

This month, for the first time, we run a guest editorial. The writer of this essay is Portia Isaacson, who is chairperson of the 1977 National Computer Conference which will be held in Dallas TX June 13-16 1977. (The conference this year for the first time recognizes the existence of our new trend in computing, personal computing, by creating a special theme for that purpose and taking the unprecedented step of adding a special exhibit hall for personal computing displays.) Here is an interesting view of the history and state of personal computing by an individual who has been enthusiastically participating right from the start. Portia is a professor of computer science at the University of Texas at Dallas and a principal in the Micro Store, a retail computer outlet located at 634 S Central Expressway, Richardson TX 75080, which is run by her husband David Wilson.

Personal Computing:

An Idea Whose Time Has Come!

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It is clear that we are entering a dramatic new era in which information processing power will be abundantly available for use by the individual consumer...

Several years ago we knew that computers were going to become very small and very inexpensive. However, predictions of the effect of inexpensive computers did not begin to cover the strength of today's personal computing movement, where we find enthusiasm at a very high pitch. It is clear that we are entering a dramatic new era in which information processing power will be abundantly available for use by the individual consumer.

The only thing one could be sure about during the past year when writing about the personal computing movement is that by the time the article was printed it would certainly be antiquated. Every month there are several new computer clubs, several new computer stores, hundreds more computers owned by individuals, and a noticeably higher level of excitement among insiders to the movement. To most of us the whole idea of personal computing is so delightfully intoxicating that we can't quite believe its time has really come — but it has!

The personal computing movement started quietly enough when MITS announced a computer kit for under \$500. Soon afterwards kits were available from several different manufacturers featuring the computer, a keyboard, a TV display interface, audio cassette interface, and the BASIC language; all for little more than \$1,000. Wow! A really operational system for about the price of a good TV or stereo — clearly in personal range. So the hardware and BASIC

software were available. The other needed ingredient was imagination.

There was no shortage of imagination. In fact, almost everyone who has ever worked with a computer has, at some time or another, been stricken with computeritis — the infection of the imagination with ideas about “what neat things could be done with a computer if only I had access.” For years we've known that students many times substitute the computer center for other forms of recreational activity. Also, that many programmers can be found in the wee hours with their company computer, doing their own thing.

Applications of a personal computer are as far ranging as the individuals who imagine them. Personal accounting, music generation, library maintenance, language analysis, stock market analysis, game playing, model train control, household control, and tutoring are only a few of the known applications. The computer has few inherent limitations.

A “movement” can be characterized by the people involved. What kinds of people are “into” personal computing? And how many? Based on the circulation of the major personal computing publications and the attendance at conventions, 100,000 is surely a very conservative estimate of the rapidly growing number of involved people. What are these people like? True, at first, they

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Computeritis: the infection of the imagination with ideas about "what neat things could be done with a computer if only I had access."

were nearly all very technical types — engineers, programmers, and electronics buffs. But times are changing very rapidly in personal computing. Now we find a sprinkling of lawyers, doctors, kids, retirees, art teachers, and tavern owners. Less and less technical expertise is needed. In fact, with computer stores ready to help and with assembled kits readily available, one can get by with no hardware expertise. And we all know that BASIC (the programming language most widely available with personal computers) has been taught widely in high schools — so very little in the way of prior background is needed. Rather, what's needed is a little bread and a lot of curiosity about one of the most curious of mankind's inventions.

Why does an individual buy his or her own computer? I think there are three primary reasons: (1) he or she has a specific application that he or she wants to implement; (2) he or she is curious and wants to learn about computers; and, (3) his or her future job security may depend on his or her knowing about computers.

Among the people wanting to implement a specific application are many small, usually one-person, businesses. There is a sprinkling of people with really innovative applications such as devices to provide assistance to a handicapped individual. Among those who want to learn about computers are the naturally very curious people who in the past would have pursued other electronics-oriented hobbies such as ham radio. There are a surprisingly large number of people who can greatly increase their job security with a little knowledge of computers — even people in fields seemingly not related to computers.

Owning the computer does not, by itself, provide a person with all that's needed to learn about computers. There is a major educational process that must be "endured." The needed information can be gleaned from many sources without resorting to formal education: books, magazines, and, through clubs and conventions, other people.

One of the primary means of obtaining information has been computer clubs. There are nearly 150 computer clubs in the United States and a few in Canada and other countries. Club sizes vary from a handful to Southern California Computer Society's more than 5,000 members. These clubs are not affiliated in any way with one another except that a few clubs are regional and have several local chapters.

The primary activity of most computer

clubs is the regular meeting. Typically, a club meets with a frequency of from every two weeks to once a month. The object of a meeting may simply be the informal exchange of information by club members. There may be a presentation by a guest speaker, a demonstration of a product or a project, or a workshop on some particular subject. It is not unusual for several people to show up unexpectedly with computer projects to show. Whatever the main objective, some side activities always take place: Individuals share their experiences and insights — usually with enthusiasm reminiscent of a revival testimonial.

Many clubs publish newsletters which are avidly read by the club members. In fact, some of the newsletters are so good that they have many subscribers outside the club's primary geographic area. The newsletters contain articles on the activities of the club, information on new products, schematics for new widgets, program listings, experiences of club members with various products, and a wealth of other information wanted by personal computing enthusiasts. Although the newsletters vary in production quality from computer listings all the way to glossy magazine format, a typical newsletter is a few Xeroxed pages.

Clubs are beginning to exchange newsletters which may bring about improved communication and some coordination of activities among clubs. A big question arises as to whether or not a national federation of clubs will form. On one hand, a national federation could benefit its members by providing publications, improved information exchange, sponsorship of conferences, encouragement of product standards, software exchange, and protection of its members in dealing with product suppliers. On the other hand, many people believe that a formal organization would be counterproductive to the goal of most computer clubs; namely, the free exchange of information for the benefit of the members. In fact, some clubs, even very large clubs, elect no officers, collect no dues, and claim no members. The newsletter is funded by passing a hat when the treasury gets low.

The personal computing movement is held together nationally by the magazines. There are a surprising number of high quality publications. Heading the list is BYTE which not only publishes a wide variety of technical articles of interest to personal computing folks, but also provides a wide assortment of other goodies such as new product announcements, book reviews, and news coverage of personal computing conferences. Among several other publica-

At first, personal computing people were very technical types... now we find a sprinkling of lawyers, doctors, kids, retirees, art teachers, tavern owners, and others.

tions, each has its own unique orientation. *Interface Age*, a general hobbyist publication, started as the newsletter of the Southern California Computer Society, but is now published independently. The stated mission of *Dr Dobb's Journal of Calisthenics and Orthodontia* is to foster the free exchange of software. One has only to look at the creation of Tiny BASIC to realize the incredible success that *Dr Dobb's* has had in accomplishing its goal. David Ahl's *Creative Computing* is oriented toward the use of computer games by kids as an educational vehicle. *People's Computer Company* is published in newsletter format, is largely oriented towards kids, but has significant personal computing coverage. Several other established publications such as *Popular Electronics* and *Radio Electronics* feature major sections devoted to personal computing.

Any discussion of the personal computing movement would not be complete without mention of the major conferences. The first major conference was the MITS World Altair Convention held one weekend in March 1976 in Albuquerque NM. Although it was supposedly an Altair users' conference, when one wandered around the lobby of the hotel, the feeling of a big computer club meeting

Owning a computer does not by itself provide a person with all that's needed to learn about computers. There is a major educational process that must be "endured" in order to reap the rewards of computing in one's personal life.

was very strong; and the fact that MITS was the organizer was really incidental. In attendance were nearly 1,000 people from across the country with a few international visitors.

The next major milestone was Personal Computing 76 held during August 1976 in Atlantic City NJ. The conference was organized almost single handedly by John Dilks, with major contributions provided by Dave Jones and Jim Main. The conference started as a project of a ham radio club but soon outgrew all expectations, probably simply because a conference was needed. The very successful conference drew 88 exhibitors with 110 booths and nearly 5,000 attendees.

Several conferences will probably be held over the next year. One "must" coming event for personal computing enthusiasts is the 1977 National Computer Conference Personal Computing Fair and Exposition

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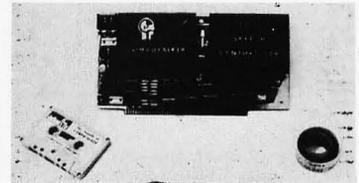
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Soon we will be waiting only for some clever and well financed company to package the Home Information Processing Center and thus create the consumer demand for this next major home appliance concept.

Expert guidance is usually available from the computer store... it is a place to turn for local help and instruction.

Articles Policy

BYTE is continually seeking quality manuscripts written by individuals who are applying personal systems, or who have knowledge which will prove useful to our readers. Manuscripts should have double spaced type-written texts with wide margins. Numbering sequences should be maintained separately for figures, tables, photos and listings. Figures and tables should be provided on separate sheets of paper. Photos of technical subjects should be taken with uniform lighting, sharp focus and should be supplied in the form of clear glossy black and white or color prints (if you do not have access to quality photography, items to be photographed can be shipped to us in many cases). Computer listings should be supplied using the darkest ribbons possible on new (not recycled) blank white computer forms or bond paper. Where possible, we would like authors to supply a short statement about their background and experience.

Articles which are accepted are typically acknowledged with a binder check 4 to 8 weeks after receipt. Honorariums for articles are based upon the technical quality and suitability for BYTE's readership and are typically \$25 to \$50 per typeset magazine page. We recommend that authors record their name and address information redundantly on materials submitted, and that a return envelope with postage be supplied in the event the article is not accepted. ■

scheduled for June 13-16 in Dallas TX. The National Computer Conference is the world's largest computer conference, attracting over 250 exhibitors with more than 1,000 booths and drawing more than 25,000 attendees. Major personal computing activities are planned for the 1977 NCC including a Personal Computing Fair, a special exhibit area for personal computing products, a program of paper and panel sessions, and a Computer Club Congress.

Now let's turn our attention to the manufacturers who started and support the personal computing movement. What types of companies are producing personal computing products? Until very recently, the typical personal computing product manufacturer was a rather small company whose only product lines were in the personal computing area; for example, IMS Associates, Polymorphic Systems, Processor Technology and Cromemco. Companies that don't quite fit the personal computing specialization are MITS, Southwest Technical Products, and iCOM. Recently, several larger companies have been seen making moves into the personal computing market; namely, Texas Instruments, Intel, and Digital Equipment Corporation.

Although at first nearly all personal computing products were sold by mail order direct from the manufacturer, we see now an important new institution emerging — the retail computer store. Presently, there are over 250 computer stores in the United States [based on the number of BYTE's direct dealer sales outlets]. A computer store is not an electronics store or greenhouse that happens to stock computers. The best computer stores offer a wide variety of products and services for the computer hobbyist and small business, including several lines of computers, parts, peripherals, prototyping equipment, books, magazines, software, repair service, custom interfacing, and consulting. The typical computer store has on display several demonstration computing systems so that an individual can see and try before buying. The computer store concept offers several advantages to the purchaser over buying directly from the manufacturer at no additional cost. The

purchaser need not deal with several manufacturers in order to reap the benefits of cost and feature comparisons. Expert guidance is usually available from the computer store. Local service is provided as well as answers to the myriad of questions sure to materialize when a person takes home his/her first computer.

Now that we have characterized the personal computing movement in terms of the people, their clubs and conventions, the magazines they read, and the manufacturers of personal computing products, let's turn our attention to the impact of personal computing and its future. Most importantly, personal computing is the leading edge of the sharing of computing power by large corporations and government with the people. Soon our homes will be full of computers quietly improving many types of consumer goods, including: ovens, sewing machines, stereos, televisions, automobiles, sprinkler systems and security systems.

More significantly, however, the Home Information Processing Center is emerging from the efforts of personal computing enthusiasts to use the computer to improve the quality of their everyday activities. The Home Information Processing Center will provide a central coordination facility for other home appliances, assistance in a myriad of personal business and record keeping tasks, interface with external systems such as bank electronic funds transfer systems and retail stores, endless entertainment with computer based games, individualized learning through computer assisted instruction for us and our children, partial replacement for the mail with a home to home telephone-based communication system, remote access by telephone to home control functions, and each home with clerical assistance such as text editing.

The public is being primed now for acceptance of the Home Information Processing Center. On the other hand, as mentioned before, many consumer goods are incorporating microprocessors as control components, so the public will start to think of the microcomputer as a rather ordinary device. On another front, video games are beginning to physically appear a lot like the Home Information Processing Center. Specifically, the games are using the television as an output device, some of them are using simple keyboards as input devices, and some use audio tape cassettes as a means of storing programs. From this video game to the Home Information Processing Center is a seemingly small step. The Home Information Processing Center would have the keyboard, the television, and the tape cassette in

addition to mass storage, such as a floppy disk, a hard copy output device, not very different from the ordinary typewriter, and be interfaced to the telephone line. The hardware technology for a low cost Home Information Processing Center exists. The application and software technology will grow from the personal computing movement. Soon we will be waiting only for some clever and well-financed company to package the product and create the consumer demand for this next major home appliance. When the Home Information Processing Center has become commonplace, personal computing will have grown to maturity.

What started as a hobby could well grow into a "necessity" of life. ■

Names and addresses of some of the publications mentioned in this editorial:

Interface Age published by McPheters, Wolfe & Jones, 6515 Sunset Blvd, Suite 202, Hollywood CA 90028 (monthly).

Dr Dobb's Journal of Computer Calisthenics and Orthodontia, published by People's Computer Company, POB 310, Menlo Park CA 94025 (monthly).

Creative Computing, published by Ideametrics, POB 789-M, Morristown NJ 07960 (every two months).

People's Computer Company, published by People's Computer Company, POB 310, Menlo Park CA 94025 (published several times during the school year).

Popular Electronics, published by Ziff-Davis, widely available on newsstands (monthly).

Radio Electronics, published by Gernsback Publications Inc, widely available on newsstands (monthly).

The Word "Byte" Comes of Age. . .

We received the following from W Buchholz, one of the individuals who was working on IBM's Project Stretch in the mid 1950s. His letter tells the story.

Not being a regular reader of your magazine, I heard about the question in the November 1976 issue regarding the origin of the term "byte" from a colleague who knew that I had perpetrated this piece of jargon [see page 77 of November 1976 *BYTE*, "Olde Englishe"]. I searched my files and could not locate a birth certificate. But I am sure that "byte" is coming of age in 1977 with its 21st birthday.

Many have assumed that byte, meaning 8 bits, originated with the IBM System/360, which spread such bytes far and wide in the mid-1960s. The editor is correct in pointing out that the term goes back to the earlier Stretch computer (but incorrect in that Stretch was the first, not the last, of IBM's second-generation transistorized computers to be developed).

The first reference found in the files was contained in an internal memo written in June 1956 during the early days of developing Stretch. A byte was described as consisting of any number of parallel bits from one to six. Thus a byte was assumed to have a length appropriate for the occasion. Its first use was in the context of the input-output equipment of the 1950s, which handled six bits at a time. The possibility of going to 8 bit bytes was considered in August 1956 and incorporated in the design of Stretch shortly thereafter.

The first published reference to the term occurred in 1959 in a paper "Processing Data in Bits and Pieces" by G A Blaauw, F P Brooks Jr and W Buchholz in the *IRE*

Transactions on Electronic Computers, June 1959, page 121. The notions of that paper were elaborated in Chapter 4 of *Planning a Computer System (Project Stretch)*, edited by W Buchholz, McGraw-Hill Book Company (1962). The rationale for coining the term was explained there on page 40 as follows:

Byte denotes a group of bits used to encode a character, or the number of bits transmitted in parallel to and from input-output units. A term other than character is used here because a given character may be represented in different applications by more than one code, and different codes may use different numbers of bits (ie, different byte sizes). In input-output transmission the grouping of bits may be completely arbitrary and have no relation to actual characters. (The term is coined from bite, but respelled to avoid accidental mutation to bit.)

System/360 took over many of the Stretch concepts, including the basic byte and word sizes, which are powers of 2. For economy, however, the byte size was fixed at the 8 bit maximum, and addressing at the bit level was replaced by byte addressing. Since then the term byte has generally meant 8 bits, and it has thus passed into the general vocabulary.

Are there any other terms coined especially for the computer field which have found their way into general dictionaries of the English language?

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