Orleans agrees that some scientists probably dislike being made to work part-time in factories, and doing research only if it applies directly to local, production needs. "It is reasonable to say that the scientist, because he likes to have freedom to do what he wants professionally, may resent the increased external controls. But I would not say that they are all necessarily unhappy or unproductive in their work. It would be a mistake to overestimate the effects of the Cultural Revolution on science."

He believes that the rhetoric which the state-controlled press habitually uses to describe situations of political conflict is often exaggerated for propaganda purposes. In many cases, the rhetorical press descriptions should be read with a grain of salt.

Moreover, the "revealing" stories of elevating cooks to the institute or sending scientists to work on cabbage diseases reflect a broader policy—one which Orleans feels may make sense in the Chinese setting.

"I don't think its ridiculous to have science closely support production. Some of the best research done in our own country is in the factories and in practical situations. But the Chinese seem to go overboard in their policies. There's no doubt that there is some good research going on in certain fields, particularly medicine and agriculture.

"The problem is that they are apparently not training highly qualified people to replace the older scientists. Since they reopened the universities, the curriculum has emphasized practical training and the thoughts of Mao."

Besides determining what is happening to the scientists, how do China watchers—in the absence of any scientific publication—figure out what research is going forward? They read through the propaganda, Orleans says, which is sometimes laced with facts. For example, an article under the title, "Obey Chairman Mao and Resolutely Traverse the Road of Integration with Workers, Peasants, and Soldiers," described how one chemist purged himself of his foreign ideas (called "foreign walking sticks") and reformed his politics in order to do some chemistry.

". . . During an attempt to solve an important problem concerning non-mercury catalyst experiments, and under the leadership of our master workmen, comrades of our scientific experimental team and I resolutely kicked away 'foreign walking sticks,' ignored 'foreign books,' studied and applied Mao Tse-Tung thought creatively, relied on the production experience of workers, and with the help of fraternal units, finally solved, after a short period of efforts, the problem of analyzing 'resin' that was not even recorded in foreign papers. Our accomplishment overcame a difficult experimental problem concerning non-mercury catalysts and was warmly greeted by our master workmen." ‡

Another sample involves the direct application of Mao's teachings to cotton boll research. It was titled, "Chairman Mao's Philosophic Concepts Guide East China Brigade to Get High Cotton Yield."

". . . Chairman Mao teaches: 'In this world things are complicated and are decided by many factors.' We should not pay exclusive attention to manuring in order to get good bolls; other factors must be taken into account. In the past we suffered losses because we failed to do enough pruning. The temperature on the soil surface reached 51 degrees centigrade in the summer of 1964. Shedding off bolls was serious on lightly pruned plants, while it was slight on more heavily pruned ones. Why? We turned to study this teaching of Chairman Mao's: 'In given conditions, each of the two opposing aspects of a contradiction invariably transforms itself into its opposite as a result of the struggle between them. Here the conditions are essential. Without the given conditions, neither of the two contradictory aspects can transform itself into its opposite.' We made an analysis of the growing conditions of cotton and found that each of the two contradictory aspects existing in the plant transforms itself into its opposite under various conditions of light, aeration, irrigation, manuring, and field management during the stages of the growth. . . ." §

A third sample on aviation technology tells little about actual Chinese achievements. It is a typical propagandist diatribe against foreign technology, and against the pre-1966 political figure, Liu Shao-chi, who urged China to emulate the "advanced nations."

"Affected by the renegade, hidden traitor, and scab Liu Shao-chi's counter-revolutionary revisionist line, some comrades in our ranks invariably hold that aviation technology is mysterious and difficult to understand. During the course of the new upsurge in the mass movement to produce technical innovations, they are conservative and remain stagnant. Do they really think that the technology is difficult to understand? No, in their minds they do not believe that all people cannot understand. What they think is that foreigners can understand but Chinese cannot understand, and that the experts can understand but not the masses.

"Mystery and superstition are always related. Those who think that technology is mysterious have blind faith in foreigners. . . .

"Is foreign equipment omnipotent? We do not think so. . . . Some foreign equipment is advanced. We should not reject these advanced products but we should realize also that some people make a perfect fetish of many items of foreign manufacture. . . ."

"Take the development of the techniques of aviation, for example. The world's first airplane was not produced by the so-called 'authority' and expert, but by a craftsman who was engaged in production and ran a bicycle shop. . . . Some experts and 'authorities' often are backward and afraid to do anything, lack creativity, and cannot accept new things because they wish to maintain a good reputation." ¶

—DEBORAH SHAPLEY

‡ *Kuang-ming Jih-pao* [Kuang-ming Daily], 9 October 1970; translated in *U.S. Joint Pub. Res. Serv. Pub.* No. 51724 (1970).

§ New China News Agency, 9 May 1971, translated in *Survey of China Mainland Press*, May 1971.

¶ "Refuting the Theory that Technology is Mysterious," New China News Agency, 20 December 1970. Translated in Foreign Broadcast Information Service, 28 December 1970.

RECENT DEATHS

Emily J. Bell, 44; professor of bacteriology, University of Cincinnati; 21 July.

René H. Bernas, director of research, National Center for Scientific Research, France; 1 July.

Emery J. Coulson, 67; allergens chemist, U.S. Department of Agriculture; 11 July.

George E. Nold, 72; retired assistant professor of physics, State Agriculture and Technical College, Long Island; 21 July.

Vito L. Salerno, 56; retired dean, College of Science and Engineering, Fairleigh Dickinson University; 24 July.