50 & 25 YEARS AGO

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In the early years, *Computer* was only published bimonthly. Therefore, we will have to skip our interesting and/or informative extractions for August. The next one will appear in the September 2021 issue of *Computer*, and we hope you will eagerly wait for our next publication of this column.

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Developments Fuel Wireless Revolution; Thomas Kineshige (p. 16) "Analysts estimate there will be 40 million cellular users by the end of this year. ... Developments in personal communication services (PCS), personal digital assistants (PDAs) and wireless notebooks technologies promise still more growth. ... GSM, the European digital cellular phone standard is used by about 150 wireless providers in about 80 countries. ... A survey conducted this year show that 24% of the US' network developers have committed to PCS, 26% have committed to AT&T's TDMA ... 48% have committed to CDMA ... By the year 2000 we will see all of the major TDMA and GSM networks evolve towards a spread-spectrum solution, a broadband, SDMA based interface, McClellan said." *[Editor's note: Already in 1996, despite this prediction, it was quite clear that GSM and its successor would conquer the world. Today's smartphones are based on this technology, which allows worldwide communication. Other solutions still exist but have serious limitations when used internationally.]*

Java, the Web, and Software Development; Edward Yourdon (p. 25) "What's the big deal about Java and the Web? The fact that they mark the death of fatware and the birth of dynamic computing built on rented components. ... The recent explosion of interest in the Internet and the World Wide Web is just the latest example. The Internet is older than my college friend, but the WWW and programming languages like Java are quite new-and quite revolutionary. ... Even if you ignore the competitive marketing pressures that led to the creation of 1,200 spreadsheet features, an important question remains: Why can't we provide users with only the features they want?" (p. 26) "But we do know that Java has created the opportunity to download the specific functionality a user wants at the moment the user requests that functionality. Obviously, this vision implies a user connected to the Internet and a functionality that can be invoked from within a Web browser. ... Indeed, the notion of renting functionality via the Internet may further invigorate one segment of the soft-ware industry, the component developers. ... Java and Internet-enabled applications will have the most significant effect on brand-new applications that reside on the Internet. But I also believe we'll see a significant transition from today's "traditional" client-server applications to this new model." (p. 28) "Security—a major topic of concern on the Internet—rarely played a significant role in the design of traditional client-server applications. ... On the Internet, a casual attitude toward security is likely to have grave consequences." (p. 29) "Internet-based applications will be the subject of debate. In this regard, it's interesting to note that Java is currently about 30 times slower than C+ +." *[Editor's note: This article is really worthwhile to read. It is from the heyday of the Internet and languages like Java. The many predictions and suggestions are all very important. Some have become reality quickly, while others are still problems today, for example, the Internet and application security and privacy issues coming from neglected attitudes in the past.]*

Collaboratories: Doing Science on the Internet; Richard T. Kouzes et al. (p. 40) "The success of many complex scientific investigations hinges on bringing the capabilities of diverse individuals from multiple institutions together with state-of-the-art instrumentation. ... Facilitating collaboration among a widely distributed scientific community is highly complex. Although a collaboratory is potentially nothing less than the village square of the Information Age, it is a synthetic place requiring social adaptation. ... Collaboratory

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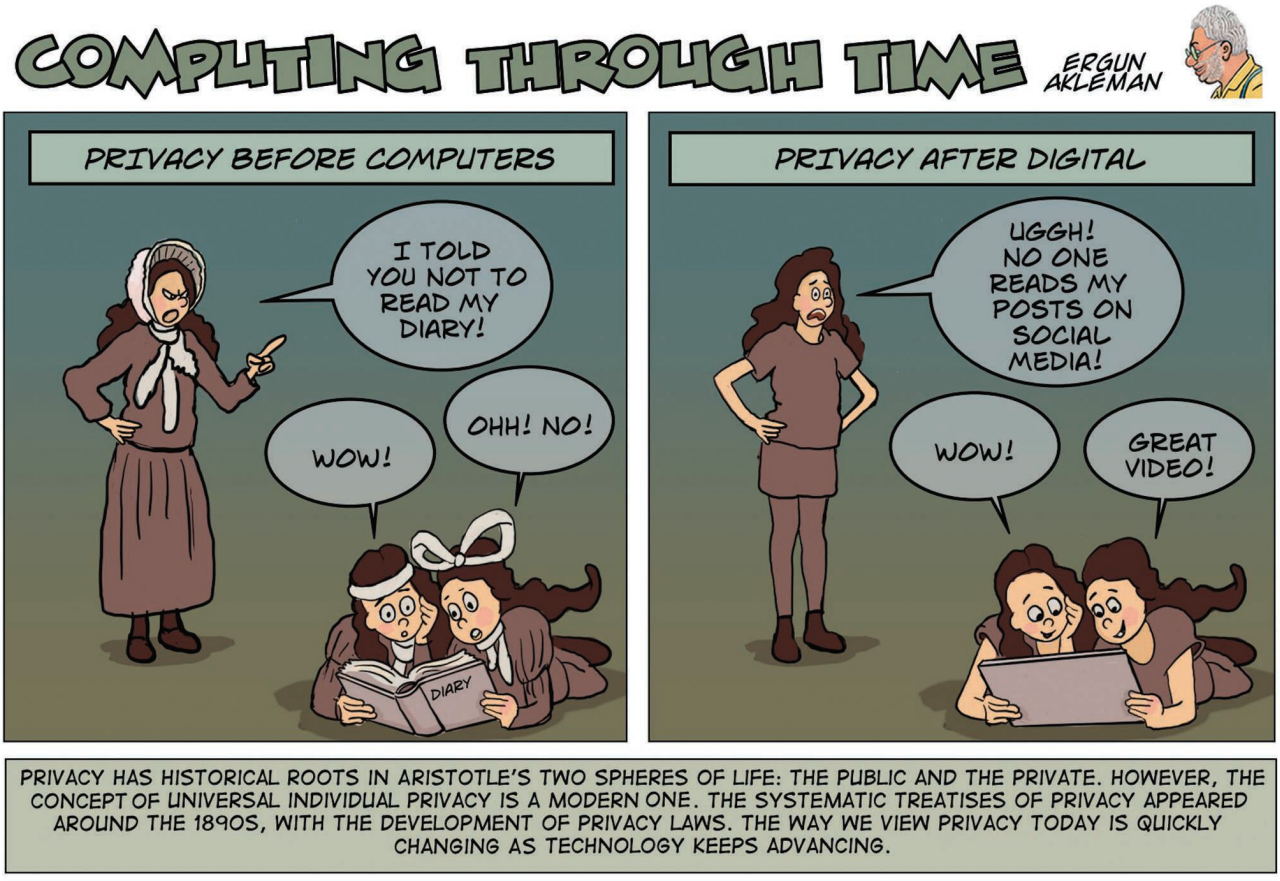

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developers must consider psychosocial issues such as autonomy, trust, sense of place, and attention to ritual. ... Technology solutions abound, but often fail to find a human problem to solve." (p. 41) "Groupware applications for a collaboratories will have to be selected and implemented with a clear understanding of the social and political concerns that characterize joint scientific work. Among these are issues of authorship, acknowledgment of contributions, esteem of peers, and recognition by professional role models. Without such characteristics, collaboratory systems will not find acceptance" (p. 45) "In the past 25 years collaboratories have sprung up and have been used extensively in the internet environment. But most of the systems offered had to be parameterized extensively to be accepted with regards of the mentioned concerns." *[Editor's note: Unfortunately, when looking at the forced home office, teleresearch, and teaching activities due to COVID-19, most of these concerns have been ignored, leading to a serious loss of productivity, teamwork, and learning, which are only now beginning to be recognized for their severe impacts.]*

Distributed Computing Using Autonomous Objects; Lubomir F. Bic et al. (p. 55) "Sensors that supply data to computer systems are inherently unreliable. ... To improve sensor-system reliability, researchers have actively studied the practical problem of combining, or fusing, the data from many independent sensors into one reliable sensor reading. ... The central question is, how can an automated system be certain to make the correct decision in the presence of faulty data? Much depends on the system's accuracy—the distance between its results and the desired results—and on the system's precision—the size of the value range it returns." (p. 57) "To satisfy the requirements of both the inexact-agreement problem and the sensor-fusion problem, we merged the optimal region algorithm with FCA to produce an algorithm that provides the best accuracy possible and increases the precision of distributed decision-making." *[Editor's note: This is a very interesting paper, especially now in the age of the Internet of Things. It discusses, in depth, a number of already-proposed algorithms that solve the problem and then offers a hybrid solution that eliminates some of the problems the others have.]*

Toward Intelligent Meeting Agents; Hsinchun Chen et al. (p. 62) "An experiment with an AI-based software agent shows that it can help users organize and consolidate ideas

from electronic brainstorming. The agent recalled concepts as effectively as experienced human meeting facilitators and in a fifth of the time." (p. 63) "A major advantage of electronic meetings is that members can brainstorm in parallel. Indeed, electronic meeting systems are generally very effective during idea generation. A major disadvantage is that all the ideas from brainstorming—typically several hundred comments—must be organized. ... must meet several challenges: Information overload—Lack of a collaborative vocabulary—Pressure to synthesize tasks—Sensitive topics and lack of trust." (p. 64) "Basically, a meeting facilitator can invoke the agent at any time to produce a category list of ideas. Each category is linked to specific comments, which users can browse." (p. 68) "Once again, the agent's lists were comparable to facilitators' lists in concept recall, but significantly inferior in concept precision." *[Editor's note: This work on supporting electronic brainstorming for finding interesting/executable ideas out of the many discussed during the meeting contains many interesting aspects. Some of them made it into the multitude of recommender systems that are used everywhere today.]*

3D User Interfaces for General-Purpose 3D Animation; Jean-Francis Balaguer et al. (p. 71) "Virtual Studio provides nonprofessional animators with inexpensive and easy-to-use 3D animation systems that have the functionality of complex and costly professional platforms." (p. 72) "You can use 3D devices to specify complex 3D motion and virtual tools to control application objects. An underlying constraint solver that automatically maintains inter-relationships among objects will tightly couple application and interface objects. ... Device configurations: ... The immersive configuration's goal is to convince users that they are part of the world they manipulate or, in other words, to create virtual reality. ... Virtual Studio's desktop configuration, shown in Figure 3, uses a Spaceball and a mouse as input devices." (p. 75) "Defining animations: When users define animations in Virtual Studio, they first express the desire to record changes in various elements of the virtual world. A controller object that is connected to each element monitors animated objects' state changes." *[Editor's note: This article discusses the many problems related to creating and using 3D worlds. It reflects the state of the art of 25 years ago where it is interesting to see that, despite the impressive progress since then, some problems still remain, both on the interaction front and with true 3D world aspects.]*

WW II Colossus Computer Is Restored to Operation; Patricia J. Douglas et al. (p. 79) "On June 6, 1996, the 52nd anniversary of D-day, a rebuilt Colossus computer went into operation, bringing back memories of World War II for many attending the ceremony. Present were Tommy Flowers, original designer of the Colossus, and Bill Tutte, the cryptanalyst who first broke the Fish cipher. Several others who had worked at Bletchley Park in the UK, the home of Allied code-breaking operations during the war, also attended." *[Editor's note: The Colossus computer (10 of them were built during the war) was kept secret for 30 years, and most of the design and user documentation was deliberately destroyed. In Wikipedia, a very interesting account is given about the problem of its reconstruction as well as about the methods used for its code breaking.]*

Digital Library Task Force: Nabil R. Adam et al. (p. 89) "Until recently, electronic information sources served mainly specialized clients, but now these sources will be accessed by a wide range of users, ranging from computer specialists, discipline experts, engineers, and the general public, including novice computer users and students at all levels. These trends have created an emerging, important discipline: digital libraries. ... A typical digital library uses a variety of database-management systems. Current DBMSs range from relational and extended relational systems to object-oriented database systems. Relational DBMSs are most often used for the storage of metadata and indexes with attributes that contain pointers to files in a file system." *[Editor's note: In 1996, the term* digital libraries *became popular in research environments. However, at the same time, the World Wide Web arose and eventually took over in the research community. Digital library technology, of course, still exists wherever controlled, indexed information is to be stored and retrieved.]*

Web Publishing: Speed Changes Everything; Steve Hitchcock (p. 91) "Because information is the lifeblood of professionals, any change will significantly affect readers as well as publishers. ... Those who criticize the Web's content quality, such as T. Matthew Ciolek (*Computer*, January 1996, pp. 106–108), miss the point ... Readers will demand quality and will also expect materials to be delivered at near-instantaneous speed, but that quality will be judged in the context of the new information medium that is the Web itself. ... Nor is the author immune to the new demands of on-line publishing. Clear and unambiguous expression, good grammar and phraseology, and logical structuring of argument take time, but are all sequential. ... Researchers must now find ways to adapt new, more transient information structures to meet quality expectations while recognizing valuable contributions and focusing debate." *[Editor's note: The changes envisioned in this article did occur much slower than predicted. The world of "quality" publications, on one side, has remain unchanged with regard to reviews and copyright enforcement. On the other side is the web, with its multitude of information-bearing sites. Quality has been sacrificed with fake and easily manipulated news, resulting in information and privacy violations everywhere. The web was built assuming that ethical and moral principles exist in all of its users, which, as it turns out, is a very wrong assumption.]*