

our universe. But artificial telepresence can also be used to design manufacturing systems that run in the physical world.

Heim gives some attention to helmet-mounted displays, the gloves, and other simulation apparatus most commonly identified with VR. But he notes the practical difficulties that have frustrated early recreational versions of these combat-born techniques, including nausea and disorientation in a significant number of users. He notes an alternative form of VR, the CAVE Automatic Visual Environment, that does not isolate the senses like (to use his metaphor) a falcon's hood. It is a 10-foot cube of display screens in which participants can interact with virtual objects. Originally designed for scientific visualization, it is now used by Detroit automotive designers as well as media artists.

Heim points to a VR that is not a replacement for nature or the social world, but merely an enhancement. He takes issue both with "naive realists" who fear VR as an opiate amid the devastation of the living planet and with the "network idealists" and "data idealists" who are indifferent as to the source of a sensory input.

Virtual reality emerges from this book as a genuinely gifted youngster with distinguished ancestors in the arts and sciences. Heim could have added that VR also has a strong religious heritage. From the 13th-century friar Roger Bacon to the architects of the Mormon Church, Western religious leaders have long sought rich sensory representations of invisible realities. Heim himself uses a theological metaphor when he writes that VR "does not imitate life but transubstantiates it."

AI has taken far longer than expected to live up to its promise. Is VR also destined to be an underachiever? Heim's rich sampling of its techniques convinces me that VR is indeed for real. But, as with so many other innovations, its most important achievements may be far different from what we project. *Virtual Realism* is a refreshingly thoughtful overview of the possibilities, and a welcome invitation to humanist critics to understand and guide them.

—Edward Tenner

**CHILDREN OF PROMETHEUS:  
*The Accelerating Pace of  
Human Evolution.***

By Christopher Wills. Perseus Books.  
288 pp. \$25

With the recurrent political and religious assaults on "Darwinism," it remains worth arguing that humankind has evolved and is still evolving. *Children of Prometheus* advances the argument more effectively than most books, whether scholarly or popular. Wills, a professor of biology at the University of California, San Diego, makes a broad selection of recent findings genuinely accessible to general readers, including students. Technical parts of the argument—such as the presentation of balanced genetic polymorphism and the forces of natural selection sustaining it—read smoothly, betraying none of the labor that must have gone into the writing.

Moreover, Wills goes a crucial step further. He emphasizes and supports the claim that human evolution—real biological evolution, not just cultural change—is accelerating. Our species has been evolving quickly by ordinary standards (for example, those for other primates) and the pace is speeding up. Although only small differences in overall DNA composition separate us from our nearest relatives, the chimpanzees, those gene differences have produced huge structural and other phenotypic changes, enabling humans to outdistance the chimps since the two lineages separated. Much of the book is devoted to explaining the reasons and mechanisms for the acceleration.

Wills argues that the distinction between human biological and cultural evolution is a false one. The two are locked in a positive-feedback loop, whereby evolution of cognitive capacity (which at first had to be genetic) results in a greater ability to alter the environment. Those alterations produce powerful selective forces in favor of enlarged and novel cognitive capacities for coping with environmental stress. The enlarged capacities lead to further (sometimes destructive) changes in the environment. And so on. Meanwhile, migrations enlarge the gene pool of merged human (or hominid) populations. Thus, the supply of genetic variation—the raw material of evolution—increases as cultural change fuels environ-

mental change. A strength of the book is its exposition of this feedback loop.

Other elements are not so solidly established. The author makes a politically correct attempt to dismiss *Bell Curve*-style hereditarianism—which, given that Wills's whole argument rests on the biological bases of cognitive ability, seems rather unconvincing. Elsewhere, Wills gives the still-emerging story of Neanderthals the same billing, and its conjectures (which is what they are) the same weight, as much more secure findings. He waxes lyrical about the recent discovery, in a cave that was probably inhabited by Neanderthals, of a 50,000-year-old fragment of hollowed-out bone in which symmetrical holes appear to have been punched. Like others, he speculates that this object was a flute, hence that the Neanderthals had music, a conclusion that would significantly alter our view of their capacities and history. But of course the object might well *not* have been a flute. The extended chain of guesses that follows, interesting and even plausible as it is, ought to be more clearly identified as such.

Still, this is an authoritative antidote to the witless but trendy calumny that evolution, specifically “Darwinism,” is just a tired 19th-century idea, ripe for overthrowing.

—Paul R. Gross

***SURVIVAL OF THE PRETTIEST:  
The Science of Beauty.***

By Nancy Etcoff. Doubleday. 325 pp.  
\$23.95

In *The Beauty Myth* (1991), Naomi Wolf blamed our patriarchal culture for inculcating “competitive” and “hierarchical” notions of female attractiveness. If TV networks would hire 60-year-old women as news anchors, if fashion designers would use average-looking models, if actresses would refuse to tone their bodies for nude scenes (“as a gesture to women in the audience”)—then, Wolf maintained, our thinking would change.

Not so, according to Etcoff, a psychologist on the faculty of Harvard Medical School. She contends that humans' conceptions of beauty are genetically hard-wired. Three-month-old infants, uncorrupted by Wolf's cultural cues, stare longer at beautiful faces than at plain ones. Whereas earlier efforts to popularize evolutionary psychology, from

Desmond Morris's *Naked Ape* (1967) to Jared Diamond's *Why Is Sex Fun?* (1997), often erected elaborate analogies between human behavior and animal behavior, Etcoff concentrates on studies of humans' attitudes and mating rituals, with only the occasional animal analogy. Readers, it seems, no longer need to be convinced that evolution has shaped human eros.

In chatty if quote-heavy prose (featuring musings on beauty by Ovid, Baudelaire, Don King, Aaron Spelling, and countless others), the author argues that the ingredients of female beauty are mostly markers for fertility. Women with large and symmetrical breasts are more fertile, as are women with hourglass torsos (Marilyn Monroe and Audrey Hepburn, despite their divergent body types, had the same waist-to-hip ratio). Thick hair, large eyes and lips, and small chins signal youth and health, which contribute to fertility. Male attractiveness proves more complicated, perhaps because females are less visually obsessed than men when mate hunting. Whereas males admire hyperfeminized faces featuring larger-than-life lips and eyes, both sexes find hypermasculinized faces off-putting. Department store managers, in fact, sometimes complain that the more manly mannequins look like rapists. A beguiling male face carries a hint of femininity.

For both men and women, appearance carries far-reaching social consequences. We are more likely to come to the aid of the gorgeous, and less likely to trouble them with our own pleas for assistance. We accord them a larger personal space in conversation. We are more likely to give them high grades and good jobs, to acquiesce to them in arguments, and to acquit them in court. The beautiful, in turn, grow serenely accustomed to our kowtowing.

While acknowledging that evolutionary psychology doesn't solve every mystery of beauty, Etcoff says little about its limitations. In particular, she never tries to unravel the interaction between culturally defined markers and evolutionary cues. For instance, women on the higher socioeconomic rungs weigh more than average in developing countries, where ready access to food signals status, but less than average in developed countries, where, with food readily available,