important as this one, and they do a disservice to the really powerful biological arguments that can be deployed. Furthermore, the misplaced combative style delays the honest synthesis Pinker professes he wants so much. I fear that *The Blank Slate* will become a happy hunting ground for the social scientists already predisposed to be skeptical about evolutionary thinking and that the wretched unnecessary debate over human nature is due for yet another silly round.

BOOKS: VIROLOGY

Chance Favors the Prepared Mind

Robin A. Weiss

Louis Pasteur's famous aphorism that heads this review aptly describes Baruch Blumberg's career. In 1976, Blumberg was awarded the Nobel Prize in Physiology or Medicine for his identification a decade earlier of Australia antigen and for showing that it represented infection by what we now call hepatitis B virus (HBV). His discovery has had an immense impact on human health. Screening of HBV carriers among blood donors was soon introduced. More recently, the anti-HIV drug lamivudine was found to be effective against HBV. Australia antigen itself, purified from human blood plasma, proved to be an efficacious and safe vaccine. Later, molecular cloning of the antigen's gene led the way to the world's first recombinant subunit vaccine. As immunization against HBV becomes implemented more widely, half a billion children born in Asia and Africa may be protected from hepatitis and from subsequent liver cancer as adults.

Hepatitis B
The Hunt for a Killer Virus
by Baruch S. Blumberg
Princeton University Press, Princeton, NJ, 2002. 256 pp. $27.95, £19.95. ISBN 0-691-00692-X.

In *Hepatitis B*, Blumberg relates his life in science and medicine. Born in 1925, he grew up during the Depression in Flatbush, Brooklyn. As a naval officer during World War II, he completed a physics degree, and after the war he entered medical school at Columbia. (He gives a telling description of life as an intern in New York's Bellevue Hospital.) Blumberg then took the opportunity to study for his doctorate at Oxford, to which he later returned on sabbatical and, eventually, as Master of Balliol College.

After joining the National Institutes of Health in the late 1950s, Blumberg began to explore serum proteins as markers for genetic polymorphisms, and he was drawn to field studies among remote human populations in various parts of the world. This gave him a feel for epidemiology as well as laboratory research, a broad perspective that served him so well during his subsequent long career at the Institute for Cancer Research at Fox Chase, Philadelphia. He made quite an important early contribution to the characterization of low density lipoproteins (now known to affect cardiovascular disease) but was diverted by his "big" discovery, the Australia antigen—so called because he found it in high frequency in the sera of native aborigines. Although the antigen was initially assumed to be an inherited human protein, the eureka moment came when Blumberg realized that it was actually the coat protein of the agent of serum hepatitis.

Field dress. To collect blood for his polymorphism studies, Blumberg visited an isolated Inuit village at Anaktuvuk Pass in Alaska's Brooks Range in August 1958.

Blumberg writes that he was "surprised at the apparent hostility" to his discovery of HBV. He sees this hostility as being a typical response to a Kuhnian paradigm shift. For Blumberg personally, the discovery was certainly a damascene conversion to virology. But it does not strike me as a conceptual leap in science, in the sense, say, that the "prion only" hypothesis of spongiform encephalopathies challenged our view that infectious agents must possess genomes. The epidemiology of serum hepatitis had clearly indicated the presence of an unknown infectious agent, just as AIDS, non-A non-B hepatitis, and Kaposi's sarcoma were clearly consequences of infection. As with the subsequent identification of the causative viruses of those diseases, what really rankled the leading researchers was that the hepatitis virus was found while Blumberg's group was looking at quite different things. As Blumberg writes, "We were outsiders not known to the main body of hepatitis investigators...making claims for the discovery of the virus they had sought for so many years."

Details in the book are not always accurate. Blumberg estimates that HBV infection leads to 1.5 million deaths each year, and we are told that "HBV kills as many, if not more, people than HIV." That was true 10 years ago, but UNAIDS reckons that in 2001 about 3 million people died as a result of HIV infection. Names are misspelled, and Erasmus Darwin is referred to both as Charles's uncle and, correctly, as his grandfather. A dominant Mendelian trait is called recessive, and the author writes of screening blood for hepatitis C DNA, whereas that virus has an RNA genome. Meticulous editing could have removed these minor irritations.

Outside my laboratory stands a large, obsolete electron microscope, lovingly restored by Richard Tedder. In the 1960s, it was the instrument with which two important human viral pathogens were discovered, Epstein-Barr virus and hepatitis B Dane particles. David Dane and his colleagues were the first to distinguish the 45-nm-diameter particles containing HBV genomes from the 22-nm "empty" particles that Blumberg showed could be purified from plasma to use as a vaccine. Both types of particles are included in the tiny image on the cover of *Hepatitis B*. But inside, Dane merits a single sentence; Alfred Prince, two; and other key players in the field (such as Fritz Deinhardt, Bill Robinson and Ken Murray), none at all. Despite its title, Blumberg did not intend his book to be a measured history of HBV; rather, it is a personal memoir. For a very brief but balanced story of hepatitis virus discoveries, one should read Bob Purcell's account [*Gastroenterol.* **104**, 955 (1993)].

Nonetheless, Blumberg is generous to the many colleagues who studied or collaborated with him. He displays a wry, self-deprecating humor, as befits the Brooklyn kid turned Oxford don. Writing of his attempt to interest Merck in developing the hepatitis B vaccine:

> Perhaps I was distracted by the opulence of the office and reception area; I remember thinking at the time that we could easily fit four good-size laboratory spaces into the room occupied by a single executive. The proceedings seemed to be inconclusive and somewhat depressing. When we emerged...I said to Wing [G. Willing Pepper]. "Well, I guess that was 'No.'" "To the contrary," Wing answered, "it was 'Yes.'" So much for my appreciation of corporate dealings.

Readers will find much to enjoy and absorb in Blumberg's fascinating personal story.

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