the chance for a united Europe, for example, and world government.

Their ideals are impeccable, says Dr. Maslow; their means, as in the Columbia incident, are stupid.

But if young people espouse new ideas, they did not create them, says Dr. Unwin, who believes sympathetic adults attribute to adolescents more certainty and moral strength than they really possess.

They are a "very bright, healthy mob," he says, but also unformed. The ideas behind youth protests are being articulated and thought out by older philosophers such as Paul Goodman, author of "Growing up Absurd" and Herbert Marcuse, professor at the University of California, San Diego, as well as Timothy Leary, high priest of the LSD movement.

Meanwhile adult society leaves kids "very much to continue what they are doing," says Dr. Unwin. Try to set up something to help hippies and it is sabotaged by adults, he declares. He says organizations carrying medical and nutritional help to hippie groups have been "blown apart."

Parents are disgusted when their children use marijuana, Dr. Unwin adds, yet two months later, they are asking for it themselves. This does not happen every day, but "I've seen it enough to amaze me."

Adults sense the need for new ways of thinking and acting, he continues, and are "using the elasticity of kids to test them out." ◇

ASTRONOMY

An optical pulsar

The astronomical radio sources which pulse about once a second fascinate astronomers: they reflect physical processes going at an exceptionally fast rate. Four such pulsars are now known to exist (SN: 3/16, p. 255).

Since the discovery of the first in July 1967 by Dr. Anthony Hewish and four co-workers at Cambridge University, theorists have supplied numerous speculations to account for the quick variations — pulsating neutron stars, white dwarfs and rotating binaries, among others.

Now the theorists will have to work even harder. They will have to fit into their theories pulsations in visible light that observers believe they have found in at least one pulsar, Dr. Hewish's first, which is now catalogued as CP 1919.

Searches for optical signals—and especially pulsed optical signals—from pulsars have been going on for several months. Some observatories report no success, but teams working at the Lick Observatory in California and at the Kitt Peak National Observatory in Arizona during late April and early May have succeeded in detecting extremely faint optical pulsations in CP 1919, which is located in the constellation Vulpecula.

News of the discovery was first communicated to interested astronomers May 20 at the Goddard Institute for Space Studies in New York City. The report, by Dr. Stephen Maran of Kitt Peak, caused an immediate uproar among the theorists.

The next day, Dr. David Cudaback of Lick Observatory flew in to report on the California observations which had been made only a few weeks before. The results were still in a rough form. Dr. Cudaback had been at the computer all night for several nights. Finally he decided to fly to New York because this gathering of astronomers interested in pulsars was the most fitting place to report the unexpected results.

The observations at Kitt Peak, by Dr. Maran, Dr. Roger Lynds and Donald Trumbo, were made with the observatory's 84-inch telescope. The California work, done by Dr. Cudaback, Dr. Leonard Kuhi, Ned Conklin and Taylor Howard, involved simultaneous observations with the 120-inch optical telescope at Lick and the 120-foot radiotelescope at Stanford University.

The optical fluctuations are far too faint to be distinguished from background light by using any existing telescope. The only way to discover the wave-like pulsation was to store and add up photomultiplier-tube data from a large number of cycles.

The Kitt Peak group assumed that the optical period would be twice the 1.3-second radio pulse. To accomplish the storage and the adding, they divided the known period of a radio fluctuation into 400 subperiods. The light intensity seen by the telescope in each subperiod was recorded and stored in a different element of an electronic memory. As each one-second period went by, the brightness from the first 400th part went to memory element 1, that from the second 400th part to element 2 and so on. Over thousands of periods background light would build up evenly in all 400 elements, but any periodic fluctuations would show up as much greater intensity totals in particular memory elements. And that, in fact, is what happened, reports Dr. Maran. Differences too small to see in one cycle added to noticeable totals in thousands of cycles.

The California observers did not assume any particular relationship between radio and optical periods. From the output of their photomultiplier tubes they generated an electrical current that would represent changes in the brightness of the light and examined this for low frequency fluctuations. The radio pulses are constant, but the rates of optical pulses were found to vary. This was a surprise because optical pulses had been expected to have rates as constant as the radio ones.

The two observations do not necessarily conflict, says Dr. Cudaback, since the method used at Kitt Peak would have suppressed evidence of fluctuations at any frequency but the selected one.

Dr. Cudaback stresses the roughness of his data. The timing of the conference did not allow him time to work them over as thoroughly as he would like. "I may be dead wrong," he says, "but I don't think so."

Possible optical pulses from other pulsars are being investigated. Kitt Peak has looked at the one called CP 0950, but so far without result.

JAPAN JOINS CLUB

Proliferation of plutonium

As debate on the nuclear non-proliferation treaty continued in the United Nations last week, news that Japan has produced bomb-quality plutonium without foreign technical assistance underlined the importance of quick action if the treaty is to be effective. Several other nations, including India, have already produced plutonium.

The Japan Atomic Energy Research Institute disclosed production of 18 grams of plutonium 239 of an estimated 95 percent purity at its Tokai Village laboratory, 70 miles northeast of Tokyo.

The successful reprocessing of used uranium reactor fuel means Japan now has technical potential to make an atomic bomb with domestically produced Pu-239. The institute termed the first home made weapons-grade Pu-239 an experimental sample. The experiment began last March in the Tokai laboratory.

Pu-239 is one of the two sources of nuclear energy for atomic bombs, the other being uranium 235. Plutonium is an artificial element created in atomic power reactors as a by-product of the fission of uranium; when used uranium fuel rods are withdrawn from reactors for reprocessing, the plutonium can be extracted.

Control of plutonium produced in booming nuclear power plants around the world, including international inspection, is a central aim of the non-proliferation treaty.

Under her own law, which limits the

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