

# ADVANCED READING

## PASSAGE 1

About twice every century, one of the massive stars in our galaxy blows itself apart in a supernova explosion that sends massive quantities of radiation and matter into space and generates shock waves that sweep through the arms of the galaxy. The shock waves heat the interstellar gas, evaporate small clouds, and compress larger ones to the point at which they collapse under their own gravity to form new stars. The general picture that has been developed for the supernova explosion and its aftermath goes something like this. Throughout its evolution, a star is much like a leaky balloon. It keeps its equilibrium figure through a balance of internal pressure against the tendency to collapse under its own weight. The pressure is generated by nuclear reactions in the core of the star which must continually supply energy to balance the energy that leaks out in the form of radiation. Eventually the nuclear fuel is exhausted, and the pressure drops in the core. With nothing to hold it up, the matter in the center of the star collapses inward, creating higher and higher densities and temperatures, until the nuclei and electrons are fused into a super-dense lump of matter known as a neutron star.

As the overlying layers rain down on the surface of the neutron star, the temperature rises, until with a blinding flash of radiation, the collapse is reversed. A thermonuclear shock wave runs through the now expanding stellar envelope, fusing lighter elements into heavier ones and producing a brilliant visual outburst that can be as intense as the light of 10 billion suns. The shell of matter thrown off by the explosion plows through the surrounding gas, producing an expanding bubble of hot gas, with gas temperatures in the millions of degrees. This gas will emit most of its energy at X-ray wavelengths, so it is not surprising that X-ray observatories have provided some of the most useful insights into the nature of the supernova phenomenon. More than twenty supernova remnants have now been detected in X-ray studies.

Recent discoveries of meteorites with anomalous concentrations of certain isotopes indicate that a supernova might have precipitated the birth of our solar system more than four and a half billion years ago. Although the cloud that collapsed to form the Sun and the planets was composed primarily of hydrogen and helium, it also contained carbon, nitrogen, and oxygen, elements essential for life as we know it. Elements heavier than helium are manufactured deep in the interior of stars and would, for the most part, remain there if it were not for the cataclysmic supernova explosions that blow giant stars apart. Additionally, supernovas produce clouds of high-energy particles called cosmic rays. These high-energy particles continually bombard the Earth and are responsible for many of the genetic mutations that are the driving force of the evolution of species.

## PASSAGE 2

The uniqueness of the Japanese character is the result of two seemingly contradictory forces: the strength of traditions and selective receptivity to foreign achievements and inventions. As early as the 1860s, there were counter movements to the traditional orientation. Yukichi Fukuzawa, the most eloquent spokesman of Japan's "Enlightenment," claimed: "The Confucian civilization of the East seems to me to lack two things possessed by Western civilization: science in the material sphere and a sense of independence in the spiritual sphere." Fukuzawa's great influence is found in the free and individualistic philosophy of the Education Code of 1872, but he was not able to prevent the government from turning back to the canons of Confucian thought in the Imperial Rescript of 1890. Another interlude of relative liberalism followed World War I, when the democratic idealism of President Woodrow Wilson had an important impact on Japanese intellectuals and, especially students: but more important was the Leninist ideology of the 1917 Bolshevik Revolution. Again in the early 1930s, nationalism and militarism became dominant, largely as a result of failing economic conditions.

Following the end of World War II, substantial changes were undertaken in Japan to liberate the individual from authoritarian restraints. The new democratic value system was accepted by many teachers, students, intellectuals, and old liberals, but it was not immediately embraced by the society as a whole. Japanese traditions were dominated by group values, and notions of personal freedom and individual rights were unfamiliar.

Today, democratic processes are clearly evident in the widespread participation of the Japanese people in social and political life: yet, there is no universally accepted and stable value system. Values are constantly modified by strong infusions of Western ideas, both democratic and Marxist. School textbooks expound democratic principles, emphasizing equality over hierarchy and rationalism over tradition; but in practice these values are often misinterpreted and distorted, particularly by the youth who translate the individualistic and humanistic goals of democracy into egoistic and materialistic ones.

Most Japanese people have consciously rejected Confucianism, but vestiges of the old order remain. An important feature of relationships in many institutions such as political parties, large corporations, and university faculties is the oyabun-kobun or parent-child relation. A party leader, supervisor, or professor, in return for loyalty, protects those subordinate to him and takes general responsibility for their interests throughout their entire lives, an obligation that sometimes even extends to arranging marriages. The corresponding loyalty of the individual to his patron reinforces his allegiance to the group to which they both belong. A willingness to cooperate with other members of the group and to support without qualification the interests of the group in all its external relations is still a widely respected virtue. The oyabun-kobun creates ladders of mobility which an individual can ascend, rising as far as abilities permit, so long as he maintains successful personal ties with a superior in the vertical channel, the latter requirement usually taking precedence over a need for exceptional competence. As a consequence, there is little horizontal relationship between people even within the same profession.

### **PASSAGE 3**

Public general hospitals originated in the almshouse infirmaries established as early as colonial times by local governments to care for the poor. Later, in the late eighteenth and early nineteenth centuries, the infirmary separated from the almshouse and became an independent institution supported by local tax money. At the same time, private charity hospitals began to develop. Both private and public hospitals provided mainly food and shelter for the impoverished sick, since there was little that medicine could actually do to cure illness, and the middle class was treated at home by private physicians.

Late in the nineteenth century, the private charity hospital began trying to attract middle-class patients. Although the depression of 1890 stimulated the growth of charitable institutions and an expanding urban population became dependent on assistance, there was a decline in private contributions to these organizations which forced them to look to local government for financial support. Since private institutions had also lost benefactors; they began to charge patients. In order to attract middle-class patients, private institutions provided services and amenities that distinguished between paying and non-paying patients and made the hospital a desirable place for private physicians to treat their own patients. As paying patients became more necessary to the survival of the private hospital, the public hospitals slowly became the only place for the poor to get treatment. By the end of the nineteenth century, cities were reimbursing private hospitals for their care of indigent patients and the public hospitals remained dependent on the tax dollars.

The advent of private hospital health insurance, which provided middle-class patients with the purchasing power to pay for private hospital services, guaranteed the private hospital a regular source of income. Private hospitals restricted themselves to revenue-generating patients, leaving the public hospitals to care for the poor. Although public hospitals continued to provide services for patients with communicable diseases and outpatient and emergency services, the Blue Cross plans developed around the needs of the private hospitals and the inpatients they served. Thus, reimbursement for ambulatory care has been minimal under most Blue Cross plans, and provision of outpatient care has not been a major function of the private hospital, in part because private patients can afford to pay for the services of private physicians. Additionally, since World War II, there has been a tremendous influx of federal money into private medical schools and the hospitals associated with them. Further, large private medical centers with expensive research equipment and programs have attracted the best administrators, physicians, and researchers. As a result of the greater resources available to the private medical centers, public hospitals have increasing problems attracting highly qualified research and medical personnel. With the mainstream of health care firmly established in the private medical sector, the public hospital has become a "dumping ground."