

ADDRESS TO THE SOCIETY FOR APPLIED LEARNING TECHNOLOGY

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The Written Word and Readiness for War

In 1973 Isaac Asimov, the distinguished science fiction writer and futurist, attended a meeting in upstate New York of a group which, much like this one, concerned itself with the social significance of modern communication devices. At that time, seven years ago, TV cassettes were the wave of the future, and a number of the papers presented at that meeting dealt with the remarkable capabilities of the TV cassette to serve as a powerful adjunct to learning, and to open whole new vistas in entertainment. Through a mishap to one of the scheduled speakers, Asimov was unexpectedly asked to make a presentation. He chose to call upon his science fiction prowess to project into the future, and to follow the TV cassette toward its ultimate destiny.

He began by describing the size, bulk and expense of the apparatus required to decode the signals on the cassette tape, and to shape an image on the television screen and elicit sound from the speakers. Obviously, he predicted, the relentless drive of technology would assure that this auxillary equipment would become progressively smaller, lighter and more mobile. Eventually, it would disappear altogether, becoming an integral part of the cassette.

He then described the energy demands that the existing TV cassette player and television monitor required to convert the information contained in the cassette into the image and sound. As a member of a nation that was in that year of 1973 newly conscious of our dangerous dependence on energy from fossil fuels, he predicted that American technologists would systematically reduce energy requirements so that ultimately there would be little or no energy required for the functioning of the cassette.

Hence, he said, we can look forward to a small, light, wholly, self-sufficient information source. While it would require energy and its manufacture, it would require no energy for use. It would not have to be plugged into the wall. It would need no battery replacements. It could be carried anywhere, and viewed wherever and whenever desired--in bed, in the bathroom, in the attic, in a tree.

But Asimov said these are not the end of the wonders in prospect. He believed it would be possible to devise the cassette so that its sights and sounds were evident only to the owner, with no possibility of his use of the cassette obtruding upon the consciousness of anyone proximate to him. Moreover, he was convinced that it would be possible to do away altogether with switches, knobs, and other controls, and make the cassette wholly responsive to the will of the user--starting at a glance, stopping when the eye was averted. Further, he saw no reason why such a

cassette could not provide for random access to any of its frames, giving the user an ability to skip backward or forward, quickly or slowly, as desired.

Could such a self-contained, mobile, non-energy consuming, perfectly private cassette, controlled by the will of the user, be brought into being? And how many years would be required for technology to produce such a marvel? Asimov's answer was that we would indeed have such a device, and that we would have it in a measureable time. That time was minus 500 years.

Asimov was describing, of course, a book. And he went on to extol the advantages of the book as a medium for storing images and speech. He described it as superior in many respects to analogue recordings, since the printed word could engage all of the embellishments with which the reader's imagination, memory, or emotion might endow it. Asimov did not argue that books could or should replace television or related forms of communication, for he described reading books as a minority activity, a form of communication that had throughout history been confined to a relatively small elite in all societies. Futurist Asimov predicted confidently that that elite--which he described as less than one percent of the world's people--would remain wedded to the ancient and ultimate printed word, no matter what developed with technologically enhanced communication, such as videodisc.

I am not here to attack Asimov's thesis that the printed word is a superior form of communication for most human endeavors. But I want you to know that I regard the written word as a major barrier to the modernization of the United States Armed Forces, and in that sense, a definite threat to the security of the United States.

Allow me to illustrate that remark historically, not as Asimov did, from the present working backward, but from the turn of the century to the present.

In the first decade of the Twentieth Century the most powerful man in the United States Army was Major General Fred C. Ainsworth, the Army's Adjutant General. Ainsworth was more powerful than the Chief of Staff of the Army, and vastly more powerful than any of its field commanders. Literally, it was impossible to move an officer from one post to another without Ainsworth's approval. No major project could be undertaken without his support, and no change of policy was possible unless he concurred. Able to challenge the Secretary of the Army on occasion, extensively connected in Congress, Ainsworth was a bureaucrat extraordinary. But the source of his power was command of the written word.

His personal history is interesting and instructive. He rose to the pinnacle of prestige in the US Army without ever having heard a shot fired in anger. He had been trained as a physician, had served as a contract surgeon

at a peacetime Army garrison, and had then accepted a commission. During the administration of Grover Cleveland, the then LT Ainsworth came to Washington and was assigned to the Bureau of Pensions. At that time Congress was besieged with constituents seeking pensions for military service, and the Bureau was inundated with requests from Congressmen for documentary support for this or that claimant. When Ainsworth arrived, Bureau practice required months to locate the pertinent records and prepare a reply, and Congressmen were understandably impatient and critical. But within a year of Ainsworth's arrival, thanks to him, Bureau performance had improved dramatically. Requests for information were being returned within 48 hours, complete with actionable documentation. The Secretary of War in his annual review of the bureaucracy declared the Bureau of Pensions "the most improved bureau within the Department", and Fred C. Ainsworth's meteoric rise to the top of the Army was thereby assured.

Ainsworth's career rested on a technological innovation: he introduced a card index file, alphabetically arrayed, of existing records of veterans. His modus operandi was to extend his index to additional bodies of records, thus consolidating his controls. From pensions he took on to medical records, and thence to other collections of documents, until only Ainsworth knew

surely where to find information pertaining to the people who were or had been in the service, to the installations of the Army, to the equipment in issue, or to any of the financial transactions affecting the day to day business of the Army. Aided by Elihu Root's desire to focus the General Staff on planning for war, Ainsworth effectively isolated that body from the Army's day-to-day operations. They spent their time planning for distant and improbable wars, he managed the force. In short, he built a bureaucratic empire which rested on control of the printed word.

Finally, however, Ainsworth was toppled from power in a dispute over written records. His nemesis was another doctor-become soldier, General Leonard Wood, who became Chief of Staff as the war clouds were gathering in Europe. Determined to ready the Army for war, Leonard Wood sought to rationalize its stationing, and streamline its administration. Convinced that troop commanders were spending too much of their time filing reports for the archives, he sought to eliminate some records and consolidate others. This brought him into open conflict with Ainsworth, for a man who had built his position on the existence of complicated records was unlikely to be in favor of eliminating them. Ainsworth wrote an intemperate letter to the Secretary of War, who promptly suggested that the Army courtmartial its Adjutant General.

Ainsworth resigned, and Leonard Wood emerged victorious.

But in the long run, Ainsworth and his successors carried the day. For all of his vision, Leonard Wood had no conception of the administrative burden of an Army of millions. The Herculean tasks of recording the induction, training, compensation, and discharge of the drafted hordes of World War I and World War II created imperatives for the efficient manipulation of billions of bits of alpha-numeric information which have led to the present day empires of computers through which the Army administers its personnel--largely run by the Adjutant General.

But neither Ainsworth nor his successors understood that much of the Army's problem with the printed word would materialize in fields other than personnel administration, such as in education and training, and they made few provisions for rationalizing the distribution of information for those purposes other than through printing. The Army went into World War I with field manuals that were produced by commercial firms, often written by military officers who derived personal profit from the publication. Before World War II, the Army had undertaken to produce its field manuals from within its schools, but when the nation began mobilizing in 1941, there were only some three dozen Army field manuals, and these few documents underwrote

that unprecedented expansion which ultimately fielded 90 divisions by 1945. Today, with an active Army less than one-fifth that size, we have literally a thousand times the number of field manuals in circulation.

Modern battle is a very much more complex business than the Army confronted in World War II or Korea. Its very complexity has occasioned an outpouring of publications to explain its various aspects to would-be practitioners. The weapons of war themselves are very much more intricate than they used to be, and again technological sophistication has driven a proliferation of publications.

When the Army issued the General Grant tank early in World War II, it was accompanied by one thin pocket-size technical manual of less than a hundred pages. The Abrams tank, the Army's latest tank (the former XM1) is going to the field accompanied by at least 8 shelf-feet of technical publications--a veritable library for the would-be tank commander or mechanic to master, dubiously available in the field and doubtfully current.

Since the mid-1970s the Army has been moving vigorously to assist the officers and non-commissioned officers in units who have to train soldiers in how to use and maintain modern equipment, or to employ same with modern tactics. Usually, this training takes place not in schools, but in the units of the Army. For the fact is, most of the soldiers of the Army are in units--nearly half overseas--and that is where the new equipment goes. Hence, the

Army has to send training support materials into units. Now the Army has some 400 military occupation specialities. Over the past five years, the Artillery School at Fort Sill, in order to train the soldiers in just one of those specialities, MOS 13E (Cannon Fire Direction Specialist), has produced and sent to artillery units in Europe, Korea, Alaska, Hawaii, and throughout the Continental United States, some 46 field manuals, some 30 correspondence courses, some 72 training films, and 160 audio-visual cassette training extension course lessons. As the new artillery materiel enters the force--the computer-based TACFIRE fire control system, the COPPERHEAD tank killing-artillery round, artillery delivered mines, etc.--cannon fire direction specialists Army-wide will have to be retrained to use this new equipment, and Fort Sill will have to modify its existing training products and publications or issue new ones. And yet the production for this one military-occupation speciality at the Artillery School is only one small part of the Army training system's undertaking, which extends across those hundreds of MOS's, and embraces both active and reserve components. Last year, the Army's Training and Doctrine Command produced some 20,000 separate training products--books, films, TV cassettes, audio-visual TEC lessons, etc. And it is programmed to produce some 50,000 in 1983.

Now it is important for you to understand that all of the Armed Forces face today problems of distributing

storing, retrieving, and presenting information that are different in kind and magnitude from any that they have had to confront in our post. We are therefore very much in need of outside technological assistance to solve those problems. Let me mention three fields in which we desperately need help. The first, of course, is training. I have alluded to that as being one of the more difficult challenges that we face. It is not alone the difficulty of delivering in timely fashion training materials to the soldier in usable, compact forms. It is also that of communicating from the units where the training is taking place back to the schools where the training materials are being put together, so that he who is designing them is informed of their effectiveness in the several environments in which it may be applied. Assuring that two-way communication efficiently with the paper-based information system which we presently have is out of the question. We simply cannot make it happen. There are present in this room individuals who know well to produce a manual today the Army takes something over one year. To print it, to ship it in thousands of copies to units, we have to have pallets of publications on the docks of Baltimore, cranes swinging up out of the hold of freighters, trains across Europe in the night, pile on pile in the storehouse--another year must pass before a soldier opens the book. In the meantime the genius who put the original word together is working on

version 2, 3, or maybe 4. The changes are already in the system behind the original, and the poor fellow that's out at the other end of the line, supposedly using the authoritative word on what he's supposed to do with this or that tactic, or this or that piece of equipment, knows for certain only that his book is out of date. He knows for sure that what he has in hand is probably not the last word on the subject. And that induces a basic insecurity in his approach to his work; it lowers the confidence of our soldiers in their equipment. And it is, therefore, a problem that goes right to the very root of our modernization. I take you than back to my chacterization of the printed word as a threat to national security. Help us with this problem of training the Army today.

But training is not the only field in which information is crucial to our success or failure. Most of you have read in the media that we are having difficulty in recruiting a volunteer force. I don't want to comment on the merits or demerits of that issue. But I suggest to you that the Army is now in the market place for manpower in a way that is has never been in its entire history. To compete for the declining age group cohorts that we know are going to be available to country through the 1980s, to compete with industry for manpower, we are going to have to have far more efficient ways of conveying information to a would-be job applicant about what the prospective service job is to which he might be attached. The traditional notion

of stationing Sgt. Glotts in Whatsis Center, New Hampshire, following a tour in some obscure unit in Europe has to be improved, for Glotts probably knows nothing whatsoever about becoming a computer programmer or whatever it is that the Whatsis Center applicant who wanders into his office may be interested in pursuing as a career in the Armed Forces. It seems evident to those who are running the Army Recruiting Command that we have to have an information system that permits Sgt. Glotts to make available to would-be applicants a rich store of information about each and all of the jobs, the 400 occupation specialties of the Army. And preferably information that is vivid, credible, and contemporaneous. Perhaps television, and perhaps up-to-the minute believable pictures of soldiers doing the jobs that the particular job applicant inquires about. That appears doable, and among Col John Goetz's other projects is indeed an innovative recruiting information distribution system. Again, we would be looking there for feedback--in other words, the information not only has to go out, but some sort of system for evaluating its effectiveness has got to come back to the Recruiting Command management.

I want to clarify one minor point. When I make representations such as I have just made, there are many who would say, "Ah, yes, but we can return to the draft and that will solve all of your recruiting problems." Remember the draft has provided a declining percentage

of the Army throughout this century. We fought World War I with an Army over 60% of which was provided through conscription. That percentage dropped to about 50% in World War II, and declined further to something like 40% during the Korean War and Vietnam. The chances are that, no matter what, most soldiers will be volunteers. To sum, we may well need some conscription should the international situation become more threatening, but it will certainly not take the services out of the marketplace for manpower. And I have no doubt but that John Goetz's technological upgrade will serve us in good stead.

Finally, I would like to mention the field of operations. It is not commonly understood that the fundamental differences among the armed services lie largely in the way that each handles information. Most people focus on the difference in our suits, the difference in the way we wear our caps on our heads, or the style of our speech. But the fundamental difference among the services can be stated quite simply: the Army must operate by decentralization. It is our modus operandi in war, and therefore it is our preferred modus operandi in peace. The Navy and the Air Force operate, to the contrary, through centralization, and have developed information collection, storage, retrieval, presentation, and transmission systems to permit them to do so. Operationally, because of the Army's need for decentralized management, the Army has a requirement to be able to store

large amounts of information in compact form, able to be transported from place to place. For example--maps: Right now the most efficient information transmitting, storage, or presentation device available to us is the simple map on paper. We can pack more information per square meter on a map than we can any other way. But simply having militarily usable paper maps available for military operations in an area like Southwest Asia, ensuring that somehow or other we will deliver to the unit that is operating in country x and place y, maps of place y imposes enormous logistical problems of supply and distribution. Again, our paper-based information system is wholly inadequate to the task. It would suggest that technologies which permit us to store large amounts of information, such as the technologies that you have been examining in this conference, would be inherently useful to the Army operator for the purposes of command and control.

We were discussing at lunch certain experimentation that has been conducted in the Army over the past couple of years which has demonstrated pretty conclusively that television used for command control alleviates many of the problems that we have been attempting to solve with the computer over the years. Video conferencing narrows the field upon which we must bring the computer to bear. Here again, ways of enriching the television via stored information are inherently interesting to the Army.

Let me conclude by telling you that for the reasons that I have outlined that the Armed services are indeed committed to finding technologies that will help our problems of modernization, at the root of which lies the problem of handling information. Admittedly we face countless problems associated with the production of information, but most of our difficulties there we probably can solve within our own resources. It is the storage, the retrieval, the presentation, and the transmission of information that stymies the services. We know we can't get there with paper. We appeal to you to help us get there otherwise. I would gather that one important purpose of these convocations is precisely to identify individuals in service that could serve as a point of contact for individuals outside who may be able to give us the sort of technological uplift that Fred C. Ainsworth brought to the Army at the turn of the century. I hope the Ainsworth of the 1980's is here and listening.