

Geoscience after IT: Part M(4)

Epilog (or Prolog)

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Like a canal navigator watching an iron horse steam by, like a railroad engineer sighting a horseless carriage, the geologist viewing images on a computer screen is witness to a paradigm shift. Unrecognized assumptions lose their validity, and things will never be the same again.

The electronic tools now fashioning the geoscience knowledge base open a door to the unknown. We can explore it only by trial and error, past experience our only guide. And so we rely on metaphor, just as Hamlet, struggling with a binary decision on whether to be (or not), took refuge in a stream of metaphors – slings, arrows, sea, sleep, dreams, rub, coil – desperate to throw light from familiar concepts on a scenario he could not fully grasp.

Scientists, like poets and prophets, are accustomed to metaphor, and for the same reason. As individuals, microcosms of the universe, they seek to explore the larger whole. If a fragment of a hologram can reproduce a full image, albeit with loss of resolution, perhaps the lesser can know (imperfectly) the greater, through insights stemming from considered experience. The information technologist uses explicit metaphors – think of the screen as a desktop, the rectangular area as a window. The scientist more often formalizes the metaphor as a model, and harnesses the power of mathematics.

Working geologists give little thought to their global metaphor or world view. They might accept that on the one hand is the real world, existing quite independently of their science. On the other hand is a geoscience knowledge base, the shareable record of observations and ideas from unnumbered contributors, representing selected aspects of that real world. Moving between them are scientists, now observing or testing hypotheses in the real world, now studying or adding to the knowledge base, carrying in their minds additional ideas, too tentative, ephemeral or complex to add to the formal record, but maybe shared in part among their workgroup.

Information technology is shaping and transforming not the real world but the Shadowlands of the knowledge base: no longer remote, but all pervasive. The landscape, the rocky outcrop, the hammer blow, the shattered specimen, can be shared as a visual record, available, on the instant, in Patagonia, in Perth, in Pocatello, Idaho. The network of scientific reasoning, the web of discourse painstakingly assembled

over so many decades, is electrified. It is traversed by electronic agents, unhampered by boundaries of discipline or place, retrieving and delivering data to the desktop - the fruits of a multitude of endeavors, filtered for relevance, displayed for easy visualization, formatted for local manipulation and integration.

Unfamiliar metaphors and models thrive in a rebuilt knowledge base, forcing change to investigational design. Broad views across global information are supported by powerful analytical software. The players of the information industry – the students, professors, surveyors, consultants, authors, editors, referees, cartographers, publishers, librarians, booksellers, archivists, curators, customers and readers – assume new roles within changed business groupings. Earth scientists, like all makers of maps and suppliers of information, must review their methods and rationale.

But look away from the screen, step outside the door, and little is altered. The geoscience community is split. For most, there has been no revolution, the case for change has still to be made. Those captivated by new technology have set their own agenda, and largely been ignored by the traditional practitioners who take for granted their pens, paper and printing press.

Increasingly, these tools are being displaced by their electronic successors as new technologies intertwine with the knowledge base. The vision developed here has a myriad of structures, the object-integration platforms of individual geoscientists, metaphorically floating above the real world through the objects and models defining cyberspace. Controlled from the desktop, the platforms change content as they roam, and level of detail as they rise and fall. Structured by metadata and based on a shared paradigm, each supports its user's view. Objects are assembled to interact with the user's knowledge and with skills honed by evolution in the human brain. It is a place for scientists to explore ideas and embody their findings in new objects – discussed, evaluated, and launched in cyberspace – where through variation, selection and heredity, ideas evolve and the favored survive.

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