

The Ark of Knowledge

Once a year one of my colleagues, who teaches the astronomy classes here in the School of Physics at Georgia Tech, asks our librarians to bring several of Isaac Newton's books including the *Principia* and *Optiks* to our classrooms for his students to see. Several years ago I probably could have gone to the library stacks and looked at some of them for myself, but these treasures are closely guarded now. This year they spread the books out on the demonstration table in Lecture Room 5. Wearing white cotton gloves, as though attending a Southern tea party, the librarians turned the pages for the students to see. I always go by to observe and to ask them to open *Optiks* to Plate 1, which contains Newton's illustrations. On that page is Fig. 2, one of the earliest schematics of an optical system. It shows the sun, the source; a prism, the analyzer; and an eye, the detector.

But what will happen as we make our way toward the conversion of our research journals to digital format? As I noted last month ("The Color of Knowledge") the electronic versions of our journals will become the versions of record because they contain color images that the print versions cannot handle.

Electronic publication not only permits color, but also opens up the possibility of adding animations, three-dimensional structures, stereo images, and short motion

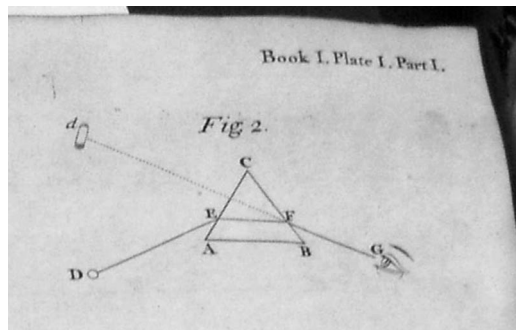


Photo: D. C. O'Shea

pictures to the record. All of these except the stereo images are impossible to reproduce in a print journal. Yet with each of these advances we face the challenge of all who tend to seek the technological high ground: formats. In ten or twenty years will you still be able to decode your data of yesteryear? Will your Adobe Acrobat.pdf files and that Quicktime.mov file be readable when you want them? Anyone who has ever stalked the halls of his or her institution trying to find an old machine to read a 5.25" floppy disk or a 400 KB floppy knows what I'm talking about. Our possibilities for retrieval may disappear with time.

All the while, our technology will continue to expand and publications recording these advances will also increase. We will be inundated with data, information, and research. This journal contributes to the gush of knowledge that 21st century engineers and scientists produce. It would appear that between the economies of digital storage and the rapidity of publication and retrieval, we are left with no option.

Perhaps the most disconcerting possibility, however, is the uncertain integrity of the files themselves. As journal content in digital form increases and the number of new print journals decreases, our future record of advances in science and engineering will become dependent on digital storage. But how do I know that these files could survive an epidemic of a computer virus? Ah, the computer types may pipe up with promises of multiple backups and off-site storage, but what if the infection were placed in files years before, so that beyond some date and time, any access of the infected files would cause them to vanish in a wisp of ones and zeroes. What then?

There are those copies of Sir Isaac's major works in the Georgia Tech library, speaking to us from the beginning of the 18th century. A little worse for wear, but readable. Perhaps in the future we should commit to print papers that are regarded as providing seminal insights after a decade or more on acid-free high rag content paper. Not that we would get rid of the rest of the heap, but if something untoward did happen, there would be an Ark of Knowledge that could ensure that all was not lost.

Does this seem too alarmist? Perhaps. But I have seen people struggle to rid their computers of the SoBigF, WTC, and MSBlast viri/worms/etc. And the infections were considered as a mild flu since they never affected more than a few tens of millions of computers. So I welcome the variety and richness of our new digital formats with a certain amount of trepidation. But for records of our best research, I don't think we should ever turn off the printing press. I think Sir Isaac might agree.

Donald C. O'Shea
Editor