Scientific Reasoning: The Bayesian Approach

By Colin Howson and Peter Urbach

This book is designed to explain to the uninitiated the controversial theories it discusses; it can serve as an introduction to the role of statistics and probability in science. Confronting the problems of induction and the confirmation of scientific theories, Howson and Urbach reject the "objectivist ideal" and the fashionable non-probabilistic standard of scientific worth, associated with such writers as Neyman and Pearson, Fisher, Popper, and Lakatos. Howson and Urbach contend that "scientific reasoning is reasoning in accordance with the calculus of probabilities," and (using nothing more advanced than elementary algebra) they give a concise introduction to this calculus. Howson and Urbach examine the way in which scientists actually appeal to probability arguments, and explain the "classical" approach to statistical inference, which they demonstrate to be full of flaws. They then present the Bayesian method, showing that it avoids the difficulties of the classical system. Finally, they reply to all the major criticisms leveled against the Bayesian method, especially the charge that it is "too subjective."

— from the publisher

Letters continued from p.147

documents of all kinds in a fashion that will ensure its long-term usefulness: Standard Generalized Markup Language (SGML). (The word "document" is used here in the broadest possible sense. Any digitally represented information of any kind, including graphics, audio, video, still pictures, studio lighting instructions, computer programs, databases, MIDI data, etc., can form part or all of an SGML document.) SGML allows the presentation of any document, containing any kind of information, in a manner reflecting the document's logical structure (but not necessarily any particular style, means or medium of presentation). In SGML, every document has a "document-type definition" (DTD), which declares the grammatical structure (so to speak) of any document conforming to that DTD. The syntax of an SGML DTD bears some resemblance to BNF productions. The DTD (or the reference to some external standard DTD) is followed by the document itself, which is normally hierarchical and tree-like. Each component or "element" of the document is "marked up," i.e., surrounded by specially punctuated information that includes a "generic identifier" — the corresponding element name as given in the DTD.

Steven R. Newcomb
Vice Chairman, Center for Music Research
Florida State University
Tallahassee, Fla.

"**Some tapes are** so old that today's computer experts do not understand how they were programmed," Ivars Peterson writes.

Speaking as one of *yesterday's* computer experts — one who was involved with NASA's data processing efforts — I must point out that there are many people still around who could salvage these data if someone would hire us to do it.

But it won't happen. In spite of being conversant with current as well as past technology, I have accumulated a whole file of application letters that never elicited an acknowledgment, much less an interview request. NASA (and others) would rather pay the youngsters dearly to learn about seven-track tapes and punched cards than hire one of us "old folks" who already know.

Emily Johnson
Westminster, Md.

Ivars Peterson mentions John McCarthy's advocacy of simplified electronic mail with "no complicated network addresses and no politics." I strongly agree with that.

The national effort to install a broad-bandwidth network for computer users in research and education should be widened beyond those groups to include the country's manufacturing, business and financial sectors. In fact, the national network should be as easy to use and no more exclusive than the telephone system. Fax is just a very expensive way of doing what might be done better by electronic mail, particularly electronic mail that can incorporate pictures and graphics; but fax survives because it is attached to a telephone network that is a 20th-century marvel. The next century, however, should see every sector of the economy possessing ready access to electronic mail and computational power. That will be the 21st-century marvel, and it will contribute mightily to American competitiveness in the world.

At the San Diego Supercomputer Center, we are working on the CASA testbed for the gigabit (billion bits per second) network mentioned by Peterson. We hope that local and national legislators and decision makers in government agencies will do their part to speed the day, by untangling the mass of regulations and knocking over the political barriers. The electronic network can be much more than a grapevine; it can be the country's informational circulatory system.

Sidney Karin
Director, San Diego Supercomputer Center
San Diego, Calif.

Multipurpose mounds

Archaeologist Robert S. Carr's hypothesis may partly explain the function of southern Florida's circular canals and earthen mounds ("Florida 'circles' may be ancient fisheries," SN: 7/7/90, p.6). In Bangladesh, canals adjacent to rural villages are used as fishing grounds. However, the canals (and/or ponds) are also the source of the fill material used to elevate village "mounds" above typical flood levels. In addition, the excavations are used for dry-season water supplies and transportation.

Christopher Shuman
State College, Pa.