

SCIENCE & TECHNOLOGY

By the early 1930s, political doctrine had pushed the two countries into opposite paths. In the "nature-nurture" debate, nature won out in the extreme genetic doctrines of Nazi Germany, which sought to create a "master race" of genetically pure "Aryans." Nurture won out in Russia, where an equally unsubstantiated Soviet doctrine, epitomized by Trofim Lysenko's version of Lamarckism, ignored genes and sought in vain to produce better strains of food plants environmentally.

Graham concedes that there may appear to be a natural alliance between eugenics and conservative, even fascist, sentiments. But that link was not logically preordained and was certainly not perceived in the early 1920s. Scientists and others interested in eugenics covered a broad range of political beliefs in Weimar Germany and Soviet Russia. All scientific theory and technological innovation exists in a social and political setting, Graham concludes, and the consequences can be overwhelming.

The Endo-Ecto Controversy

"Warm-Blooded Dinosaurs: Evidence Pro and Con" by Jean L. Marx, in *Science* (Mar. 31, 1978), 1515 Massachusetts Ave. N.W., Washington, D.C. 20005.

In recent years, the notion that dinosaurs, as reptiles, were cold-blooded creatures (ectotherms) whose body temperatures fluctuated with that of the environment around them, has been challenged. Some paleontologists now argue that dinosaurs were warm-blooded (endotherms) like mammals and birds, and suggest that this explains the dinosaurs' ability to dominate the earth for 140 million years.

The central question is the dinosaurs' level of activity, observes *Science* staff writer Marx. Reptiles are often depicted as slow, sluggish creatures incapable of much sustained effort because they are cold-blooded, with low metabolic rates, and therefore do not produce enough energy for vigorous action. Only by taking advantage of environmental heat (i.e., basking in the sun) can they warm their bodies and raise their metabolic rates to high-activity levels. By contrast, warm-blooded endotherms are independent of their environments and have metabolic rates high enough to give them ready energy to hunt for food and escape their enemies.

Paleontologists Robert Bakker of Johns Hopkins and John Ostrom of Yale have concluded that dinosaurs do not fit the picture of the slow, sluggish reptile. Instead, they had long limbs, erect postures, and (probably) four-chambered hearts characteristic of present-day warm-blooded vertebrates. They had greater speed and agility than modern ectotherms (e.g., lizards) whose limbs project out to the side.

Other investigators point out that the image of the sluggish reptile is misleading; a reptile can move very rapidly when startled. Moreover, some cold-blooded reptiles (like the crocodile) also have four-chambered hearts. The dinosaur, given its large size, may have had a

SCIENCE & TECHNOLOGY

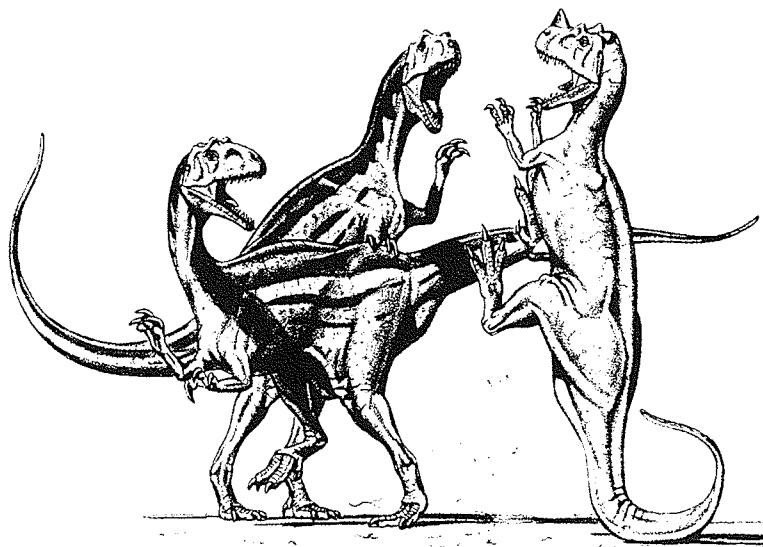


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Ceratosaurus, on the right, 15 feet long and weighing two tons, balances on its powerful tail to slash with clawed hind feet at a pair of agile *allosaurs* (averaging 25 feet in length and weighing three tons).

large heat-storage capacity to reduce the changes in body temperature brought about by environmental temperature changes. Uncertainty surrounds other aspects of the endotherm-ectotherm controversy, which may never be resolved because of the need to rely on an incomplete fossil record and analogies with modern creatures.

Trouble Brewing for Basic Science

"Suspicion: Basic Research and Scientific Freedom" by Robert C. Cowen, in *Technology Review* (Jan. 1978), Massachusetts Institute of Technology, Room 10-140, Cambridge, Mass. 02139.

Sputnik I, the first Soviet satellite, launched just over 20 years ago, was an "angel of deliverance" for hard-pressed American scientists who then faced the loss of vital federal funding for research. American scientists could use another Sputnik today, writes Cowen, science editor of the *Christian Science Monitor*.

American research and development is hardly starved for money; yet, on the whole, funding for it has reached a plateau. Federal support for basic science is uneven, and faltering in such fields as high energy physics and astronomy. According to the National Science Foundation,