

RELIGION & PHILOSOPHY

The problem, Letwin argues, is that there is no clear consensus on what principles are important or on how competing values (e.g., equality and individual freedom) should be balanced. Each judge would simply apply his or her own principles. But reconciling different beliefs, she contends, ought to be the job of elected legislators. Leaving the job to judges guarantees that the written law will be disregarded.

Letwin suggests that Dworkin and his colleagues take a cue from Socrates. The Greek philosopher was so convinced that a society in which the law was not supreme would be turned "upside down" that he submitted to a death sentence he knew to be unjust.

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A Chemistry Of Crime

"Locks—A Key to Violence?" and "Biochemical Aggression—The Legal Dimensions" by Janet Raloff, in *Science News*, (Aug. 20 & Sept. 10, 1983), 1719 N St. N.W., Washington, D.C. 20036.

For some people, violent behavior could be a matter of chemistry.

William Walsh, a chemical analyst at the Argonne National Laboratory near Chicago, has been studying the crime-chemistry link in his spare time for 17 years, reports Raloff, a *Science News* editor.

Last spring, Walsh released the results of a five-year-long study comparing concentrations of metallic "trace elements"—calcium, magnesium, and zinc—in the bodies of 96 "extremely violent" and 96 "nonviolent" men. Of the violent men, 35 were only sporadically so. All 35 shared a distinctive chemical profile: low levels of copper, high levels of potassium. Fifty-seven chronically violent "sociopaths" followed the opposite pattern: high in copper, low in potassium. The remaining four men were deficient in *all* trace elements.

Scientists do not know what causes trace element imbalances. Diet seems an unlikely suspect. Earlier, Walsh studied 24 pairs of brothers between the ages of eight and 18. In each pair, one boy was "very delinquent," the other, "all American." Each pair grew up together and presumably ate the same foods, yet displayed marked differences in trace element levels. Walsh suspects that the abnormalities stem either from a metabolic disorder or from a basic chemical imbalance. Nor do scientists know exactly what role trace elements play in the body's functioning, though some researchers suspect links between these nutrients and intelligence and diseases such as Tourette's syndrome.

The key to all this intriguing research, writes Raloff, is hair. Trace element levels in individuals vary from day to day in blood or urine; hair serves as a more reliable table of contents, collecting trace elements 200 times more concentrated than those in the blood. Criminal forensic specialists have long used comparisons of hair samples to iden-

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Trace element imbalances are only one possible crime-chemistry link. Some researchers believe that high-sugar diets can induce violent behavior. Tests in which junk foods—soda, candy, snacks—were barred from prison diets suggest that the researchers may be correct. But conclusive proof is lacking.

tify individuals. Beginning in the 1960s, however, when mail-order charlatans promised to diagnose medical problems using locks of hair, disrepute tainted wider applications of hair analysis. Though the field is now governed by stricter standards, the doubts linger.

Meanwhile, Walsh is pushing ahead with his work. At his new Health Research Institute near Chicago, he is beginning to treat delinquent boys for trace element abnormalities. No results yet.

If they are confirmed, notes Raloff, Walsh's findings would raise a host of ethical questions. Can the chemically imbalanced be held accountable for their crimes? Should a young child be tested for chemical hints of criminality? What if his test were positive?

A Scientific Success Story

"The Origins and Development of the American Patent System" by Morgan Sherwood, in *The American Scientist* (Sept.-Oct. 1983), 345 Whitney Ave., New Haven, Conn. 06511.

New methods of making candles, milling flour, and distilling alcohol were among the first inventions awarded U.S. patents. Today, more than 4,370,000 patents later, the patent system is quietly rolling along.

Americans take the system so for granted that they forget how complex it is, notes Sherwood, a University of California (Davis) historian. The system must balance two competing goals: encouragement to inventors and public access to their inventions. The Founding Fathers wrote their idea of a proper balance into the U.S. Constitution: a patent system granting inventors proprietary rights over their creations, but for a limited term (now 17 years). The Founders were, however, less than unanimous on the virtues of this scheme. James Madison and Alexander Hamilton favored awarding prizes instead. Both Thomas Jefferson and Benjamin Franklin refused to patent their own inventions.