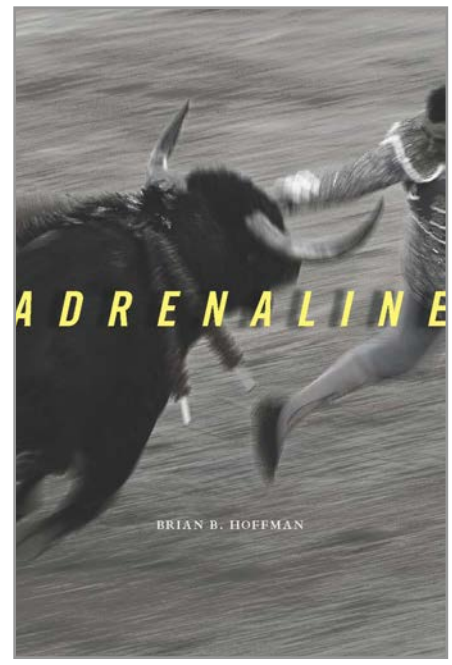
A Heart-Racing History

ADRENALINE

REVIEWED BY **HANNAH HOLMES**



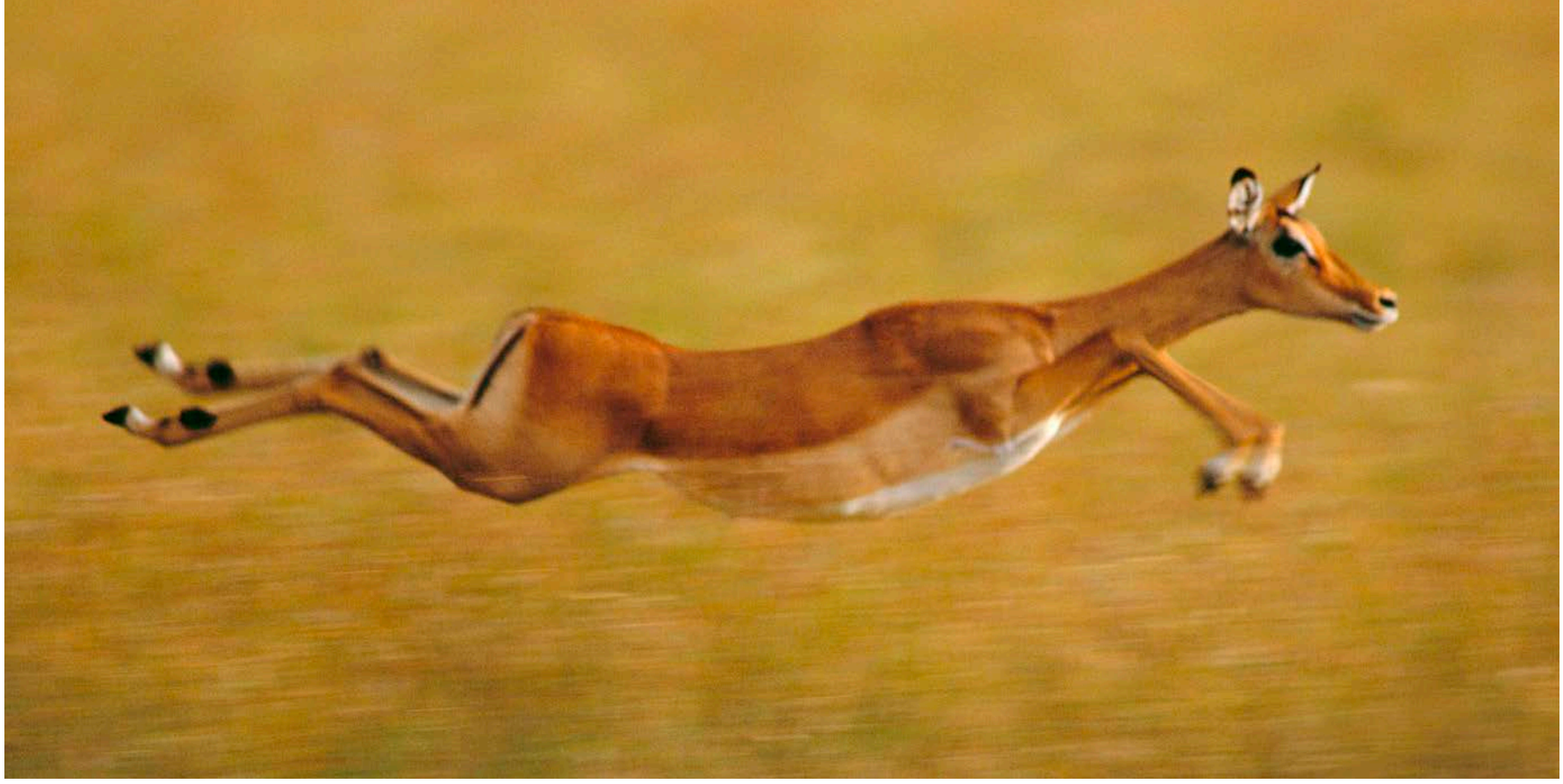
By Brian B. Hoffman
Harvard Univ. Press
298 pp. $24.95

MEDICAL HISTORY IS PULSE-RAISING STUFF. In our buttoned-down age, we forget that there was a time when no one objected if you tried to transfuse blood from a sheep to a child, or remove parts from a dog to see if it might live without them. Books about such fumblings put us in a place where we can watch the human mind striving for clarity in a candle-lit era. *Adrenaline*, by Harvard professor of medicine Brian B. Hoffman, opens such a portal.

Glands have long labored in the shadow of organs. In autopsies of yore, the adrenals were cast aside by anatomists dazzled by the allure of the large and obvious kidneys. Sitting near (or *ad*, in Latin) the kidneys (*renes*), the adrenal glands are neither small nor tidy. They sag over the tops of the kidneys like globs of errant fat. They were ignored in medical texts until Bartholomaeus Eustachius noted them in 1563, after which they were by and large ignored.

Then Thomas Addison, an English physician, noted abnormal adrenal glands during autopsies on a number of patients who had suffered fatigue, faintness, weight loss, vomiting, and darkened skin. Writing in 1855, he tentatively proposed a link. Although nobody paid much attention, he was eventually rewarded with immortality when the malady became known as Addison's disease.

In 1884, a hapless German farm girl was admitted to a hospital. She had bouts of anxiety, headaches, vomiting, and vision difficulties. Under a doctor's fingers, her arteries were rigid. An eye exam found blood in the back of her eyes. She soon died. The anatomist who did the autopsy on her body noticed twin tumors in the girl's adrenal glands, but knew not what to make of them.



FRANS LANTING / CORBIS

An impala in the Masai Mara National Reserve, Kenya.

As decades passed, enough of these tumors were found—by surgeons probing the bodies of patients who had endured bouts of illness and rigid blood vessels—that the link was strengthened. Surgical removal of those cancerous glands proved remarkably (if mysteriously) curative.

It was another English doctor, George Oliver, who first got the notion to collect extracts from the adrenal glands of sheep and calves, and feed them to people. This being 1893, gaslight had supplanted candlelight, and Dr. Oliver had even invented a rudimentary instrument that measured the radius of arteries. Under these laboratory conditions, he concluded that sheep adrenaline caused human arteries to constrict. With adrenaline having been tested on humans, the next logical step was to try it on dogs. Upon injection, the dogs' blood pressure spiked also, and their hearts raced.

This was news. The circulatory system was notoriously hard to control. A substance that could alter its behavior was worth money. By the turn of the century, competing chemists had purified the active ingredient of the adrenal glands. Adrenaline restored free breathing to people with hay fever, stemmed bleed-

Adrenaline restored free breathing to people with hay fever, stemmed bleeding, and, if you believed all the accounts, cured hemorrhoids and bedwetting.

ing, and, if you believed all the accounts, cured hemorrhoids and bedwetting. Drug companies went wild.

More important, a shot of adrenaline could rescue surgery patients whose blood pressure cratered due to complications of anesthesia. In fact, its pop-culture story began when a researcher overdosed a dog with anesthetic, then restored life with an injection to the heart. Adrenaline also relieved asthmatic constriction of the airways with life-saving speed.

Adrenal history unfolded in measured steps during the years when an offending body part was summarily plucked out. But because the chemical itself held such promise as medicine, investigators continued to investigate, on smaller and smaller scales.

Medical history is a fine kettle of fish. But biochemical history is a completely different dish, and one not easily digestible by the average consumer. When adrenaline lands on the laboratory bench halfway through this book, Hoffman slips on the white coat and the attribution style of the academic. Paper by academic paper, and in traditional passive voice, this history is detailed—the discovery of cyclases, kinases, cAMP, GDP, then genetics. The various receptors that grant adrenaline access to a cell are thrice diagrammed. No discoverer of an obscure protein is overlooked.

None of this translates from the lab bench to the bedside table. Beta-blockers, which Grandpa takes to prevent adrenaline from spurring his weary heart, are known in this academic portion of the book only as "ß adrenergic receptor antagonists." (That funny-looking ß is a Greek letter, beta.) The drugs we might take for migraine, tremor, hyperthyroid symptoms, gut bleeding, or alcoholism are briefly recognized as additional "ß receptor antagonists." Closely, we follow the fight over adrenaline's name and its Greek synonym, epinephrine, but there is no mention of the EpiPen injector that severely allergic people carry today.

As the units of scientific discovery shrink, from entire organs, to small glands, to cells, and to the synaptic spaces between the cells, the chasm between researchers and the public yawns wider. These conjoined books—the first a popular history and the second a biochemistry review paper—present an awkward but illuminating study of science history. ■

Science writer **HANNAH HOLMES** is the author, most recently, of *QUIRK: Brain Science Makes Sense of Your Peculiar Personality*. Her blog, *Human/Nature*, appears at www.hannah-holmes.com. She lives in Portland, Maine.