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**COVER:** Thermonuclear fusion experiments with plasma of a "doublet" shape, a ring with a two-lobed or figure-eight shaped cross section, have shown such promise that a scaled-up version of the apparatus, Doublet III, is now under construction at General Atomic Co. in San Diego. The most recent experiments with its predecessor, now in operation, the smaller Doublet II-A, are described on p. 61. (Illustration: General Atomic)

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# LETTERS

## Endorphin in the future

If acupuncture causes the natural pain-suppressant endorphin to pour into the bloodstream (SN: 11/20/76, p. 324), an answer may be near for some questions in and out of sports physiology. The suggested mechanism calls for the pituitary gland to release endorphin when nerve cells deep within the body of a muscle are stimulated. Now, when during the course of the day might such nerve cells be stimulated?

Consider several well-known observations from an activity which might exhibit such effects in their purest and most intense form—training and competition in endurance athletic events. Bicycle racers and distance runners need a warm-up before they feel right. They know that the "second wind" exists. They can fall during a race and not even notice they have just broken bones or lost skin. They tell you they are addicted to their sport. And they become almost euphoric merely talking about "putting in the miles" during training.

It would not be unexpected if large amounts of endorphin were released during such efforts. Such a mechanism would have much wider benefits to a species than providing some members with a natural high. Surely there is great survival value in automatic reinforcement for practicing some strenuous and possibly exhausting and painful activities, such as chasing or fleeing or even standing around chewing your food. All this, of course, in addition to the switching off of unneeded and disabling pain from traumatic wounds. A simple assay for endorphins would tell us how severe or prolonged this natural stimulation need be, and how close it is to opiate addictions.

*Joseph Barranco*  
Miami, Fla.

**In regards** to Dr. Pomeranz's model of a neural mechanism for acupuncture, there are some interesting possibilities. If in actuality this pain suppression loop exists, then there also follows logically the possibility that other points could be receptors that follow paths to either different areas of the pituitary or other neurons in the central nervous system, thereby creating a mechanism whereby organs could be affected via either neuro-hormonal control or direct stimulation by the sympathetic or parasympathetic nervous system. These effects could be meas-

ured as well as the pain-suppression effect, and, if substantiated, could lead (in some cases) to a type of therapy with perhaps very few harmful side effects (i.e. affectation of an organ by acupuncture rather than by administration of drugs).

The problem with this type of therapy could be that if neuronal location is the result of a "chance" occurrence (SN: 11/20/76, p. 325), then if these acupuncture pathways do indeed exist, they may be differently located and have to be determined separately for each person.

*Steven Evans*  
New York, N.Y.

## Antipodes, orbits and ice

Perhaps you should be more wary of unusually strong statements. Your article "Ice Ages Attributed to Orbit Changes" (SN: 12/4/76, p. 356) seems to have "apparently settled the argument" over what causes dramatic changes in global climate a little too hastily. The article points out quite rightly that in the 23,000 year cycle the earth's closest approach to the sun occurs at different times of the year, and that at present this occurs in December, but in 10,000 years it will occur in July. Then the article continues—"A longer distance between the earth and sun in summer means cooler temperatures, less snow melting and a growth of the polar ice caps."

This argument forgets altogether the Southern Hemisphere, which in the same time frame, is enjoying during its summer a shorter distance between the earth and sun, leading to warmer temperatures, more snow melting and a decrease of polar ice, at least for the south polar regions.

*John J. Green*  
Ottawa, Canada

## Earthquakes and the moon

I was surprised by the categorical contention that established scientists have found no relationship between the gravitational pull of the moon and earthquake activity (SN: 12/11/76, p. 373). This is simply not so. There exist many studies which demonstrate that such an influence is at work. The most recent one I have seen is S. A. Fedotov's published high correlation between large earthquakes in Kamchatka and the 18.6-year tidal cycle.

*John S. Rinehart*  
Santa Fe, N.M.

*(The article did not mean to say there was no relationship, but rather that the relationship—if it exists—is so complex that no useful predictions have been based on it.—Ed.)*

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