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A Little Traveling Music, Please

By Andrew Ruppel, Feature Editor

Thanks to astonishing advances in telecommunications, distance has died (to rephrase a line first coined by Frances Cairncross for *The Economist*). Yet spanning distance remains one of our persistent challenges. The engineers of Boeing and Airbus are busy developing the next approach to long-distance travel. Will it be small and fast (Boeing's supersonic approach) or big and slow (Airbus's double deck-er)? For the airlines, will it continue to be "hub & spoke" or more "point-to-point?" For crisis-sensitive manufacturers, will it be more "just-in-case" instead of more of "just-in-time?" Overcoming distance is a matter of speed and direction. How fast can we go? What tack should we take? Do we even know where we are starting from? Here are three books that "vector in" on these questions.

(Alhazen, Neipce, Nimtz). And this book deals with more than just the speed of light: there are discussions of photography, photosynthesis, physics, and astronomy.

An important point to remember is that visible light occupies a pitifully small slice of the total electromagnetic spectrum. But the full spectrum is all light. Light is made up of photon particles with wave-like behavior and/or waves with particle-like behavior. Take your pick. That is, of course, what scientists have been doing as they try to understand how light operates. So who are these guys, Alhazen, Neipce, and Nimtz, and where do they fit into this great optical adventure? Alhazen was a tenth-century Arab mathematician who wrote one of the first treatises on light and vision. Joseph Neipce was an early nineteenth-century French physicist whose image of a landscape on a metal plate was among the first photographs taken. His artist-friend Louis Daguerre would later translate Neipce's process into a commercial success—the daguerreotype.

Guenther Nimtz is a current-day German physicist who claims to have sent a signal faster than the speed of light. Quick point here—the speed of light is declared to be 299,792,458 meters per second. Note that this no longer subject to change because the cart has been put before the horse. That is, the meter is now defined as 1/299,792,458 of the distance light travels in one second—no more platinum bar in Paris stuff. So how did Nimtz achieve a superluminal (yes, that's the word) velocity? He relied on the extra rapid tunneling capabilities of photons through certain materials and was willing to 'accept' partial waves coming out the other end. Yes, he got a signal through faster than light speed, but not a full and true signal.

Other researchers have reported 'special-case' type speed results as well. What has theoreticians edgy about these experimental findings is the prospect of going back in time by traveling faster than light.



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Light Years & Time Travel

By Brian Clegg

Wiley, 2001, 310 pages.

www.amazon.com

CAN'T GO MUCH FASTER THAN THE SPEED OF LIGHT—at least that's what we thought. Surprising reports of clever experi-

ments are generating some doubt about the constancy of the speed of light. One experimenter apparently has sent data at four times that rate! How did we come to know what light's speed is in the first place? Brian Clegg, a UK-based technology consultant, with degrees in physics and operational research, has assembled the story of man's interest in light, color, and escaping the bonds of ever-progressing time. There have been many participants in this adventure. Some are well known (Bacon, Newton, Michelson) and some are not so

Cause can thus come *after* effect. Whoa, we're not used to that arrangement. Clegg, unfortunately, does not do a good job of documenting the accounts of these experiments and provides insufficient detail to remove the reader's skepticism. Overall, this book comes across as a collection of scientific mini-biographies and anecdotes, without enough focus to knit them together better. If he had just concentrated on the speed question and not spent so much time covering other admittedly related optical topics, then the vexing velocity issue might have been more convincingly handled. But he did live up to the book's subtitle: An exploration of mankind's enduring fascination with light.



The Riddle of the Compass.

By Amir D. Aczel

Harcourt, 2001,
178 pages

www.HarcourtBooks.com

PROF. ACZEL IS KNOWN TO DSI MEMBERS for his texts in statistics. Over the last several years,

however, he has written popular accounts of science and math topics. In this little volume, Aczel brings his personal experience with sailing together with his skill in clear exposition, to produce an intriguing account of a truly critical invention—the compass. Note that the compass is one of the first decision-making tools. It is descriptive of the decision environment as a set of possible alternatives and becomes normative when coupled with the captain's instructions to "sail a course due west," etc. While the compass provides us with a certainty about direction, there is uncertainty about who invented it. Its use by sea-going civilizations grouped around the Mediterranean is historically recorded, but the role of China was underplayed as Europeans overlooked (and sometimes actually destroyed) Chinese records concerning a floating lodestone. The European side of the story reflects the competition among the city-states of Italy as well as the competition and cooperation between the Christian and Muslim worlds for trade.

The city of Amalfi, near Naples, is the repository of records that suggest, but do

not prove, that one Flavio Gioia invented the compass. There is a statue of him in the town. But even the locals are unsure of his role. Venice, while not taking credit for the compass's creation, certainly took advantage of its usefulness to become the pre-eminent naval power in the Mediterranean. The compass enabled Venetian trading vessels to sail during all seasons of the year, which, in turn, encouraged larger vessels to be constructed. The frequency and volume of trade increased thereby. And so did the transfer of disease by ship-borne rats.

The key to the compass's performance is magnetism—something the early Chinese were well acquainted with. Indeed, one ruler used a magnetized gate to check for iron-weapon-bearing guests in what might be the first form of airport security. But the Chinese became reluctant ocean-voyagers, focusing more on their internal empire. Their versions of the compass—an iron spoon or molded fish floating in a liquid—was deemed more important to determining the direction of the wind-borne spirits and hence to the favorable siting of buildings (*feng shui*). How much different the world might be if the Chinese has sailed beyond the Indian Ocean into the Atlantic as well as farther into the Pacific—particularly if their vessels were equipped with cannon to utilize the gunpowder that they invented. Historical speculation aside, the tale of the compass is a fascinating case study, well told by Aczel, of the adoption and diffusion of an innovation of considerable consequence.



Inner Navigation

By Erik G. Jonsson

Scribner, 2002,
347 pages.

www.simonsays.com

DO WE HAVE AN INNER COMPASS? Why do we often have a gut feeling about which way

to go? How do some guides manage to find their way out of a featureless desert or a look-alike wilderness? Experienced urban and rural trek-er Erik Jonsson tries to address these questions not so much in a systematic, scientific way, but rather by

drawing upon various accounts of compass-lacking navigational feats in hopes of discovering common threads.

Jonsson's packs his stories and insights into 44 short chapters, with suitable hand-drawn illustrations, plus notes and a bibliography.

Inner navigation relies on mental or cognitive maps. We first establish a directional frame, says Jonsson, upon which is plotted the location of key features—both physical and psychological. Repeated trips enable us to refine those locations and add new ones. This is not a conscious process and the resultant mental map is not like a conventional topographic map. We can be fooled in using this map if we fail to affirm its proper orientation at the outset or foul-up in plotting locations. Many of Jonsson's accounts show how this happens. He even describes how he got mis-oriented in his own living room; clearly a source of personal puzzlement, but rationalized by him as stemming from fatigue and the deterioration of way-finding skills with age (he was well over 70 at the time). He does feel that we have a magnetic component to our senses that plays a role in the functioning of our inner compass and proposes some experiments to test this premise. Curiously, no anecdotes concerning the blind are provided. What kind of mental maps do the blind form? Are the processes employed by them any different from those employed by the sight-full and for whom visual images so clearly dominate the content of the mental maps? There would seem to be some fruitful avenues to explore here. By partnering with a spatial psychologist, the author could have added more to the reader's understanding and appreciation of how humans find their way in simple and complex settings. ■

I wish to express my appreciation to Andrew Ruppel of the University of Virginia for his service as feature editor of the "From the Bookshelf" column since 1994. We are pleased to announce that Peter Ittig of the University of Massachusetts will be replacing Andrew as feature editor.

G. Keong Leong
Decision Line editor