example, that a dose of only eight aspirin a day temporarily reduced the amount of various prostaglandins in the seminal fluid of young male volunteers. All this research offers a fairly tight explanation for why aspirin can control inflammation in the early stages of arthritis—by inhibiting inflammation-triggering prostaglandins.

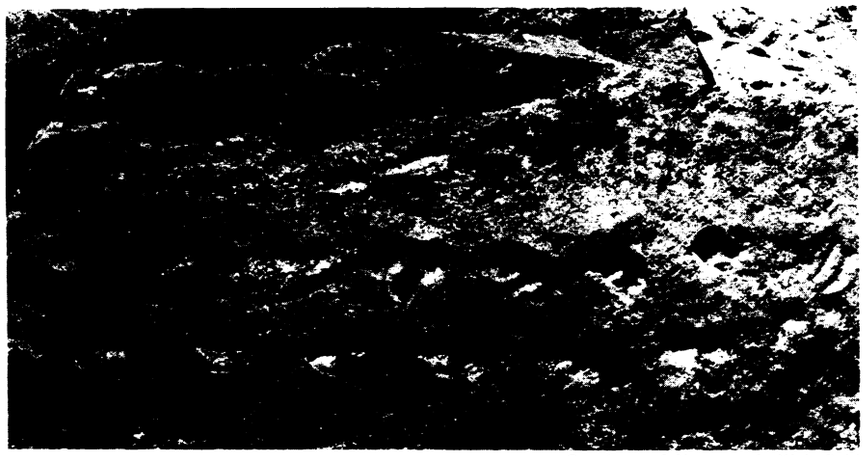
Now, Gerald Weissmann, Robert Zurier, Sylvia Hoffstein and Franco Quagliata of New York University School of Medicine have further evidence for prostaglandins' role in inflammation and arthritis. They have found that prostaglandins, which normally turn on inflammation, can also turn it off.

About a year ago, Quagliata and Zurier reported in NATURE that injecting massive doses of prostaglandins into rats with adjuvant arthritis, an artifically induced condition similar to rheumatoid arthritis, suppressed tissue inflammation and damage. They are now studying the same action in rats whose adrenal glands have been removed, to make sure the inflammation-suppressive action is indeed caused by prostaglandins, and not by adrenal steroid hormones. So far, Zurier told SCIENCE NEWS, they are quite sure prostaglandins, not the steroids, are the suppressors.

The New York University team also has evidence that, when prostaglandins switch off inflammation, they probably do so by turning off the release of certain potent enzymes from white blood cells. Weissmann, Hoffstein and Zurier report in this month's AMERICAN JOURNAL OF PATHOLOGY that they exposed purified human white blood cells to aggregates of suspected inflammation triggers—not the prostaglandins, but antibodies known as immunoglobulin G and rheumatoid factor (found in the tissue of 70 percent of all rheumatoid arthritis patients, although scientists are not sure what it is directed against). As the white blood cells engulfed the antibodies, a normal immune response, they released potent, so-called "lysosomal enzymes." Treating the white blood cells with fairly large concentrations of several kinds of prostaglandins, the researchers found, turned off the release of the inflammation-causing enzymes.

Further questions about prostaglandins' role in inflammation and rheumatoid arthritis still need to be answered. For example, how can prostaglandins that normally turn on inflammation also turn it off? This seeming contradiction, Weissmann says, is probably explained by a rather common biochemical phenomenon known as "negative feedback." That is, whenever certain levels of a chemical are reached in the body, those levels signal the body to turn off production of the chemical until further notice. □

Footprints in the sand(stone)



Courtesy of Norman A. Wakefield

Genoa River trackways: "Remarkably clear" imprints 355 million years old.

About a year ago, two Australian scientists discovered three ancient trackways, or sets of footprints, preserved in sandstone in the Genoa River beds of eastern Victoria. Norman A. Wakefield of Monash Teachers' College and James W. Warren of Monash University kept the discovery to themselves until the trackways could be safely transferred to a museum. Now, Wakefield and Warren have published their analysis of the find in NATURE. The published article, and a communication from Wakefield, clarify and add details to an earlier report (SN: 8/19/72, p. 117), which contained several inaccuracies.

They conclude that the trackways are the oldest known tracks of limbed vertebrates. The tracks, the scientists estimate, are about 355 million years old, about the same age as the oldest known fossils of limbed vertebrates, previously found in Greenland.

One trackway, about 1.1 meters long, is a "remarkably clear" set of 38 impressions. The tracks made by the hind foot are about 3.5 centimeters wide with five toes. One track shows traces of webbing between the toes. The forepaw is smaller and has at least three toes. The researchers estimate that the animal that made the tracks was about 55 centimeters long.

The second trackway is not as clear as the first, but it shows a wavy mark between the left and right foot impressions that was probably made either by a tail or by the animal's underbelly. This animal had a longer stride than the other and the impression of the forefoot is missing in some places. This indicates, say the researchers, that the animal may have been using body and tail undulations to assist in locomotion. The third set of tracks reveals no details of foot structure, but relative placement of the footprints indicates that the animal was 90 centimeters long.

The best-known of the Greenland fossils are of *Ichthyostega*, an amphibian slightly less than a meter long, with a blunt head, stout tail and short limbs. Wakefield says the Genoa River trackways were probably made by amphibians similar in size and general body and foot shape to *Ichthyostega*.

One of the most interesting aspects of the find, say Wakefield and Warren, is the way the toes of the hind foot in the first trackway point outward from the body. In later amphibians, the hind feet are pointed more toward the front. Wakefield predicts that study of these tracks "will throw new light on the early evolution of tetrapod locomotion, for the prints demonstrate a more primitive stage of limb development than has been observed previously in the fossil record." □

The APA gets into population psychology

Psychologists are not trend setters. They, like most scientists, go where the Government money is and attempt to solve problems currently in the public eye. In this manner psychology is becoming more socially active and problem-oriented. One problem that has received a considerable amount of attention in the past five years is population control.

Demographers, sociologists, economists, political scientists, legal scholars and anthropologists have all become interested in the various aspects of population research that fall under their auspices. Similarly, three years ago, the American Psychological Association officially began to look into the psychological ramifications of population control. An APA task force was established to study the possibilities of teaching and training population psychologists and broadening the knowledge of population

psychology. The aim of the task force was not merely to review existing research. The goal was to generate new research topics and research models to focus on neglected areas and issues of population that have not been significantly challenged by psychologists.

Last week at APA's annual meeting in Honolulu, the task force held symposia and a two-day workshop. Questions were more numerous than answers, but according to Frederick Wyatt of the University of Michigan, who chaired the workshop on family and fertility counseling, the task force found that many psychologists are becoming interested and active in population research. The task force ended with a move to create a division of population control within the APA.

To do this a petition must be signed by 10 percent of the APA membership and the signing members must all agree to become members of the new division. By-laws for the division and a statement of mission are then submitted to the existing divisions for approval. If there is no overlap in missions the APA Council of Representatives then takes the petition under consideration. By last week half the needed signatures had been obtained, but it is doubtful that approval of the 32 existing divisions will be secured in time for the December meeting of the Council of Representatives. If the process is completed by next year, the division of population control will become a reality in January 1974.

Wyatt, James T. Fawcett of the East-West Population Center in Honolulu and Nancy Russo of Richmond College at the City University of New York discussed some of the issues to be considered by the population psychologists. Minority views will be a major concern. Young black males tend to fear any form of birth control while black females of child-rearing age are more pragmatic and seem to look favorably upon it. If the population declines, parents and children will be psychologically affected. Fewer children and less sibling interaction could possibly have adverse effects on verbal I.Q. Or, will day-care facilities provide alternate sibling relationships? Is the stress of being an only child as much a strain as sibling rivalry?

What will replace the ego, social and economic value of children to parents? Alternate gratification might come from better jobs for women, but social pressures to have children will still be strong. Fertility research, the consequences of abortion, the stress of overcrowding and the personal and biological consequences of different contraceptives all have to be studied. Fawcett says such research will add a psychological perspective to the growing body of knowledge coming from other scientific disciplines.

Another ongoing APA project is the development of a new set of ethical standards for psychological research (SN: 5/20/72, p. 327). The revised principles were discussed last week at a three-hour symposium. According to Stuart W. Cook of the University of Colorado, the general consensus of the APA membership is that the present revision is appropriate. Some members feel the standards are too lax while others feel they are too restrictive, but Cook hopes to submit the new ethical code (with minor additions to the illustrative material) by Nov. 1. The Council of Representatives will review and probably adopt the ethical standards this December without a vote by the membership. □

Nailing lung cancer to air pollution

This week, a committee of the National Research Council of the National Academy of Sciences issued a report that appears to link lung cancer to air pollution more conclusively than it has ever been linked before.

The committee, chaired by physiologist Arthur B. DuBois of the University of Pennsylvania School of Medicine and comprised of some dozen other university and industrial experts in environmental medicine, preventive medicine, pathology and pharmaceutical chemistry, undertook its work two years ago for the Environmental Protection Agency. The panel has exhaustively surveyed, interpreted, evaluated and reconciled hundreds of epidemiological and experimental studies, many yet to be published. The committee's findings should not only inform the EPA and the public on the latest evidence linking air pollutants with lung cancer but also lead to more effective monitoring and control of potentially dangerous compounds. Since economists have been in dispute over the costs of air pollution control, the finds should also provide them with a sounder basis for arriving at costs.

Persons living in urban areas, the committee reports, have twice as high an incidence of lung cancer as do those living in nonurban areas. Within urban communities the incidence is even greater where fossil-fuel products from industrial usage are highly concentrated in the air. Immigrants usually have an incidence of lung cancer somewhere between the rates for their home countries and those of the countries to which they migrate. The older people are when they migrate, the closer their lung cancer rates are to those in their home countries. In some cases in which the lung cancer rate was much higher in the country of origin, rates among persons who left decreased significantly, even though their cigarette smoking increased. "These studies," the panel asserts, "suggest a significant environmental effect operating early in life for lung cancer development."

The air pollutants of special concern, the committee continues, are polycyclic organic matter (POM). Three major sources of POM in the air—coal- and wood-fired residential furnaces, coal refuse fires, and coke production from the iron and steel industry—account for more than 90 percent of the annual nationwide POM emissions. Motor vehicle emissions represent another significant source. A major source of indoor, nonindustrial pollution is tobacco smoking.

Studies of job-related diseases show that POM is implicated in skin cancer and other skin reactions such as dermatitis, hyperpigmentation and acne among workers engaged in the burning, refining and distilling of fossil fuels. However the panel found no evidence that POM in urban air is directly associated with noncancerous lung diseases, such as bronchitis or emphysema.

POM is highly reactive. Evidence suggests these compounds are degraded in the atmosphere by photooxidation, reaction with atmospheric oxidants and sulfur oxides. Most of the likely atmospheric reactions produce compounds that could damage human health. Some, but not all, attempts to produce tumors in experimental animals with polycyclic compounds have succeeded. The tumor-inducing agents appear to transform normal cells directly into cancer cells. They may or may not "switch on" a latent virus that may be responsible for cancer induction (SN: 7/29/72, p. 68).

Neither epidemiological nor experimental data, the panel asserts, are adequate to determine a safe dosage of any chemical carcinogen below which there will definitely be no tumor response in humans. The panel declares, "One must always insist on the lowest possible exposure to air pollutants."

Of the various polycyclic organic compounds described in the report, one cited as being of greatest concern is benzo[a]pyrene. It is a particularly potent carcinogen in animals. The committee estimates that the lung cancer death rate rises five percent with each additional microgram of the compound per 1,000 cubic meters of air. A reduction of urban benzo[a]pyrene pollution from six micrograms to two micrograms per 1,000 cubic meters might be expected to reduce the rate of lung cancer by 20 percent.

"Benzo[a]pyrene," the panel concludes, "could be used as an indicator molecule of urban pollution, implying the presence of a number of other polycyclic organic materials of similar structure that may also have some carcinogenic activity." □