence of the unit operations: transportation of solids and liquids, transfer of heat, evaporation, crystallization, drying, and screening. No chemical reaction appears in these steps. On the other hand, the cracking of petroleum, with or without the aid of a catalyst, is a typical chemical reaction conducted on an enormous scale. Here the unit operations transportation of fluids and solids, distillation, and various mechanical separations are vital, and the cracking reaction could not be utilized without them. The chemical steps themselves are conducted by controlling the flow of material and energy to and from the reaction zone.

4. A number of scientific principles and techniques are basic to the treatment of the unit operations. Some are elementary physical and chemical laws such as the conservation of mass and energy, physical equilibria, kinetics, and certain properties of matter.

5. Chemical process equipment is of two kinds: custom designed and built, or proprietary "off the shelf." For example, the sizes and performance of custom equipment such as distillation towers, drums, and heat exchangers are derived by the process engineer on the basis of established principles and data, although some mechanical details remain in accordance with safe practice codes and individual fabrication practices.

   Much proprietary equipment (such as filters, mixers, conveyors, and so on) has been developed largely without benefit of much theory. From the point of view of the process engineer, such equipment is predesigned and fabricated and made available by manufacturers in limited numbers of types, sizes, and capacities. The process design of proprietary equipment establishes its required performance and is a process of selection from the manufacturers' offerings, often with their recommendations or on the basis of individual experience. Complete information is provided in manufacturer's catalogs.

6. The human-relations aspect of engineering practice is not usually emphasized in undergraduate training because of the great quantity of technical information and techniques the student must learn. That this may be a fallacious course is implied by the fact that failures of young engineers because of personnel problems are at least five times as frequent as failures because of inadequate technical training. All engineers must realize that the industry in which they are working requires team effort of all personnel. The person who has "lived" with an operation has probably observed actions and effects and has learned methods of detailed control that cannot be approached by formal theory alone. The best engineering job can be done only with proper regard for all available facts regardless of their source. A new process or the technical improvement of an existing one designed without due regard for the operators is usually destined to failure. The start-up of a new plant or the installation of a technical change is likely to be much smoother and the cost of it much less if the operating personnel understand the objectives and are convinced of their soundness.