behavioral sciences

Youth in transition

The crossing from childhood to adulthood, from ages 14 to 24, is not an easy one (see story p. 88). In recent history, society has coped with this transition in two ways. In the first era, the work era, young people began to work as soon as their physical maturity allowed in order to help their families. In the present or schooling era, young people are kept in school and out of the work force as long as possible. Now, says the Panel on Youth of the President's Science Advisory Committee, it is time to move into a third era.

The panel, chaired by James S. Coleman of Johns Hopkins University, released this week a report titled "Youth: Transition to Adulthood." The report suggests that young people be given the opportunity to assume more responsibility for themselves and for others than they now have. Schools, the report says, should be more diverse, less impersonal (smaller) and provide more outside experiences such as opportunity for work and public service. Legal and administrative restrictions on work should be eased, the report says, so that young people can alternate between school and work. It urges that vouchers be given to young people at age 16 to be used at their discretion for education or training at any subsequent time, thus leaving the major educational decision in the hands of the young people themselves and equalizing the subsidy to all youth.

A test for pot smokers

There is a breath analysis for alcohol and a urinalysis for narcotics and some other drugs. Now, there is a blood analysis for marijuana. Stig Agurell and a team of researchers at the Karolinska Institute in Stockholm have announced "the first method to identify and accurately measure nonradioactively labeled THC [the psychoactive ingredient in marijuana] in the plasma of persons who have smoked cannabis."

By combining the techniques of gas chromatography and mass spectrometry, the researchers say they can measure THC to levels of half a billionth of a gram. This test will help determine marijuana's role in such things as traffic accidents and crimes. Agurell says "the forensic aspect is very important but it is not our ball game." The Karolinska group will use the test to extend basic studies of the biochemical actions of marijuana that have been reported in recent years.

The importance of play

Young monkeys and chimpanzees play to perfect physical movements and social gestures they will use the rest of their lives. In tribal human societies, children also play in ways that train them for adult life (hunting or housekeeping games). But, says Phyllis Dolhinow of the University of California at Berkeley, the average child in the United States is overwhelmed with toys completely unrelated to adult life. "Or else," she adds, "the child sits passively in front of a television set, uninvolved in social interaction or creative use of the intellect. It's not only the violence on TV that should worry parents, but also the passivity it causes."

Dolhinow, an anthropologist, has done field research on the early play habits of monkeys, chimpanzees and humans. Based on these studies, she says, "It is important to realize how terribly functional play is. It isn't goalless, wasted activity, but rather a very valuable pastime that doesn't really pay off until the adult years."

biomedical sciences

Muscle gets the nerve

Usually a muscle is connected to a single motor nerve. Under certain conditions, such as local injury to muscle, muscle allows itself to be innervated by other motor nerves. But why?

Recent evidence showed that if the original nerve to a muscle was blocked, the muscle became more receptive to acetylcholine. Acetylcholine is a chemical that transmits an electrical impulse from a nerve to muscle. Conversely, if the muscle was electrically stimulated, its increased sensitivity to acetylcholine was prevented. These observations suggested there is something in the activity of muscle per se that allows it to take on new motor nerves.

Further support for this theory is presented in the Aug. 10 SCIENCE by Jan K. S. Jansen and his team of neurophysiologists at the University of Oslo. They found that when the motor nerve innervating a muscle in rats was blocked by anesthesia, the muscle became innervated by a transplanted motor nerve without losing its original innervation. Such innervation by the same foreign nerve was largely reduced by direct electrical stimulation of the muscle.

Pineal control of growth

Growth is controlled by growth hormone, which is made in the pituitary gland of the brain. Growth hormone is controlled by a factor released from the hypothalamus of the brain. During the past several years, there has been mounting evidence that hormones from the pineal gland of the brain also help regulate growth.

When the pineal hormone serotonin was injected into the brains of rats, it caused them to grow. Serotonin was found to stimulate the secretion of growth hormone while people sleep. On the other hand, the pineal hormone melatonin was found to reduce growth.

Now, G. A. Smythe and L. Lazarus of St. Vincent's Hospital in Sydney, Australia, report in the July 27 NATURE that growth hormone release is mediated through serotonin receptors, and melatonin can block these receptors. So serotonin's and melatonin's opposing effects on growth may well take place at these receptors.

Elucidating the synthesis of transfer RNA

A mechanism that is universal to cells in all living organisms is the transfer of genetic material into proteins. The message is known to be transferred from genes (DNA) to molecules of messenger RNA. The message is then transmitted to molecules of transfer RNA, which line up amino acids into proteins specified in the message.

Little is known about how tRNA's are made. So Paul Schedl and Paul Primakoff of Stanford University School of Medicine decided to undertake a genetic study of bacteria with the aim of obtaining mutant bacteria whose tRNA's are blocked at different steps along the biosynthetic pathway. The mutant tRNA's, they hoped, would better enable them to delineate various steps in tRNA synthesis.

The Palo Alto biochemists report in the July PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES that they isolated 27 mutant bacteria that were extremely defective in their capacity to synthesize tRNA. Some of the mutants failed to modify certain bases (building blocks) in their tRNA's. Five mutants were unable to process tRNA precursor molecules, or to cleave them. Eleven mutants could not synthesize any tRNA's or tRNA precursors. The researchers speculate that these latter mutants may be defective in an enzyme that is needed to stabilize tRNA synthesis.