corporation, it is by no means free of business ties. It owns stock in many companies, and individual faculty members are officers or consultants for a variety of private concerns. For example, in the same department as Mark Ptashne, who played a key role in the plan for a new company and whose research was to have been the basis for the company's initial project, is Walter Gilbert, who is co-chairman of the board of directors and chairman of the scientific board of Biogen, a Geneva-based genetic engineering firm that plans to open a Cambridge laboratory. The proposed new genetic engineering company is likely to be formed, even without Harvard's direct involvement, with Ptashne and perhaps other Harvard faculty members as major participants.

Had Harvard gone into the genetic engineering business, it would not have been the first university to turn entrepreneureal. For about 20 years Cornell University ran a company that made plane and car safety devices and for a few years the University of Illinois ran a rug-making plant. Most universities that make money from their discoveries and inventions do so, however, by licensing patents to outside corporations, and some schools even have created separate foundations to administer patent affairs. □

The 1980 Lasker awards announced

The $15,000 Albert Lasker Basic Medical Research Award is being shared by four scientists whose pioneering recombinant DNA research has had enormous repercussions on the biomedical research world — Paul Berg, Stanley N. Cohen and Dale Kaiser of Stanford University School of Medicine and Herbert W. Boyer of the University of California at San Francisco. Berg is also a 1980 Nobel Prize winner in chemistry for his recombinant DNA investigations (SN: 10/18/80, p. 244).

The $15,000 Albert Lasker Clinical Medical Research Award is being shared by five scientists who created a vaccine for preventing Rh disease (a disease of blood incompatibility between a pregnant mother and her unborn infant) — Vincent J. Freda, John Gorman and William Pollack of Columbia University College of Physicians and Surgeons, Cyril A. Clarke of the University of Liverpool and Ronald Finn of Royal Liverpool Hospital.

A Special Albert Lasker Public Health Award of $15,000 has been presented to the National Heart, Lung and Blood Institute for a hypertension study that, in the opinion of the Lasker jury, "stands alone among clinical studies in its profound potential benefits to millions." The study showed that patients getting individualized treatment had far fewer fatal strokes and heart attacks than did those not getting it. □

Balloons, enzymes for atherosclerosis

New procedures to treat two potentially fatal heart conditions, atherosclerosis (hardening of the arteries) and thrombosis (clot formation) were presented last week in Miami Beach at the meeting of the American Heart Association. Though the cause-and-effect relationship between the two conditions and heart attacks has yet to be clearly defined, both are associated with blocking blood flow to the heart muscle.

Kenneth M. Kent of the National Heart, Lung and Blood Institute announced the results of a multi-nation registry of percutaneous transluminal coronary angioplasty. PTCA has been used experimentally in the United States since April 1978 to allow freer blood flow in the coronary arteries by pushing fat-rich plaques out of the way. A tiny balloon is threaded into the heart through a long catheter inserted in the groin area. Once the balloon has reached the narrowed area it is inflated, forcing the plaque up against the arterial wall. Since few patients have died, the plaque's fate has not been determined.

Of 804 patients in the registry, about 15 percent had a noncompressible narrowing, while in 83 percent of the successful cases the patients reported a significant reduction in chest pain. About five percent of the cases resulted in abrupt artery closure, requiring immediate coronary bypass surgery. Nine patients died, some as a result of the bypass operation. Until the safety and effectiveness of PTCA is established, the procedure is being performed on patients with only one coronary artery obstructed, a condition that can cause pain but is unlikely to result in death.

Blowing up a balloon within an artery concerns Thomas N. James, the outgoing American Heart Association president. "If you have a crusty tough lesion and you put in a balloon, something's going to break," he says.

Breaking the plaque might be serious, since some researchers believe that it is only when the smooth wall of the plaque is broken that blood clots form. Researchers in the United States and abroad have been working for many years on ways to remove a coronary artery-blocking clot that appears sometime during the rapid stream of events of a heart attack. Variable success rates with clot-destroying enzymes have been reported over the years, but the most impressive results have come from a technique performed only in the past six months.

William Ganz of the University of California at Los Angeles, who already has one catheter to his name, has developed an extra-long catheter that he can thread right up to the clot in a 20-minute procedure. He showed a movie of the catheter nosing right up to a clot and releasing the drug. To the gasps of the audience, the clot dislodged.

Twenty of 21 of his patients are well, he reports. The one failure occurred before he developed the new catheter. The procedure does not, he notes, treat the underlying atherosclerosis. Seven of the patients subsequently underwent coronary bypass surgery after recovering from their heart attacks. The possibility that the enzymes could hurt the heart muscle concerned some members of the audience as well as James, but Ganz reports no effect in dogs or humans. One trick will be needed if the procedure pans out: getting patients to come in as soon as they feel a heart attack beginning, instead of hoping it will go away and allowing irreversible heart damage. □

Brain space: Bird and monkey economics

Within the compact structure of an animal's brain, many complex operations appear to be competing fiercely for turf. Two quite different sets of experiments reported at the meeting in Cincinnati of the Society for Neuroscience indicate that areas of the brain devoted to specific functions are flexible and can adjust to meet the changing needs of the animal.

Song learning, a seasonal activity of male canaries, provides one example. Each spring the males pick up a new repertoire, and Fernando Nottebohm of Rockefeller University reports a corresponding seasonal variation in the male canary brain. In the spring two brain regions, the hyperstriatum vocalis and the robust nucleus, that are involved in song production (SN: 1/26/80, p. 58) are almost double the size they were in the fall. Nottebohm speculates that the extra space is filled with a proliferation of the nerve cells' long, branching processes that are the basis of the brain's communication network.

The enlarged brain space may directly influence the sophistication of learned tasks. Individual canaries of the same species sing a program of 23 to 47 recurrent units or syllables. The size of the hyperstriatum vocalis can vary three-fold, and Nottebohm finds that the birds with the largest song areas tend to sing the most syllables. Female canaries sing only if they are treated with the male hormone testosterone, which induces the song centers in the brain to expand. The number of syllables females sing after hormone treatment is in the same relationship to the area size as in males. "This is the first time that a measure of 'intelligence,' in this case the ability to learn a motor skill, is related to the amount of brain space devoted to this skill," Nottebohm says.

Measurements of the space in a mon-

key's brain that receives sensory information from its hand also support the idea of "use-dependent" brain allocations. Randall J. Nelson and colleagues at the University of California at San Francisco discovered that the brain area devoted to images of the hand surface varies far more between individual monkeys than does the size of a monkey's hand. The parts of the hand that are used most receive the greatest share of the available brain space. The scientists suggest that the way an animal uses its hand determines how brain tissue will be allotted to represent the image.

The flexibility of brain space is further demonstrated when the scientists cut one of the three nerves that carry sensory information from the hand to the brain. Immediately, the processes of the other two nerves, while maintaining their original representations, expanded into the "silenced" space. One area of the hand ended up with more than 20 times its original brain area and another hand region gained a new representation far from its original map. The newly apportioned brain space is topographically organized according to the same principles as the original map. Michael M. Merzenich, Nelson and colleagues conclude that their monkey findings, along with studies of patients with nerve damage, indicate that perceptual maps on the surface of the brain are not fixed and that continual use dependent competition probably determines the boundaries. □

Diversification in neuron chemistry

A dogma of neuroscience has fallen by the wayside as new techniques reveal multifaceted chemical production in individual nerve cells. The old rule was that each cell manufactures only one transmitter chemical, which it releases to influence other cells. But now more than a dozen examples provide exceptions to the rule. Some neurons contain two, and in at least one case three, chemicals that may serve as intercellular messengers. "And we expect to find many more examples," Tomas Hokfelt of the Karolinska Institute in Sweden told the Cincinnati meeting of the Society for Neuroscience. The combined effects of a nerve cell's chemical transmitters determine the cell's physiological influence.

Brightly fluorescent silhouettes of nerve cells provided the impetus for scientists to revise conceptions of neuron chemistry. Researchers have developed specific antibodies to selectively label cells producing each neurotransmitter. To the antibody they attach a molecule that fluoresces red or green or yellow under ultraviolet light (SN: 10/28/78, p. 298). Thus with a set of fluorescently tagged antibodies they can visualize on a slice of tissue the cells with specific neurotransmitters. Some cells have been found to fluoresce with more than one antibody tag.

One peptide and one "classical" neurotransmitter are produced in many of the dual transmitter nerve cells. The synthetic routes of such compounds are completely separate. "This suggests that the dynamics of the transmitters might be very different in such cells," Hokfelt says.

Two transmitters in a single neuron may allow precise control of the cell's signal. Hokfelt, Benjamin S. Bunney and collaborators at Yale University have found, for instance, that a group of midbrain neurons, known to release the classical transmitter dopamine, also release a peptide similar or identical to cholecystokinin (CCK), a substance originally found in the intestine. The activity of these cells is affected by both transmitters—but in opposite directions. Dopamine inhibits the nerve cells, whereas CCK activates them. "Thus the interaction of these two compounds may be very important in regulating activity of these cells," Bunney says. "CCK may be intimately involved in the control of the activity of a subpopulation of dopamine neurons."

Another example of paired transmitters has been found in the cells that innervate sweat glands. The cells release both the classical neurotransmitter acetylcholine and the peptide called vasoactive intestinal polypeptide (VIP). The acetylcholine triggers sweat gland secretion; the VIP dilates vessels to increase local blood flow. Together, the neurotransmitters effectively stimulate sweat gland response. Hokfelt says, "The coexistence of these compounds makes physiological sense."

Hokfelt and colleagues are now looking for more systems of physiologically sensible neurotransmitter coexistence, with other interactions that enhance physiological response. □

Protein celebrities meet in the brain

First there was the disclosure that pituitary gland proteins could, in addition to their hormonal roles, influence the mind and behavior (SN: 9/25/76, p. 202). Then there was the discovery of brain proteins called endorphins and their effects on human thoughts, emotions and behaviors (SN: 11/25/78, p. 374). Third came the finding that the pituitary hormones and endorphins are related. And now it appears that another protein—interferon—may be related to the pituitary hormones and endorphins, according to a report in the October PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES by J. Edwin Blalock and Eric M. Smith of the University of Texas Medical Branch in Galveston. If this is the case, it opens the possibility that the antiviral protein, interferon, may sometimes pose as a hormone or even influence the mind and behavior.

A few months ago Blalock and Smith found that interferon has some protein hormone activity, notably that of the pituitary hormone adrenocorticotropic hormone (ACTH), and that, after interacting with cell membranes, interferon and protein hormones share common pathways of cell activation. These similarities suggested to Blalock and Smith that there might be structural similarities between the protein hormones and interferon. They tested this, using as their tools antisera (antibodies) against ACTH, gamma-endorphin and human leukocyte interferon (one of three major kinds of interferon) and the digestive enzyme pepsin, which would carve the amino acid sequence of ACTH out of interferon if such a sequence were present and show ACTH activity.

As they report, antiserum against ACTH blocked the activity of human leukocyte interferon but not that of fibroblast interferon (another major type of interferon). Conversely, antiserum against human leukocyte interferon blocked the activity of ACTH. And when human leukocyte interferon was digested with pepsin, it totally destroyed interferon's antiviral activity but generated ACTH activity instead. Antiserum against gamma-endorphin also blocked the activity of human leukocyte interferon. However, antisera against two other pituitary hormones — luteinizing hormone and follicle-stimulating hormone — did not block the activity of human leukocyte interferon.

Thus, it looks as if human leukocyte interferon is structurally related to at least one pituitary hormone—ACTH—and to at least one endorphin — gamma-endorphin —and that leukocyte interferon may be a precursor for these proteins or may share a common precursor with them. And in either case, leukocyte interferon might possess, in addition to its antiviral activity, hormonal or even psychological and behavioral activity.

Before such unorthodox insinuations can be said to be the case, though, lots more research into the relationships among the pituitary hormones, endorphins and interferons has to be carried out. For instance, since Blalock and Smith submitted their findings to the PNAS in July, part of the amino acid sequence for human leukocyte interferon has been published by other researchers, allowing them to compare that sequence with the sequence known for ACTH. There were no similarities between the sequences, Smith told SCIENCE NEWS. This finding, or nonfinding, detracts from the antigenic and enzymatic suggestions that leukocyte interferon is structurally related to ACTH. However, Smith and Blalock remain hopeful that when the final sequence of human leukocyte interferon becomes known, it will resemble that of ACTH. □