GENERAL SCIENCE

Books Decay Rapidly; Durable Paper Sought

BY ABOUT 1980, nearly 40% of the so-called "permanent" books printed between 1900 and 1949 will have such brittle pages that they will have to be taken out of circulation completely.

Researchers at the Virginia State Library, Richmond, Va., chose 500 non-fiction books which had not been handled excessively and tested the paper by machine tearing and bending. Only one percent of the books had "high strength" papers. The other 99% were expected to last about 50 years or less with moderate usage.

A published report of the tests stated that although librarians had been concerned about book decay, no one had guessed that the situation was so serious.

Dr. Robert V. Hobbs, a paper analyst at the National Bureau of Standards in Washington who has followed the Virginia study, said that the acidity of wood pulp used in paper manufacture is the factor that causes paper to decay. Papers made of rags have a lower acid content and last longer.

The acid gets into the paper during the processing of wood pulp, and up until a few years ago, Dr. Hobbs said, manufacturers were not particularly concerned about acid content because no one knew that it caused decay.

The Virginia researchers are now working on a technique to stop acid-caused decay of books already in print. They do this by dipping the paper in a solution that neutralizes the acid, Dr. Hobbs explained.

To demonstrate its point, the Virginia State Library printed the report of the tests on a newly developed, low-acid paper.

Science News Letter, April 9, 1960

PUBLIC HEALTH

New Tools Needed for Water Pollution Fight

AMERICA is fighting a losing battle in trying to meet today's mounting water pollution problems with outdated equipment, a Government report discloses.

It shows that the total combined national expenditure for water pollution research is now running less than $6,000,000 a year. Less than one-third of this is spent by the U.S. Government. The special report was filed by the Public Health Service with the Senate Select Committee on National Water Resources.

"It is obvious," said Sen. Robert S. Kerr, (D.-Okla.), committee chairman, "that a country spending over $1.5 billion per year on 'soap operas' and other forms of TV and radio entertainment should invest much more than $6,000,000 annually to find out how to keep these fine new products of our soap factories and other chemicals from spoiling our drinking water."

In addition to scientific research, the PHS report urges:

1. Nation-wide planning of water quality control programs for river basins at a rate up to $8,000,000 a year.
2. Collection of data on sources, strength, volume and hazards of all types of pollution.
3. Construction of the $4.6 billion unbuilt backlog of remedial works needed to use the best methods now available to clean up water sources in the next five years.
4. Better enforcement of state and Federal anti-pollution laws.
5. Legislation to meet new pollution problems, and action to establish wider public understanding of the pollution problem.

Science News Letter, April 9, 1960

ENGINEERING

National Academy Of Engineering Proposed

A PROPOSAL to establish a National Academy of Engineering has been made by Dr. J. Herbert Hollomon, general manager of General Electric's general engineering laboratory. The proposed Academy would be set up by Congress and would be on a par with the National Academy of Sciences. Dr. Hollomon believes that the establishment of such an organization would help disentangle the roles of science and engineering, which he said have become "confused" in recent years.

Science News Letter, April 9, 1960

ANTHROPOLOGY

"Chin" of Ancient Bone Found Due to Cancer

A VERY ANCIENT jaw bone from Africa which has puzzled scientists for years is identified as probably belonging to a creature intermediate between the ancient form known as Atlanthropus and modern man, or possibly it belonged to one of Africa's ape men.

Because the jaw has what appears to be a chin, scientists at first believed it to belong to a man. A chin is a distinguishing human characteristic. But now Dr. Phillip V. Tobias, anthropologist of the University of the Witwatersrand, Johannesburg, reports in Nature, 185:946, 1960, that the "chin" is really a bony growth caused by a bone cancer and that the jaw is not human at all.

When the mystery bone was unearthed at Kanam in Kenya, Africa, by Dr. L. S. B. Leakey, the "chin" led scientists to believe that the jaw belonged to modern man, but the site in which it was found indicated that the animal lived in early Pleistocene times, perhaps a million years ago. Scientists found it difficult to believe that modern man lived that long ago and in 1935 it was recommended that the mystery jaw be placed in "a suspense account" pending further discoveries.

"We are now," Dr. Tobias said, "in a position to consider the age of the Kanam specimen, free from any misconceptions that it is Homo sapiens."

Science News Letter, April 9, 1960

IN SCIEN

CHEMISTRY

Metals Purified by Gas Chromatography

ALLOYS can now be separated into their constituent metallic elements by means of gas chromatography—a technique commonly used in the analysis of gas mixtures.

Dr. Frank E. DeBoer of the Argonne National Laboratory, Lemont, Ill., has used this method to separate the metals in an alloy of zinc and cadmium, two common metals with similar chemical properties, he reports in Nature, 185:915, 1960.

Chromatography in general works on the principle that, if a solution containing a number of chemicals is allowed to flow through a constricted medium, through blotting paper for example, the different chemicals in the solution will travel at different speeds and may thus be separated. If the chemicals are of different colors, bands of color will be seen in the paper.

The same principle is used in gas chromatography, the mixture of gases being diluted with an inert "carrier gas," such as helium, and passed through a long narrow tube. The different fractions are collected at the end.

In this case, helium at 1,150 degrees Fahrenheit was passed over the alloy, which was also at 1,150 degrees, and the metal vapors condensed, after separation, on a cold surface.

This is believed to be the first time that the direct purification of metals in this way has been reported. The work was sponsored by the U.S. Atomic Energy Commission.

Science News Letter, April 9, 1960

RADIO

Sun Can Relay Signals, Radio Engineers Told

THE SUN could be used to relay radio messages between distant points on earth, a scientist told the international convention of the Institute of Radio Engineers.

Donald J. Blattner of the RCA Radio Laboratories at Princeton, N.J., said radar pulses bounced from the sun demonstrate that the sun's gases could also reflect coded radio signals.

He said the system is technically feasible and may someday be justified by the growing demand for more communication channels. It could be especially useful when the moon is not in position to serve as a reflector for radio signals. The solar method would require large antennas, a transmitter with power output of a million watts and electronic data-handling equipment.

Science News Letter, April 9, 1960

CE FIELDS

VIROLOGY

Russia's 'Flu Vaccine Is Inferior to America's

RUSSIA'S live virus influenza vaccine appears to be less effective than America's killed virus vaccine, a Denver researcher reports.

The Russians have concentrated on live influenza vaccines, which are made from live but weakened viruses and administered by nasal inhalation. Vaccines used in this country are made from killed viruses and administered by injection.

The live virus vaccine proved to be moderately effective in boosting antibody levels in persons who had no such previous disease fighters before contact with the vaccine. Persons who had acquired antibodies before inhaling the vaccine, however, showed little booster effect, Dr. Gordon Meiklejohn of the University of Colorado School of Medicine reported in the Journal of the American Medical Association, 172:1354, 1960.

Furthermore, the American vaccine, made from killed viruses, proved more effective than the live vaccine in raising antibody levels of persons who had antibodies at the time of the vaccination.

The report was based on observations of the responses of 27 volunteers who received the live vaccine. No illness was observed in these persons.

Science News Letter, April 9, 1960

ZOOLOGY

California Zoo Apes Become "Medical Firsts"

NOELL, SCOOP AND TRIA, three apes that live in the San Diego zoo, have made medical history.

They "came down" with chicken pox while in their zoo cages during a period last summer when there was a high incidence of that disease among children in San Diego County.

Now researchers believe that these three anthropoid apes are the first nonhuman animals to become naturally infected with chicken pox, Dr. Werner P. Heuschele, veterinarian at the San Diego Zoological Gardens, reports in the Journal of the American Veterinary Medical Association, 138:256, 1960.

Noell is a two-and-a-half-year-old female orangutan. Scoop is a 20-month-old male gorilla, and Tria is a three-and-one-half-year-old female chimpanzee. All three are in close contact with children at the zoo. They attend parties held in the Children's Zoo area and are handled and petted frequently, Dr. Heuschele explains.

They have even attended luncheons, dinners, theater openings, charity shows and other functions. The veterinarian expresses the belief that these opportunities for close contact with humans, a unique feature at the San Diego Children's Zoo, exposed the apes to infectious doses of virus particles. Most zoos avoid this situation by exhibiting apes from behind glass or at least at a distance from visitors, he points out.

Chicken pox has been produced in monkeys by direct inoculation of the virus but there appears to be no references in medical history to natural infection such as this among subhuman primates, he reports.

Tria, the chimp, was the most seriously affected by the disease, exhibiting a fever and rash, while Noell and Scoop appeared relatively untroubled. This could be due to a difference in individuals or difference of susceptibility of species, or to exposure to a small amount of the virus, he concludes.

Science News Letter, April 9, 1960

TECHNOLOGY

Columbium Toughens Weldable Steel Pipe

ADDING small amounts of columbium to steel during its manufacture has been found to strengthen it and to make welding easier.

With the rapid expansion of the natural gas industry, there has grown a demand for a steel suitable for the construction of long-distance, trouble-free pressure pipelines.

Higher gas pressures in these pipelines has dictated use of higher strength steels. These have usually involved high carbon contents, resulting in more brittle steels and great welding difficulties, especially at low temperatures.

This problem has now been solved by the Great Lakes Steel Corporation, Detroit, a division of the National Steel Corporation in Pittsburgh, Pa. Great Lakes will produce a new family of steels containing columbium.

These steels, although developed for use in gas pipelines, have already generated wide interest because of their possible use in truck frames, highway lamp posts and railroad equipment.

Making the steels economically attractive is the fact that the price of columbium has dropped over the last 10 years and large deposits of columbium were recently discovered in Quebec.

Science News Letter, April 9, 1960

AERONAUTICS

Study Shows Alert Pilots React in 0.23 Second

ALERT PILOTS react in about 0.23 second to large right-and-left disturbances of their planes in flight, a study by the National Aeronautics and Space Administration shows. Reaction time for moderate pitchings of the planes, however, was 0.33 second. The study was made of pilots flying jet trainers. Special modifications of the planes permitted a second pilot to disturb the plane without moving the control stick of the pilot being tested.

Science News Letter, April 9, 1960

ENTOMOLOGY

Flies May Be Controlled By Chemical Sterilization

CONTROL OF HOUSE FLIES and fruit flies by chemical sterilization, so that they cannot reproduce, is being tried in experiments by the U.S. Department of Agriculture.

The experiments, involving one of three new methods of insect control proposed by USDA's Dr. Edward F. Knipling, make use of a modified glutamic acid to bring about self-annihilation of insects by chemical sterilization.

Tests have shown that a concentration of as little as one one-hundredth of one percent of this chemical, added to food for laboratory-reared house flies, has prevented egg-laying or hatching and that one-half of one percent in a single feeding will cause permanent sterility in female flies.

Male flies, according to tests made so far, are not sterilized by eating food containing the chemical. To be fully effective, chemical sexual sterilants of maximum effectiveness will have to produce sexual sterility in both males and females without adverse effects on mating behavior.

Chemical sterilization, if eventually successful, would not require release of treated flies to wipe out normal ones because food treated with an effective chemo-sterilant could be made generally available.

Although satisfactory for use in testing the principle of chemical sterilization, the USDA points out, modified glutamic acid may not prove completely suitable as a practical means of insect control by this method.

The other two control and eradication methods suggested by Dr. Knipling include the production and release of diseased insects to infect and kill their own kind, and of insects possessing lethal genetic traits that could control an insect pest. The first of these is already being investigated.

Science News Letter, April 9, 1960

BIOCHEMISTRY

Tiny Loops on DNA Seen As Hereditary Mutations

TWO SCIENTISTS have identified hereditary mutations as tiny loops in molecules of DNA.

The loop in the molecules could be the result of a mutation or "error in copying" in the chemical process that passes hereditary signals from cell to cell, Dr. Jacques R. Fresco, chemist at Harvard University, and his assistant, Bruce M. Alberts, explained in the Proceedings of the National Academy of Sciences, 46:311, 1960.

A change as permanent in heredity as a mutation would probably show up as a tiny loop in the molecule of DNA, deoxyribonucleic acid. With the aid of plastic models, the Harvard scientists observed the possible changes in chemical architecture that accompany certain types of hereditary change. They found that changes occurring in mutation can produce loops.

Science News Letter, April 9, 1960