Residents of the county have been described as having a mental or alcoholic problem with few exceptions. However, with all our failings, we have in general adapted ourselves to treat our fellow man with respect." (Unlike Reding.) Eventually, because the mental health board refused to fire him, the county withdrew its financial support from the $200,000-a-year program. So Reding and his staff left. So did Reding's wife, a psychiatric nurse who was running the halfway house because they couldn't find anyone else to do it.

As a final gesture, the county turned down an 8-year, $100,000-a-year federal grant for alcoholism services, which Reding had just obtained—for no other reason, says Reding, than that it was his idea.

Reding is now setting up a department of community mental health in a private hospital in Coudersport, Pennsylvania, situated in a rural, poor county in western Pennsylvania. His inpatient psychiatric policies have been adopted, and the project is apparently running smoothly. But he says he will have to leave soon so that he can put his children in good schools.

A person who wants to reform rural health care runs into enormous problems, ranging from personal logistics to the top ranks of organized medicine.

Reding says his report of the Franklin County experiment was turned down by several psychiatric journals. Ironically, Reding says, the *Archives of General Psychiatry* refused to include the "meat" of the article, in which he accuses psychiatrists of furthering prejudicial treatment of mental patients and says: "The time has come for psychiatric hospitals to justify their continued operation." The article's final acceptance by the prestigious *New England Journal of Medicine* would seem to justify Reding's belief that the mental health profession is in need of some self-examination.

—CONSTANCE HOLDEN

New York Times: All the News That's Fit to Printout

The newspaper industry has acquired a reputation for being one of the more technologically backward of American industries. Craft unions have resisted automation as a threat to their jobs. Management has never shown much enthusiasm about investing in innovation. And, on the editorial side of the business, journalists' characteristic attitude toward modernization makes it surprising that they ever gave up the quill pen.

The *New York Times*, however, has recently taken a major step in pioneering computer applications by establishing an information bank for the storage and retrieval of material published in the *Times* and in other newspapers and magazines. The new system has been expensive to develop and is costly to operate, and the *Times* would hardly have gone ahead with it if there had not been sound commercial prospects in selling the service.

The new system was designed by IBM's Federal Systems Division in collaboration with the *Times*. The Federal Systems Division, as the name implies, does business principally with military and civilian federal agencies, but it also works with nongovernment customers that need big data processing systems.

The conventional newspaper information retrieval system is not very sophisticated. At the heart of it is the traditional "morgue"—file drawers full of envelopes full of clippings referenced by name and subject. Most morgues serve their purpose in a rough-and-ready way, but there are inherent limitations, not the least of which are that envelopes can be easily mislaid and clippings tend to drift away. The *Times* has run the largest newspaper morgue, but it still suffers from the generic defects.

Where the *Times* has had an advantage over other newspapers, however, has been in publishing the *Times Index*. The *Index* carries not only a citation for virtually every article and feature carried in the daily and Sunday *Times*, but also an abstract of the stories. The abstracting operation provides the essential inputs for the new information bank. As one *Times* information man put it, "What is in the *Index* in print is transposed into a system capability."

A user seated at his terminal can summon up on his screen an abstract of up to 150 words or so. He cannot, however, get the full text of an article from the computer. A decision was made early not to give the computer a "full text" capability. Feeding full texts to the computer would have created information storage problems.

Furthermore, it was found that perhaps 80 percent or more of outside users making inquiries do not require the full text, and about 60 percent of in-house users are satisfied with the abstract.

Most users, both in the *Times* building and outside, can get a "hard" (paper) copy of the abstract via a printer that produces copies of abstracts displayed on the cathode-ray tube terminal.

To provide the full text of an article, the system relies on a development of microfilm techniques. In connection with the information bank, the *Times* has provided a new microfiche service. The actual size of the microfiche is 4 inches by 6 inches—the dimensions of a large postcard—but each fiche contains 99 frames. Each frame, in turn, is a microphotograph of a 9 inch by 12 inch sheet on which clippings from the newspaper are mounted. One microfiche contains all the news stories and editorial features of a daily *Times*; the Sunday *Times* takes four fiches.

The fiche number and frame number are included in the information that accompanies the abstract on the terminal screen. The full text from the microfiche can then be provided by several means. Inside the *Times* building, the text can be displayed on the terminal screen through closed-circuit television. A hard copy can be made by a photographic process. Or the fiche can be used on a reader, a machine similar to a microfilm reader. Some of these machines are equipped to make hard copies of the frames required.

In spite of the variety of options, the world of the full-text viewer is not

yet a perfect one. Texts on closed-circuit television can be blurry, and a demonstration hard copy obligingly made for this reporter was almost vanishingly faint, apparently because the mix of chemicals in the copying machine was wrong. But the operators of the system are confident that the wrinkles can be ironed out.

Serious consideration of a new information system at the *Times* dates back about 5 years. At that time, an effort was made to evaluate what was being done by the *Times* morgue and indexing staff, what the requirements of the company were, and what the commercial possibilities might be. Competitive bids were invited, and IBM's federal systems people were successful. IBM is the major contractor, having provided the software for the information bank, the display terminals, and the main computer (a 371-45) and peripherals. Other hardware is supplied by several other manufacturers.

The advent of the new system apparently caused no technological unemployment at the *Times*. Because of the central role played by the indexing staff, the human element in the system remains particularly strong. (The indexing staff is comprised of 26 indexers and six senior editors. The indexers are specialists in particular fields, such as science, education, or finance.) The editors designate clippings from the *Times* to be processed by individual indexers. The indexers then prepare the abstracts and assign them entry terms, through which information is stored and retrieved, using "descriptors" from a special thesaurus of subject terms.

Processed material goes into a special storage area in the computer, and a printout of it goes to the editor and indexer for review. Any corrections needed can be done on-line, and the entry is held out of permanent storage until the editor is satisfied with its quality.

Right now there is a lag of about 7 days between the time material is published and the time the abstract becomes available in the information bank, but an effort is being made to reduce the lag further.

The information bank includes selected material from about 65 publications in addition to the *Times*. These newspapers and magazines include *Science, Scientific American*, and *The Bulletin of the Atomic Scientists*. Abstracting for these other publications is done by outside services. Virtually all news and ·editorial material goes into the bank, and even some advertising the *Times* describes as having "potential research value" is included. The other publications are gleaned for material that in various ways fills the needs of the system.

The data base now includes *Times* material dating back to 1 November 1969. It is unlikely that any full-scale effort to extend the data base back further will be made. It has been found that 80 percent of inquiries deal with material that falls within the previous 5 years. As a man from the *Times* information services staff said, "Originally, a lot of people jumped to the conclusion that we would put everything in the morgue into the computer. But that would not be economic or efficient."

It is true that this leaves 20 percent of inquiries which the information bank cannot deal with. No conclusions, apparently, have been reached on how to cope with this. The word is that machine capabilities are being evaluated and ways of storing information in off-line form—that is, not in the information bank—are being studied. The working assumption is that at some point the morgue will be phased out, but there are no firm predictions on when this will happen.

The original plan was to have a system that would accommodate some 25 years' worth of *Times* material in the information bank without purging, but there seems to be a real question now as to whether such a long period is necessary.

What about acceptance of the new system by the users for which it was primarily designed, the reporters and editors of the *Times*? Although the

Alaska Pipeline: NEPA Put Aside

Perhaps the most striking demonstration of the value of the National Environmental Policy Act (NEPA) to environmentalists has been the use that has been made of it to hold up construction of the trans-Alaska pipeline (TAP) over the past 3 years. Given recent actions in the House and Senate, however, it now appears that Congress will direct that TAP be built without further court review under NEPA. Making this all the more discouraging from the environmentalists' standpoint is the fact that the Nixon Administration is lending its support to this breach of the act.

On 2 August, the House passed a bill—similar to a measure approved by the Senate in July (*Science*, 27 July)—that would declare NEPA's requirement for an environmental impact study to have been met in the case of the TAP. The House divided 221 to 198 in the critical vote on this issue. This legislative determination is being made despite clear evidence that the impact study did not include a thorough analysis of the alternative of building the pipeline across Canada instead of across Alaska (*Science*, 9 March). Without such an edict environmental lawyers are convinced that the U.S. Circuit Court of Appeals for the District of Columbia, where the TAP case is now pending, would order that a more adequate impact study be prepared.

Prior to the House vote President Nixon, in a letter to Speaker of the House Carl Albert, endorsed the exemption of the TAP project from further judicial review. In light of the "unique circumstances" surrounding the pipeline issue, Nixon said, such an exemption from NEPA could not "properly be construed as a precedent." It is a precedent, however, and it is one that may be cited repeatedly in future years by oil companies, electric utilities, and other interests impatient to get on with their projects, some of which may have as much relevance to substantial national problems as the TAP has to the U.S. oil deficit.

Final action on the TAP legislation will not occur until after differences in the House and Senate ·bills have been resolved in conference. Those differences have to do mainly with whether existing law pertaining to rights-of-way across federal domain lands should be broadly rewritten, as in the Senate bill, or whether, as in the House bill, that law should be left unchanged for the moment except for lifting the prohibitive 50-foot-width limitation as it applies to the TAP.—L.J.C.

company announced that the system was in full commercial operation in May, and a testing phase begun last autumn made the system available at the *Times*, a visitor gains the impression that many staff members are still getting acquainted with the new technology. One observer involved in information-bank operations generalized that "most people are not using it on a continual basis. Some jumped at it and use it all the time. Some we haven't been able to drag to a terminal."

The system takes some getting used to. The computer language of the system is English, and rational discourse with the computer can be carried on by someone who is not a computer expert, but finding the right entry terms can be frustrating, particularly if time is a factor. The problem is mitigated for reporters by the presence in the newsroom of a half-dozen researchers now familiar with the system whom reporters can ask to "run" an inquiry for them.

This reporter found no Luddites on the subject of the data bank. One reporter, who perhaps is a typical user at this point, said he calls on the system almost exclusively for the retrieval of specific factual information—middle initials, dates, numerical data. He says he finds the system helpful and not difficult to use. His major negative comment was that he misses the element of serendipity which was a potential dividend in using clippings from the morgue. Often a reference in a clipping that seems only remotely related by strict indexing criteria, or that might even be in the envelope by mistake, leads a reporter to something worthwhile. A member of the IBM group who worked on the *Times* system acknowledged that this point had been raised right from the start and observed wryly, "Maybe we shouldn't have debugged it so thoroughly" (meant in the pre-Watergate sense of getting the bugs, or extraneous material, out of the system).

Outside subscribers to the information bank have the option of several classes of service, with costs varying according to hours of availability and terms of access. Unlimited access through all the hours of operation costs $1350 a month. The system now operates from 8 a.m. to early evening, but plans are to extend the hour of shutdown to the early hours of the morning, when the *Times* has its final deadline. At the other end of the cost scale is 8 a.m. to 1 p.m. service, Mon-

day through Friday, which costs $675 a month. The basic contract does not include the cost of hardware used by the subscriber.

The information bank now has about 15 customers, including media subscribers such as the Associated Press, *Detroit Free Press*, and NBC, plus government agencies, the United Nations, corporations, and financial institutions.

The *Times* is not very forthcoming on what the costs of the system are, and it is true that it is difficult to decide where some costs should be assigned—for instance, indexing/abstracting, which was already a major budget item. The *Times* did say in announcing the commercial service that the development of the system had cost some $3 million.

In respect to the state of the computer art, the *Times* system is not deemed to be at the forefront of technology. But in terms of capabilities it surpasses most big systems. The MEDLINE system operated by the National Library of Medicine (*Science*, 23 July) is an impressive on-line system but is limited to responding to inquiries with standard citations of scientific literature.

The security arrangements built into the *Times* system are apparently fairly standard ones. There are identification numbers and, in some cases, "passwords" to ensure that only authorized users get access to the bank. And there are other protective controls such as those for outside customers who don't wish others to know what inquiries they have run. Again, human judgment plays a role, since there is a staff member on hand whenever the system is operating to act as a monitor and decide the issue if rights of access are questioned.

In developing the system, the *Times* and IBM rejected most of the fancier options on the frontier of computer applications. Ruled out, for example, was machine scanning, which would have provided for electronic indexing through machine recognition of key subject words and phrases in articles. On the other hand, the system is carefully designed so that it can be extended. There is some consideration, it seems, of creating subsidiary information banks in specialized areas such as science and business.

While the *Times* is pioneering with information bank, it is hardly a leader in other computer applications. On the production side, the *Los Angeles Times* and several other, smaller papers have taken a lead, and on the editorial side

both the Associated Press and United Press International are far advanced in using computer technology in speeding the process by which news is written, edited, and transmitted. The *Times* has faced particularly tough resistance from craft unions on automation of the production process, and *Times* management, now in a delicate phase of labor negotiations, is being tight-lipped on the subject of technology. But the *Times*, like other publications, has been led by economic necessity and technological opportunities to regard itself as in the information business and to seek to approach the packing-house ideal of using everything but the squeal.—JOHN WALSH

RECENT DEATHS

Herbert J. Bartelstone, 50; professor of pharmacology, College of Physicians and Surgeons, Columbia University; 11 May.

Egon Bretscher, 71; retired head, nuclear physics division, Atomic Energy Research Establishment, United Kingdom; 16 April.

Thomas B. Cameron, 56; professor of chemistry, University of Cincinnati; 2 March.

Edward S. Castle, 69; professor emeritus of physiology, Harvard University; 19 May.

Frank L. Chan, 67; retired research chemist, Aerospace Research Laboratory, Wright-Patterson Air Force Base; 8 October.

Emile Despres, 63; professor of economics, Stanford University; 20 April.

Sidney Farber, 69; former president and scientific director, The Children's Cancer Research Foundation; 30 March.

Paul W. Gast, 43; professor of geology, Columbia University; 16 May.

Francis R. O'Brien, 61; associate professor of mechanical engineering, University of North Dakota; 12 May.

Ivan Pratt, 64; former professor of zoology, Oregon State University; 14 April.

Eugene Rabinowitch, 71; former professor of chemistry, State University of New York, Albany; 15 May.

Zdenek Sekera, 67; professor of meteorology, University of California, Los Angeles; 1 January.

H. T. U. Smith, 63; former head, geology and geography department, University of Massachusetts; 22 February.