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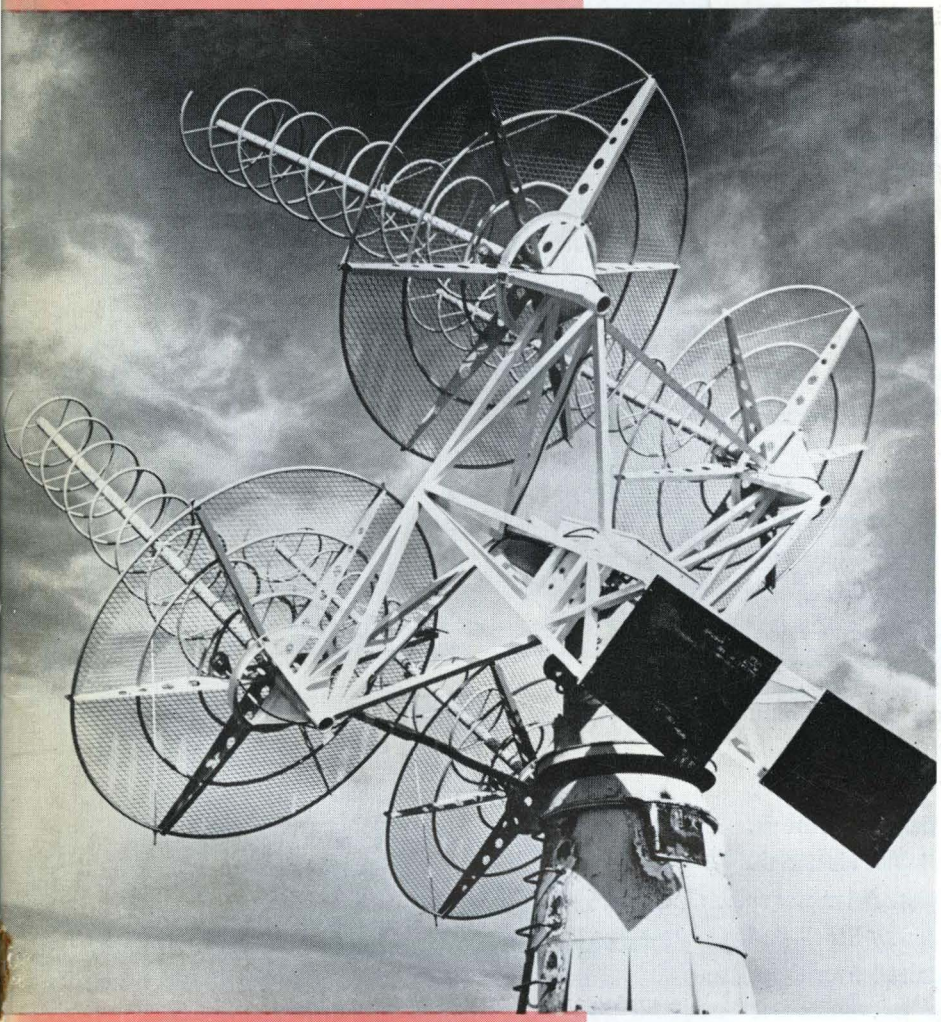

## COMPUTERS AND WAR SAFETY CONTROL

## A PICTORIAL REPORT ON COMPUTER APPLICATIONS

JANUARY
1962
•
Vol. 11 — No. 1

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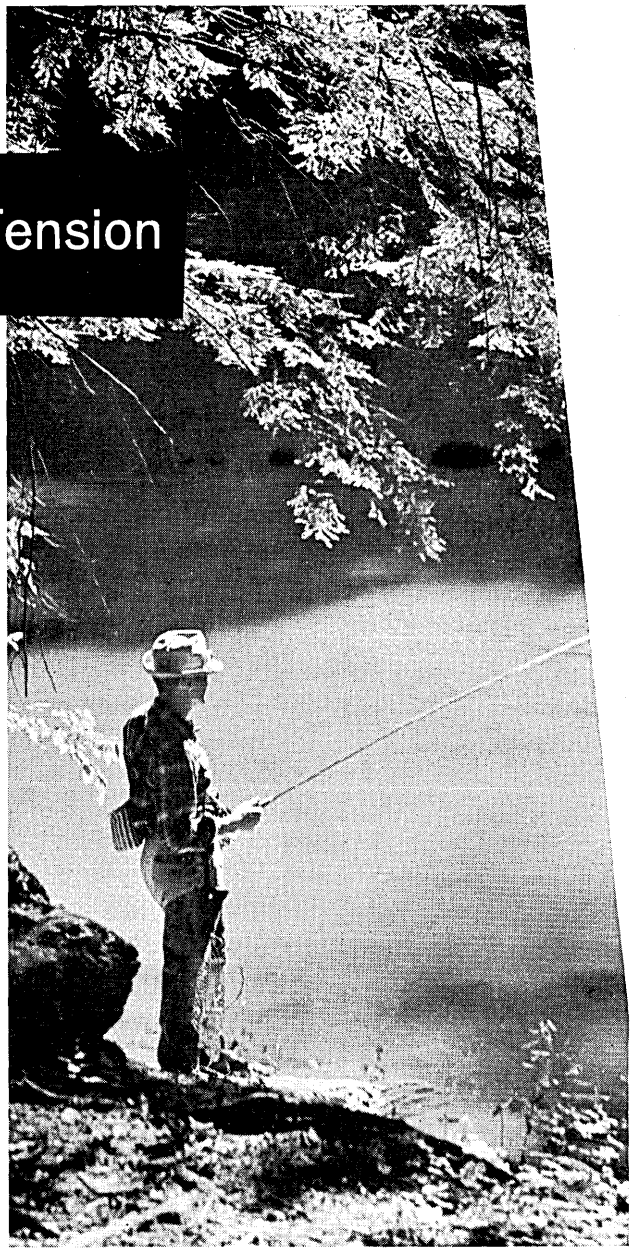

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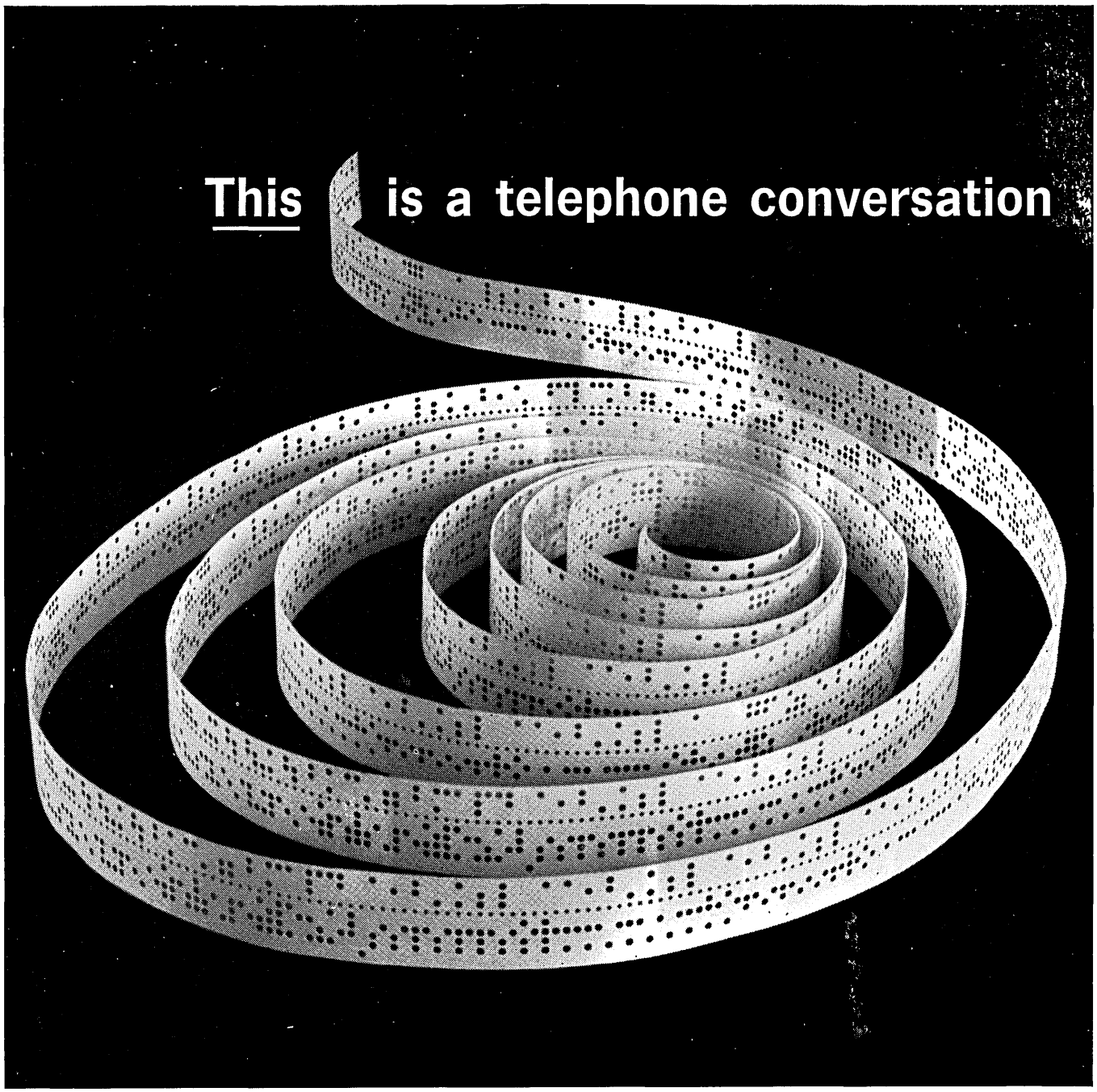


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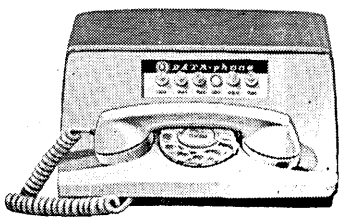


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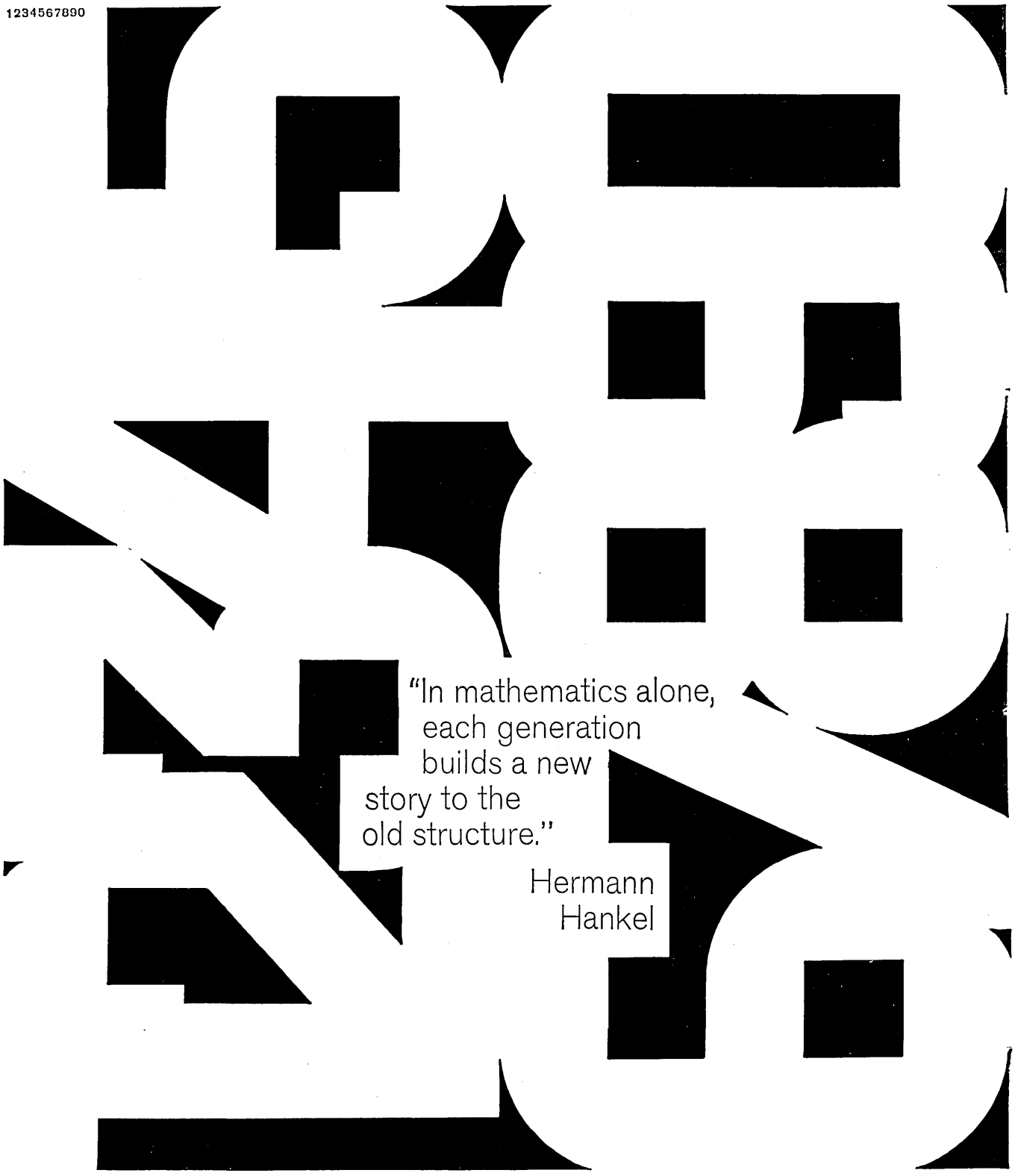


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# *A Report on . . .*

# Computers and War Safety Control

War Safety Control is a proposed system which is analogous to Air Traffic Control, and which was proposed in 1961 by Howard G. Kurtz, a former airline pilot and manager, and a member of the U. S. Army Reserve, 1929-46.

Essentially War Safety Control is the idea of a multi-national technological control system (making use of computers, other devices, and people) to secure safety from war on behalf of all nations jointly, and *regardless* of the government that they have.

An example of the application of this idea might be the conversion of early warning systems presently functioning to guard a single nation or a group of allied nations into warning systems which would guard all nations.

The purpose of the report and arguments set forth in this issue of **Computers and Automation** is to promote wide discussion of this proposal among computer people and other scientists and engineers—particularly as to its technical feasibility.

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## I. Genesis—Air Traffic Control and War Safety Control


**Howard G. Kurtz**
**Handy Associates**
**New York 22, N. Y.**


### The Collision Hazard

When the airplane pilot found himself flying blind in a cloud, he entered an age of intense new anxiety he had never before experienced.

He realized grimly he was blind and that other pilots also were flying blind in the same cloud: he could not see them; they could not see him.

In similar emergencies on land or sea, previously, man had been able to slow down, to lower the sails, to heave out the anchor, to put on the brakes, even stop, in order to save his life. But in the air the pilot could not slow down; his plane had to fly forward at high speed just to stay aloft. The other pilots could not slow down either. Flying toward each other at breakneck speeds, the pilots grew ever more anxious realizing that should collision occur, it would happen in the twinkling of an eye, with no time for evasive or defensive action.

Ever greater anxiety was generated with the realization that there was only a limited length of time in which to solve the problem. Each gas tank carries only a specific number of minutes of flight. The pilot could not sit and wait as earthbound men had previously been able to do.

Even greater levels of fear built up, from the realization that if collision should occur, then both sides would be dead. Almost nobody ever walks away from a midair collision.

In this new oven of anxiety that man found himself flying in, a surprising change took place.

### The Melting of Conflicts

Among airmen flying blind in a cloud, all the things that men used to find to disagree about, to hate about, to fight about, to kill each other about, began to melt away. If you are flying one airplane in this cloud, and I am flying another, it no longer makes any difference what church you or I go to . . . what political party you or I represent . . . what color is your skin, or mine . . . what your nationality is or mine . . . These things

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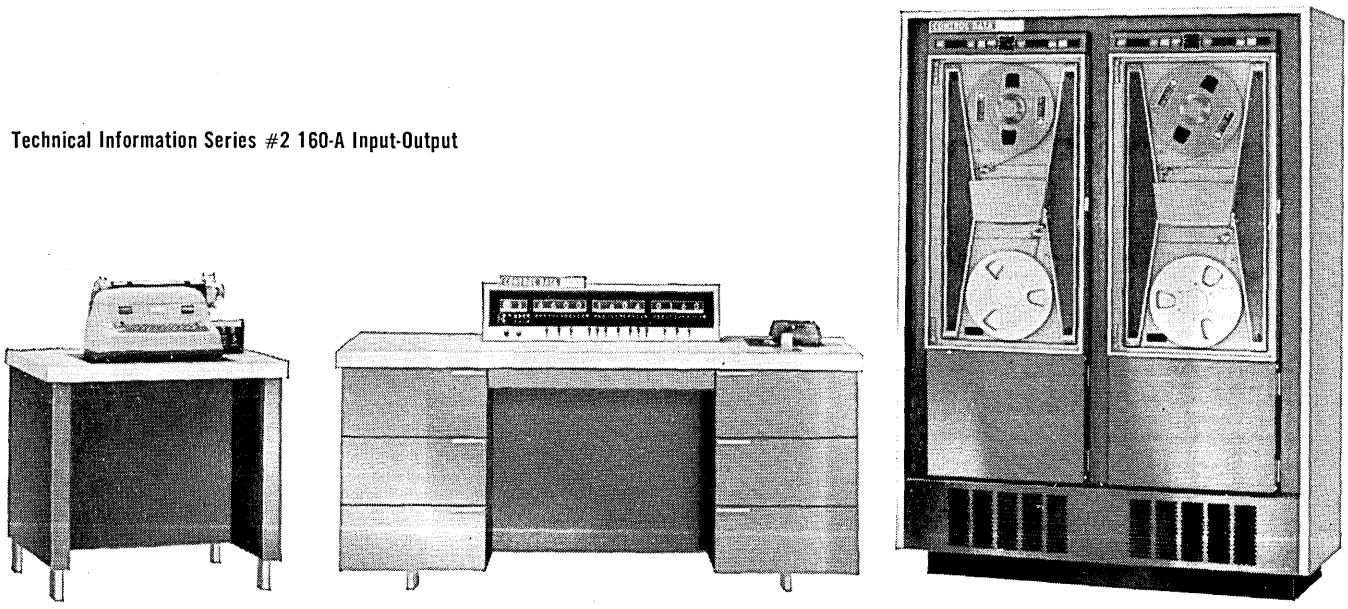

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When a peripheral device is connected to the normal channel, data is transmitted between the 160-A and the peripheral device via the normal channel only. However, when it is connected to the buffer channel, data can be transmitted between the 160-A and the peripheral device via *either* the buffer or normal channels. In this case, the normal channel is utilized at any time the buffer channel is not engaged.

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no longer matter. We shall both be dead if collision is allowed to occur.

Something else melted in this high temperature of fear. This thing called "self-interest," which some civilizations have built up almost into a religion, began to melt into a new and better shape.

On the verge of final extermination through accident, it is no longer possible to make any important distinction between my own selfish concern for my own safety and my equal concern for your safety. Everything I do for my safety also assures your safety. Neither can I pretend to be selflessly concerned only with your safety, and not my own, because whatever I do to assure your safety, I simultaneously do to assure my own. We have met in common anxiety and common concern for common safety.

This in fact is the basic meaning of the Golden Rule taught by all religions "Love Thy Neighbor as Thyself." Airmen have learned the hard way, and have proved beyond doubt, that any lesser policy is unsafe. This is the proper moral way of life.

### Limited Higher Authority

Airmen in all parts of the world reacted in similar patterns to the danger of collisions in flying. They created a limited higher authority called Air Traffic Control with superior power in the narrow channel of preventing collision. It was not world ownership of the airplanes. It was not world law for pilots. It was simply a *limited higher authority*. The pilot remains in sovereign control of his own plane and passengers. If he does not consider it advisable to wait an hour in the pattern over an airport before his permission to descend will be given, he can decide to go to some other airport. But if he decides to descend and proceed towards possible collision, he turns himself over to higher authority.

Air Traffic Control has transformed air travel from the ever present hazard of sudden death, strewing wreckage all across the landscape, into the kind of disciplined safety system in which over 100 million passengers a year purchase tickets on the scheduled airlines of the world, and can plan with almost complete certainty to remain alive. Yet in the early 1930's there were no company rules or national codes crystallizing human behavior into mandatory safety procedures. But they came and they found ready acceptance all around the world.

### Implications

What is the lesson for mankind and nations? Nations today are on the verge of similar final collision, resulting in hundreds of millions of deaths. Nuclear war, and other kinds of war based on modern technology, can exterminate civilization from the face of the earth. Doomsday can now come at the will of man—or even through communications error.

The whole world needs an analogue to Air Traffic Control. What is needed in my opinion is a world safety organization with limited authority to issue warnings and seek to prevent collision courses among nations.

In air transportation our safety procedures have grown immeasurably. In the beginning they were warnings of danger. Now they include studies of preventive measures against development of hazards. And the degree of cooperation all over the world has become extraordinary.

It is possible to envision the similar growth of safety procedures to prevent war, starting with warnings of danger, and proceeding to preventive measures against the development of hazards—a development and flourishing of War Safety Control.

# II. Proposal—War Safety Control

**Howard G. Kurtz**
**Handy Associates**
**New York 22, N. Y.**

**(This is a summary, slightly modified, of a central portion of "The Future Research Challenge—Control of World Crisis," a consulting report by Howard G. Kurtz submitted to the Foundation for Instrumentation Education and Research, 335 East 45 St., New York 17, N. Y., copies available at printing cost in quantities or 50c single copy.)**

The two main purposes of this report are: (1) to consider the design and implementation of a "war safety control" system—a technological system of control organized multi-nationally to help increase the safety of all nations in the world from aggression, but without interfering in their governments in any way; and (2) to stimulate the widest possible pro and con discussion of the concept of an international "war safety control" organization.

A first (and earlier) purpose of the War Safety Control organization is to warn people of all nations about preparations for future aggressive wars; a second (and later) purpose is to protect people of all nations by preventing future war, nipping it in the bud, as it were.

At the start War Safety Control can be organized by one or several nations; as a result of growth it may be expected that later on it will become part of the United Nations, or will be a separate international organization.

War Safety Control will contrast greatly with the present mission of existing military forces, which is to protect the people of one individual nation, and to destroy attacking military forces or nations. It is intended that War Safety Control will maintain the national security and national independence of all nations, simultaneously. Its purpose will be to assure that no nation will be threatened or dominated by any foreign power and to assure that each nation can have its own peculiar form of government without dictation from any foreign power. The world organi-

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zation of safety strength is to be controlled so that the safety force itself will not become a tyrant over the minds of men or the governments of independent nations. In other words, the proposal presents an additional choice: neither *militarism* nor *pacifism* but *control of world crisis,* producing safety for one's enemies and one's neighbors, as well as safety for one's own nation.

* * * * * *

Scientists and engineers in the most advanced military systems technologies have now progressed to a moment of readiness to declare scientific war on war, itself.

Science and technology that have been mobilized by nations for the purpose of creating ever-increasing destructive power, sufficient to bring an effective end to all civilization, could now be mobilized for the purpose of creating and operating a world-wide War Safety Control organization capable of providing national security and national independence for all countries, simultaneously. This would bring an end to war, and would bring world crisis under control, it is hoped.

Civilizations are so conditioned to conflict that the concept of a war-proof world is today beyond the imagination of many political leaders, military leaders, and the scientists who have the ability to bring it about. The purpose of this report is to try to picture more clearly some of the first details of this future research challenge, War Safety Technology.

It will call for many increases in responsibilities among military forces and for massive new research, development, testing, evaluation and production by the instrumentation, electronics, communications, data processing, and systems industries, plus added contributions from the professional and industry societies and associations, and from colleges and universities.

How can the Secretary of Defense and the Joint Chiefs of Staff be expected to tell the President and the American people the new truth that, even if military budgets were doubled or tripled, it is no longer possible to assure the future security of the United States against upcoming scientific weapons systems? whether launched as first strike, or as retaliation, by command, or by accident, or by war between two other powers, with or without a missile gap?

The British Defense Ministry found courage to tell the British people in 1957 the awful truth that their nation no longer could be defended against modern weapons. This same grim truth has swelled to encompass the entire world, today. This is not an American problem, alone. The Soviet Government can no longer assure the future of the Soviet Union. No national military organization can any longer assure the future security of its citizens, if modern full-scale scientific war should start.

In this age the whole world is exposed to the danger that people of all nations can be destroyed in a day. No nation will find its future security unless and until some kind of world-wide War Safety Control organization is created that will provide national security and national independence simultaneously to the people of all countries. World security is no longer fantasy. It is becoming scientifically possible to achieve.

War Safety Control will be kept under civilian control, and will be committed to the physical security of all nations simultaneously, without concern for the different political affairs or systems in independent nations.

Neither the United Nations nor War Safety Control will be "world government" in that the function of "government" will remain in each independent nation. Cuban independence will be guaranteed, for example, without danger of having its government or its economy controlled or dominated by the U.S.S.R., or by the U.S., or by any other foreign power. The Cuban people can have any kind of government or political system they will tolerate, without its being dominated or controlled from Moscow or New York or London or any other foreign group.

Every nation will be independent, and safe from foreign domination or conquest. Relentless, continuous, increasing pressure, and research, negotiation, and exploration must accumulate through the years, until the basic common denominator of physical safety, desired and needed by the people of all patriotisms and of all beliefs, forms a hard core of the most basic world community—the universal community of physical fear—on which the War Safety Control operation can be based, without the impurity of control by veto, or minority, or majority whim among the nations.

In Organizational P l a n n i n g Terminology, the United Nations will NOT have *line responsibility* for government, but will have only *staff responsibility* and *service functions.* Each nation will be an autonomous, decentralized operation, sharing only certain, specified service facilities from the central administrative headquarters, the United Nations. War Safety Control will be one of these service functions. There will be no "one world." There will be a "safe" world of many independent nations.

Within War Safety Control, there will be no foreign "parliament of man" meeting to pass laws telling the United States how to settle its integration problems . . . to pass laws telling the Soviet Union how to grant political freedom to its citizens . . . to pass laws telling any independent nation how to run its domestic political economy and government. Within War Safety Control, there will be no need for veto or minority or majority action in the halls of the U.N., on these matters of domestic national government.

Air Traffic Control that operates to prevent collisions between airplanes in flight across the world is *not* world government . . . it is *not* world ownership of the airlines . . . it is *not* world domination of the pilots' labor unions . . . it is *not* world control of the origins or destinations of the planes in flight . . . it is *not* control of the fares charged. Air Traffic Control has jurisdiction in only *one* area: the area of preventing a pilot from committing suicide by flying into and killing people in other airplanes, in flight.

And so, by rough analogy, War Safety Control will have jurisdiction in only *one* area . . . in the area of preventing any nation or group from committing na-

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tional suicide by threatening war or waging war against other people.

Not a single conflict or disagreement will be resolved. Theologians and philosophers of all positions will continue to disagree, perhaps endlessly into the future. War Safety Control will provide ground rules within which the debates will go on, without blowing up the world or killing people as debating points. War Safety Control will make the world safe for Soviet communists and Belgian capitalists and Norwegian socialists and the American philosophers of permanent revolution, to continue their debates and demonstrations. It will allow all the peculiar national political economies to move forward, without the collisions of war that can bring an end to mankind in all political economies.

### War Safety Control Intelligence

World-wide War Safety Control Intelligence may dwarf the complexities of even the present great defense systems already in operation to sense and report events and dangers and readiness of enemy action from around the world into command headquarters. Enormous quantities of instruments, sensing devices, and data consuming machines throughout the world will be reporting through electronic communications systems to regional data processing and evaluation centers for rapid analyses and comparison, to report the alarm if any future Hitler or Napoleon begins to mobilize military power to threaten or wage future war or organized destruction.

The scientists in military weapons fields are the ones who know enough about their special technology of destruction to work out the specifications for military safety control.*

One specific War Safety Control Intelligence problem which has often been mentioned in the public press is the need to devise the safety systems to detect if anyone sneaks future underground tests of nuclear explosions. On one side of the safety systems research team there will be geological scientists and nuclear scientists helping to clarify the measurable distinctions between nuclear underground explosions, and the various kinds of earthquakes. On the other side of the safety systems research team will be the experts in instrumentation, communications, data processing, and systems evaluation who can integrate the increasing knowledge resulting from further research, into operational warning systems. Such systems may have perhaps thousands of instruments buried permanently underground throughout the world, reacting and reporting electronically, or by other means, to computers. Evaluating the reports of earthquakes and explosions each day, they can shout a warning to the world, one day, if an explosion takes place that is not like any earthquake pattern. This is just a sample of perhaps hundreds of different world-wide War Safety Control Intelligence systems that will have to be created and operated.

* For more detailed outlines of the technical problems which research must solve, see "The Technical Problems of Arms Control" prepared by Bernard T. Feld, Donald G. Brennan, David H. Drisch, Garry L. Quinn and Robert S. Rochlin, for the American Academy of Arts and Sciences, available for $.50 from the Institute for International Order, 11 West 42nd Street, New York, N.Y., from which some of the above material has been adapted freely.

*Question:* Suppose, for example, that some nation were to begin secret preparations for a surprise attack with some nuclear weapon made from a critical raw material of industry. How would the safety system determine whether such a material was being diverted to illicit underground factories?

*Answer:* An extended analogy may help to suggest one possible answer to the problem. Consider, for example, the "Link Tracer" that came from the laboratories of Link Aviation, Inc., and is now being installed in every bus in Chicago. It is a small plastic unit containing miniature circuits for receiving and sending radio signals. When the bus passes over energized cables that are laid at intervals under the street, signals energize the coils in the tracer and it transmits its coded identification number to a receiver by the road. The code signal then moves to the dispatcher's office, where a visual board shows the exact location of the bus at that moment. If there is a breakdown, to cite one possibility, the dispatcher can detect the halting of the bus and via radio send a repair truck to the exact spot.

The next market for this invention may be our railway system. We already have marshaling yards where electronic devices sort out cars from incoming freight trains. These yards are automated except for one detail: someone has to inform the computer in what order the cars are approaching. But if each car is provided with its own "tracer," it can report its number and position miles away from the yard.

It would be technically feasible to go further than this in controlling freight car movements of nuclear materials under War Safety Control. Each car could be audited by electronics to make certain that it went straight to its legitimate destination. If any car were diverted or delayed at some isolated junction, the electronic monitor could set the warning system in action and thus send an inspection team speeding to the scene of the presumed violation of security.

*Question:* What are some of the other areas where War Safety Control Systems teams will have to be organized for long range research?

*Answer:* Nuclear and other scientists will have to search for strategic phenomena which can cause response or reaction by some instrumentation device, in nuclear explosions on the surface, and under water, and in the atmosphere, and in outer space. They will have to specify telltale factors which will register on instruments if nuclear stockpiles are increased or decreased or moved . . . if nuclear bomb production is undertaken, or diverted from peaceful uses to military purposes.

Experts in radiological, chemical, biological, explosive and future weapons will have to work in research teams with the war safety systems teams so that reports of give-away events or reactions may be fed into the War Safety Control Intelligence System.

Statistical data on national budgets, economic reports, import and export tonnages, and many other business records will be fed into the data processing systems, evaluating strategic facts to detect when, and if, some future fanatic like Hitler should try again

# EAST VS. WEST DIAGRAMS VS. EQUATIONS

**THE COMPUTER'S ANSWER TO A LONG-STANDING COMPUTER ISSUE.**

For a decade East Coast and West Coast computer designers have been using different methods of representing computer logic—the Easterners with diagrams, the Westerners with equations.

```
LBSMI=
      (LXA1)(LXA2*)(LFCA*)
     +(LXA1*)(LXA2)(LFCA*)
     +(LXA1*)(LXA2*)(LFCA)
     +(LXA1)(LXA2)(LFCA)
LFCAJ=
      (LXA1)(LXA2)
LFCAK=
      (LXA1*)(LXA2*)
```

In the example illustrated here, the diagram and the equation tell us exactly the same thing. Either represents a serial full adder where the sequence of pulses at the output, LBSM, will represent a serial binary number that is the sum of two serial binary input numbers occurring at LXA1 and LXA2. (The asterisks indicate binary complements; for example, whenever LXA1 is energized LXA1* is not, and vice versa. LFCA is a carry flip-flop.)

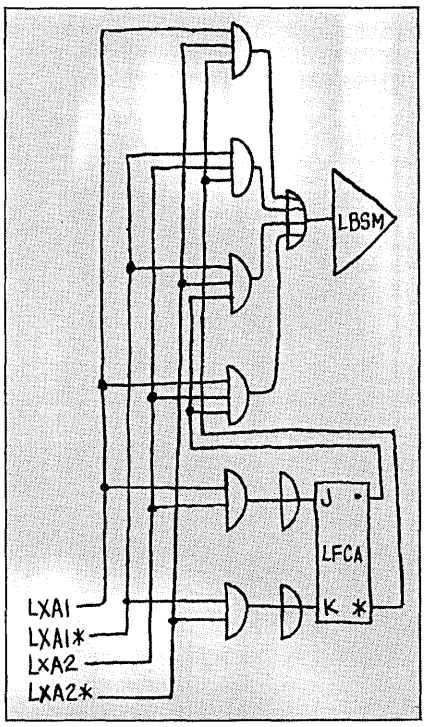
There are persuasive arguments on both sides. Eastern proponents of diagrams point out that the logical interconnections can be seen at a glance and followed through any number of stages by eye. The logical structure of an entire system can be understood from a diagram more directly and intuitively, they maintain, than from a set of equations.

The Western argument for equations goes like this. It's not true that diagrams communicate better to the viewer's intuition, except at first exposure. The human mind is highly adaptive. After working analytically with the equations for a while, the mind begins to operate intuitively in that symbology. Then the intrinsic superiority of equations over diagrams begins to make itself evident. One advantage, say the Westerners, is that equations can represent the same information more compactly and efficiently, as our illustration shows. Another is that equations lend themselves better to computer manipulation of logical design information.

As evidence of the latter advantage Westerners point to a recent achievement of some Litton Systems people: a completely mechanized procedure for translating logical designs into wiring lists, including operational simulation of the design to verify its accuracy. A procedure enormously facilitated by the computerizability of logical equations. It's easy to picture the benefits in cost, delivery schedules, reliability, price. Using only a partial development of this method Litton Systems recently brought a major computer system from concept to operation in less than a year.

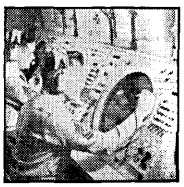
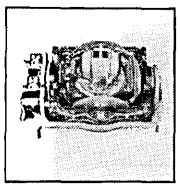
Now under consideration at Litton: a machine that will accept as inputs a supply of standard computer components and a set of coded specifications defining the logical functions desired, and will crank out completely fabricated systems.

*Maybe you think we've loaded the argument in favor of equations. You're right. But we're ready to listen to arguments on either side. Drop us a card. Or better still, drop in in person. You'll like the*




*imagination-stretching atmosphere generated by Litton management's appreciation of the rewards of creative controversy. And we have a few excellent opportunities for computer design people. Ask for S. L. Hirsch at Litton Systems, Inc., Data Systems Division, 6700 Eton Ave., Canoga Park, California.*

An equal opportunity employer

LITTON SYSTEMS, INC.

A DIVISION OF LITTON INDUSTRIES

DATA HANDLING & DISPLAY SYSTEMS · GUIDANCE & CONTROL SYSTEMS · COMPUTER SYSTEMS · SPACE SCIENCE · BIOELECTRONICS · ADVANCED COMMUNICATIONS TECHNOLOGY

to mobilize military power to blackmail or conquer other people.

Sensors loaded with batteries of specialized instruments may be sunk in the mouths of rivers, registering the chemicals in the water flowing out to sea. When a factory upstream suddenly gives off a new waste chemical that arouses suspicion of military deception, the War Safety Control Intelligence system will register warnings.

New instruments that react to earth shocks, radio waves, light, radioactivity, sound, and other phenomena, will come from the large-scale, long-range research and development teams financed by War Safety Control.

In fact, Air Traffic Control systems across the world reporting the movement of aircraft for air safety purposes, can also be wired in to War Safety Control Intelligence to report any strange craft, missile, or satellite.

Since future nuclear weapons could be carried in a suitcase, at immigration stations throughout the world people will walk past instruments that will detect the weapon without bothering the millions of innocent people who walk past the device without knowing it.

Aerial photography, radar, infra-red camera, and television can pipe intelligence into a world network of automated intelligence devices. Massive Soviet early warning systems and U.S. early warning systems one day can be blended into unison as they become operational in the War Safety Control organization to scan the world for evidence of any future danger to either country, or to any country in the world.

Individual nations may continue to have their own intelligence networks to look for evidence that any nation anywhere in the world is successfully evading the War Safety Control Intelligence system.

Individual nations may continue to have their own counter-spy experts trying to trick the War Safety Control Intelligence networks to see if the system remains foolproof.

War Safety Control Intelligence will be expensive. Research, development, science, and technology will be pressed onward to keep safety disciplines up to date and in step with all the technological breakthroughs of the future. The relentless battle to maintain safety will never be relaxed.

Nations are spending billions of dollars, rubles, pounds, francs, etc., on national military power today, and are not receiving national safety or security in return. We are suggesting here that nations change their insurance policies, and begin investing in this future possibility for national security—world security through war safety control.

War Safety Control Command will develop "nonlethal weapons."

Imagine some border clash arising between two nations. The disturbance might be quelled by aircraft which could blanket the area with certain tranquilizing gases. These gases, which would not be dangerously poisonous, would literally make the lion lie down beside the lamb.

In the case of more serious clashes between opposing nations that had somehow secured old-fashioned arms, modern chemical weapons could be used which could put an entire population to sleep for 48 hours, thereby providing time for War Safety to bring the situation under its control. These examples may seem fantastic, but the fact is that such new means of exercising police action through chemistry have already been developed in the laboratories of chemical warfare. A new arsenal of life-sparing "psychic weapons" is basically at hand. There would be no need to use live ammunition except in a last desperate repulsion of violence.

War Safety Control Command would train tough troops in the art of stopping fights and border incidents without hurting anybody . . . permanently. These well-trained soldiers with blazingly identifiable uniforms (to loudly witness that all civilized mankind stands behind them to be certain that a war will NOT be permitted) can be transported by fast jet to any trouble spot in the world in a few hours.

The War Safety Control troops may patrol borders to make certain that arms, ammunition, and war material are not transferred from one nation to another.

In final reserve, with the hope that it may never be used, War Safety Control Command will have destructive power if needed to stop a build-up for war completely.

The War Safety Control Command will be trained, like the policemen of London, New York, or Moscow, to the highest and noblest traditions as the impartial friend and protector of people of all patriotisms and of all beliefs. Like firemen they will be ready to sacrifice their lives, if necessary, to put out the fires of war before the flames destroy the citizens they are protecting.

By the time in the future when War Safety Control becomes operational all over the world, it will have developed a new intelligence force . . . the billions of world population who, by then, will have realized that in War Safety Control, they can find the safety and security essential to survival. Each citizen of each independent nation will realize, and will be constantly reminded that his own nation's safety and security can be maintained only if the whole world is made safe against war.

Every citizen will report dangers he sees in the same way that nowadays a man seeing a house catching fire will telephone the fire department.

### War Safety Control Operations

When the Command Center of War Safety Control receives word from Intelligence that a violation may have occurred, the Command Center will go into action promptly.

What radically different plans, strategies, tactics, and hardware will be needed to PREVENT a war, in contrast to the present military capacities to carry on a war? What kind of military force do you use to make the whole world SAFE, in contrast to the force now mobilized to kill great numbers of people?

Here are some suggestions which point in the general direction.

War Safety Control Command will have an Air Force. When Intelligence spots an unexplained freight car of military chemicals, War Safety Task Forces will be in the air in minutes, will reach the spot for inspection, and enforce discipline if necessary.

War Safety Helicopters will hover over question spots. War Safety aerial reconnaissance and photography will be a major function.

War Safety Control Command will have a Navy. Flashes from Intelligence may send fast boats chugging about the busy harbors of the world, or up the rivers where there is evidence of suspicious events.

War Safety Command will have land force: highway patrols, routine inspectors in factories, border patrols.

The War Safety Control Command will develop whole new arsenals of "non-lethal weapons" . . . such as tranquilizing gases. . . .

In final reserve, with the hope that it may never be used, War Safety Control Command will have whatever destructive power is needed to stop a build-up for war dead in its tracks.

Instead of a dread "big brother" spying in every person's window, the War Safety Control Command will be constructed in the highest and noblest traditions, as the friend and protector of people of all patriotisms and of all beliefs. They will be trained —and welcomed—as firemen who, at the sacrifice of their lives if necessary, will put out the fires of war before the flames destroy the citizens they are protecting.

* * * * * *

# III. Comments and Discussion

## 1. A STATEMENT

"Having read advanced proof of this consulting report, and speaking as individual citizens within the limits of our individual fields of special competence, we see no insurmountable barriers in the way to prevent the eventual solution of the massive problems of creating, and operating, a world-wide War Safety Control organization, when and if the decision is made to undertake such a large-scale, long-range advanced study and research effort.

"As a matter of greatest urgency, we agree that all possible consideration should be given to decisive, forward, new action to clarify the psychological and social and technological problems, and to mobilize the special efforts required to achieve proper world security under an *additional new strategy for prevention of war.*

"Under threat of the fantastic oncoming developments in scientific military destructive power, there is reason seriously to question whether the future security of the United States can be maintained with only the obsolescing and negative strategies of defense and deterrence, alone. An additional bold, new-dimension vision has become imperative."

Mr. Albert F. Sperry, Past President, Instrument Society of America, and Past President, Foundation for Instrumentation Education and Research, 500 Crestline Dr., Los Angeles 49, Cal.

Dr. Lawrence Rauch, Head, Instrumentation Program, Univ. of Michigan, Ann Arbor, Mich.

Dr. Rufus Oldenburger, Director, Automatic Control Center, Purdue Univ., Lafayette, Ind.

Dr. Harold Chestnut, Past President, International Federation of Automatic Control, c/o General Electric Co., Schenectady, N. Y.

Dr. Otto J. M. Smith, Dept. of Electrical Engineering, Univ. of California, Berkeley, Cal.

Dr. John Truxal, Head, Electrical Engineering Dept., Brooklyn Polytechnic Institute, Brooklyn, N. Y.

Dr. Ralph Tripp, President, Instrument Society of America, c/o Grumman Aircraft, Bethpage, Long Island, N. Y.

Mr. Peter Schenk, Executive Vice President, the MITRE Corporation, Bedford, Mass.

Dr. Merritt A. Williamson, Dean, College of Engineering & Architecture, Penn State Univ.

Dr. Hugh Wolfe, Editor of Publications, American Institute of Physics, 325 East 45th St., New York, N. Y.

Dr. Theodore P. Wright, Chairman, Cornell Aeronautical Laboratory, and President, Flight Safety Foundation, 510 Cranshaw St., Ithaca, N. Y.

Dr. Quincy Wright, Woodrow Wilsow Dept. of Foreign Affairs, Univ. of Virginia, Charlottesville, Va.

Dr. John L. Kennedy, Chairman, Dept. of Psychology, Princeton Univ., Princeton, N. J.

Dr. Louis B. Sohn, Harvard Law School, Cambridge, Mass.

Dr. Margaret Mead, American Museum of Natural History, 79th St. & Central Park West, New York, N. Y.

Mr. Elmo Roper, 111 West 50th St., New York, N. Y.

Dr. Charles J. Dexter, Chairman, Organization Development Council, 51 Madison Ave., New York, N. Y.

Dr. H. B. Maynard, President, Maynard Research Council, 718 Wallace St., Pittsburgh, Pa.

Mr. George A. Beebe, Director, Institute for International Order, 11 West 42d St., New York, N. Y.

Mr. John Moynahan, John Moynahan & Co., 155 East 44th St., New York, N. Y.

## 2. COMPUTERS AND "WAR SAFETY CONTROL"

**Edmund C. Berkeley**
**Editor, Computers and Automation**

### New Ideas

Nearly every new idea that comes along the path of human activities meets with a reception in which almost all the old ideas rear up their heads, bare their teeth, and snarl at the new idea. In fact we published an article once which among other things talked about how much opposition computers encountered when they were a new idea ("Opposition to New Ideas," by Neil Macdonald in "Computers and Automation" for February 1959).

Many of the reasons why the old ideas object to

the new ideas are very good. First, the new ideas may involve contradictions of the old ideas, as Einstein's mechanics contradicted Newton's. Second, a new idea is often embedded in a collection of other ideas which are mistaken or wrong or irrelevant or commonplace—and the new idea may be judged by the company it keeps—and this, of course, is fallacious logical reasoning. Finally, a great number of the important and valuable ideas for human beings have already been found, worked out, and applied, in many ways; and so the chances that any given new idea is a good one are not very favorable.

And yet, the new idea of War Safety Control put forward by Howard G. Kurtz, and discussed in this issue of "Computers and Automation," is a new idea with significance. Essentially, it is the idea of a multinational technological control system to secure safety from war on behalf of all nations jointly, and *regardless* of the government that they have.

An example of the application of this idea might be the conversion of the United States' ballistic missile early warning system into a two-way (or many-way) warning system, whereby the Soviet Union and any other nation would be warned of missiles going in their direction.

The idea of War Safety Control has in it elements of profound common sense—just like the idea of flying through the air in a machine heavier than air, and like the idea of traveling beyond the surface of the earth among the planets of the solar system.

### Desirability and Practicality of War Safety Control

It requires no genius to see that a world-wide multinational control system to secure safety from war is highly desirable, no matter how difficult it may be to attain it. Technologically, it should not be more difficult to attain than putting a man on the moon. Politically it may be unfeasible now, but it might become feasible soon, because of two facts: (1) it can be started in a small way, unilaterally (without international agreement), and in twos and threes; (2) it is in the interest of all nations to operate a joint alarm system.

For example, suppose the United Nations contracted with the leading computer and instrumentation organizations of the United States, Great Britain, and the Soviet Union to work out a powerful warning system to answer the question:

> Is any nation really preparing to attack any other nation?

This problem is most certainly studied in the war departments of all the big nations of the world, and information is collected by these war departments so that they can answer this question.

For example, when the equipment at the Ballistic Missile Early Warning Station at Thule, Greenland, on October 5, 1960, reported that "a large flight of missiles" was coming up over the horizon from the direction of Northern Asia, one of the first questions asked by the officer in command at NORAD Combat Operations Center in Colorado Springs was "Where is Khrushchev?" Since he was known at that moment to be in New York, it seemed inconceivable to the officer that the Soviet Union was launching World War III with Khrushchev outside of Russia. A short while later, the radar echoes were determined to be from the Moon.

In general, it would be easy to store in a computer the location from hour to hour (if known and indisputable) of the leaders of each government in the world which might initiate a war, and use the information with appropriate evaluation (and combined with much, much more information) in a program of war safety control.

Yet, the present horse-and-buggy control system using mainly fallible human beings includes for example speeches made in the Assembly of the United Nations. A delegate from a little country M rises and says that the big country N is planning to attack it. Then the delegate from the big country N gets up and says, no, it has no intention of attacking the little country M, although it would not be surprised if the exiles from that little country M were trying to change the government of that country. And so on, and so on, and so on. Could not a modern technological control system do much better in producing answers to such questions?

It should no longer be necessary to use the armchair way of settling the question, "Is any nation really preparing to attack another nation?" Instead, it should be possible to develop a program, feed it into a computer, and come out with much more hard-headed answers. In fact, there is little doubt that if several billion dollars (1/10 of the military budget of the United States) for example were devoted to answering this problem, clear and prompt warnings of developing intentions re war all over the world could be easily given. And the answers would probably be more efficient and more reliable than those at present produced by human beings—for one reason at least —because you could not punish a machine for bringing you an unpalatable answer.

### More than Inspection and Arms Control

What are the differences between Inspection, Arms Control, and War Safety Control?

Inspection is based on answering the question "Is Country C living up to its agreement to reduce its weapons to level L?" Inspection assumes an international agreement to begin with, and ways of determining successive levels of armament so that the relative strengths of the participating countries are not unbalanced.

Arms Control apparently accepts the belief that arms can never be eliminated, and so the "practical people" on both sides might as well agree on some "reasonable limits" to arms, instead of having an entirely uncontrolled arms race.

But War Safety Control is keyed to answering a more fundamental question:

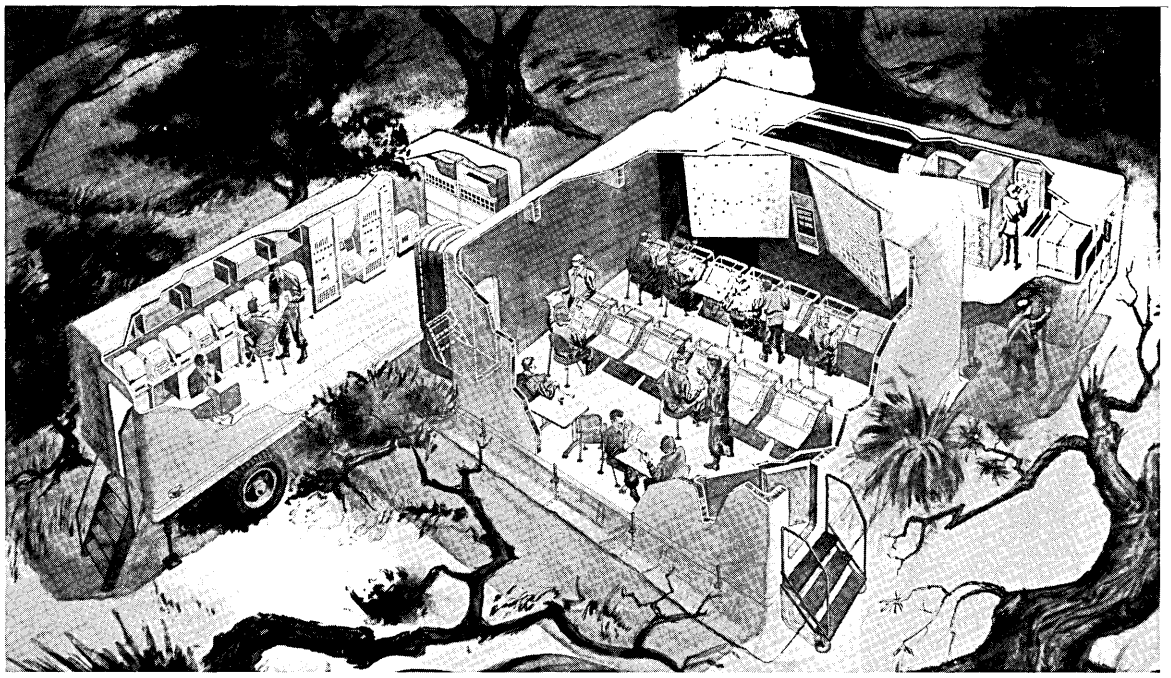
> "Is any nation really preparing to attack any other nation?"

It is a system of control organized multinationally to help increase the safety of all nations in the world from aggression, without interfering in their governments in any way whatever.

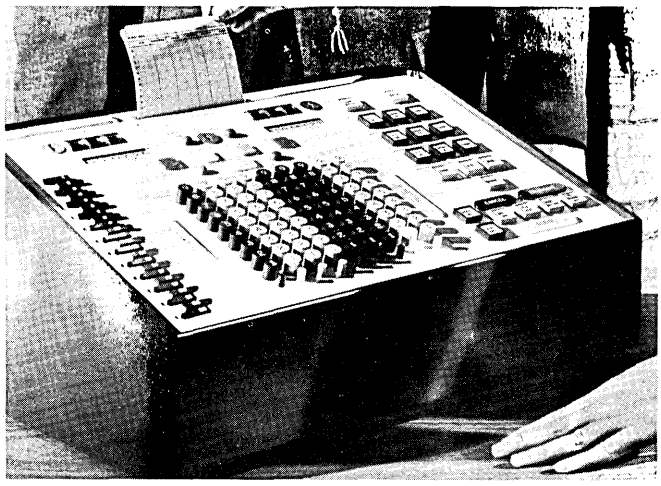
*(Please Turn to Page 37)*

# A PICTORIAL REPORT

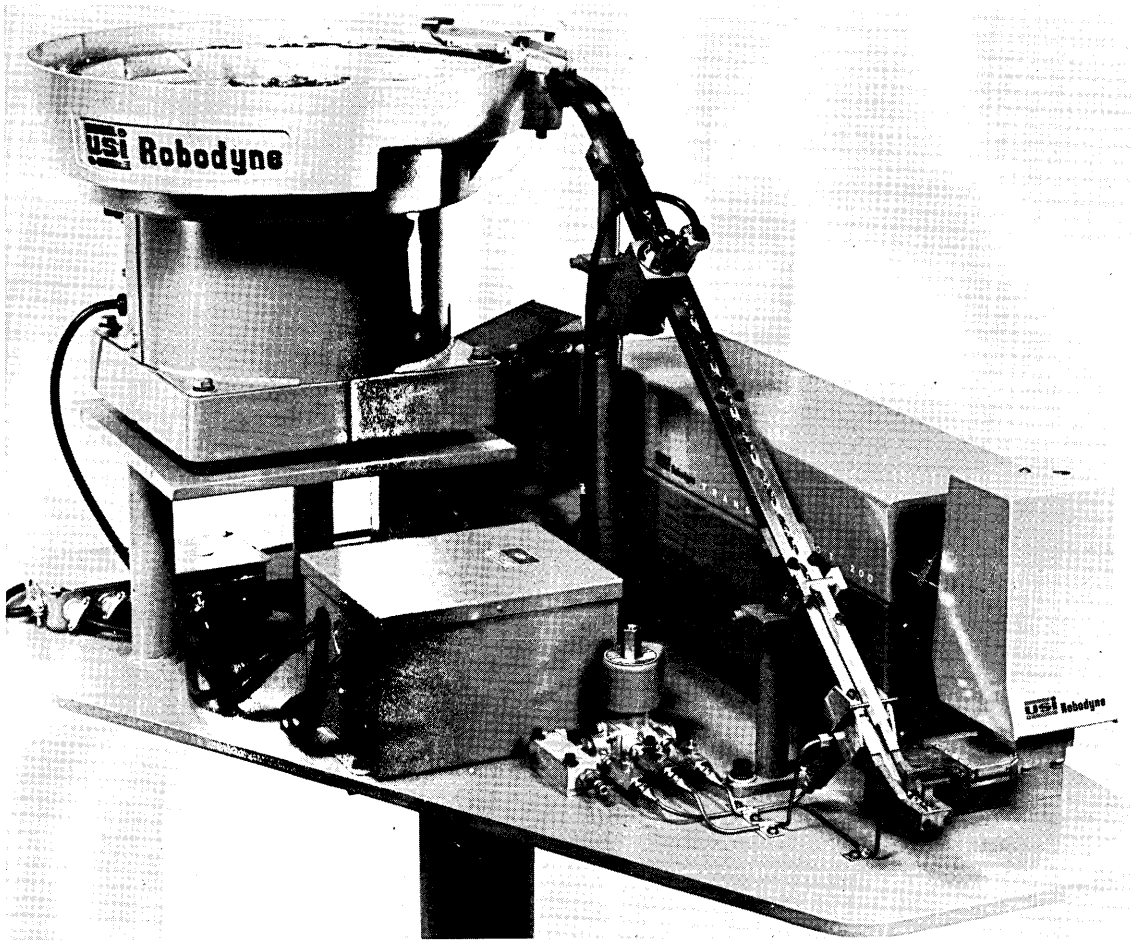
# ON APPLICATIONS OF COMPUTERS



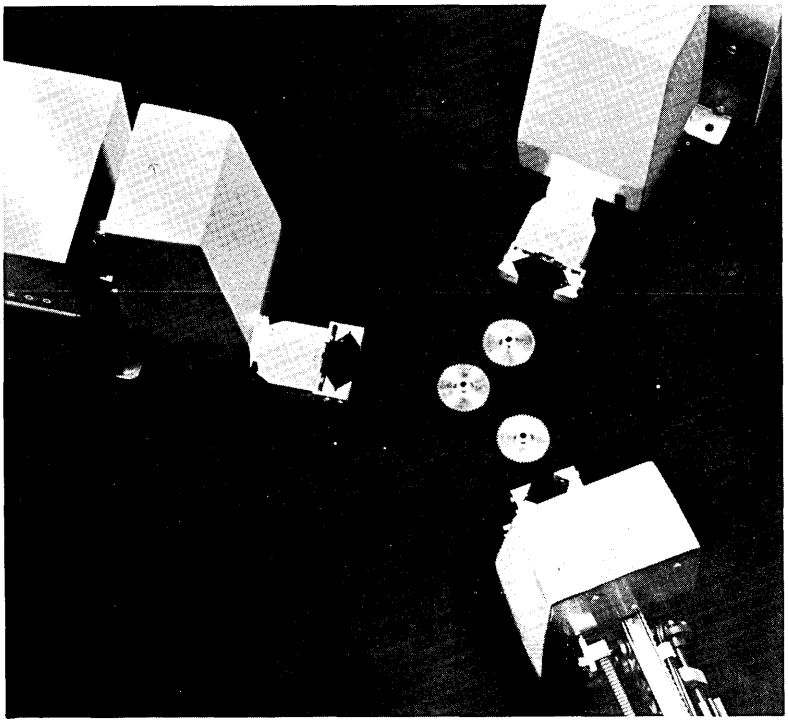
Aeronutronic Division, Ford Motor Company, Newport Beach, Calif. -- ARTOC (Army Tactical Operations Control) combines the judgement and skill of the field commander and his staff with the speed and information capacity of modern computing, data processing, and display equipment. The artists drawing shows a cutaway sketch of how ARTOC, which is highly mobile, is housed in various van-inflatable shelter combinations in the field.



Unisaver, bank computer input device -- Remington Rand UNIVAC, Division of Sperry Rand Corp., New York, N.Y. With the use of this set, deposits and withdrawals will take only a few seconds. The teller inserts the bankbook and keys in the amount of the transaction which is sent to the centrally located computer. The computer sends back updated information, at electronic speed, to the Unisaver where it is entered in the bankbook. Data can be transmitted at rates up to 1200 bits per second. Up to 4096 Unisavers can be linked to a Univac 490 Real-Time System.



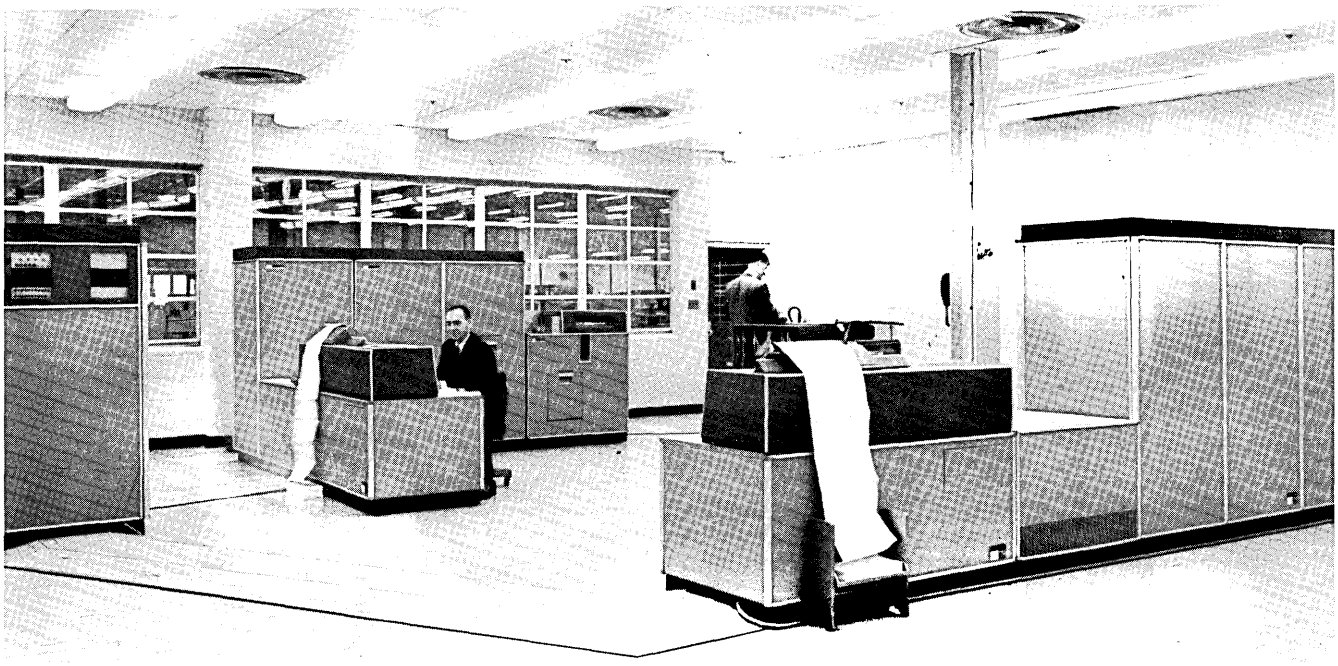

U.S. Industries, Inc., USI Robodyne Div., Silver Spring, Md. -- The segmented vibratory feeding bowl supplies small components to the waiting jaws of an automated TransfeRobot 200. The segmented bowl is so constructed that one small piece can be detached and another inserted to make the bowl ready for a different assembly task.



U.S. Industries, Inc., USI Robodyne Div., Silver Spring, Md. -- TransfeRobot 200. This device usually works in conjunction with the USI Robodyne segmented vibratory feeder bowls (see above) that feed parts to it. It is suited to handling and assembling almost all small components. The hands or jaws, seize, move, turn, or position any small part, at the direction of the TR 200's own electronic brain.

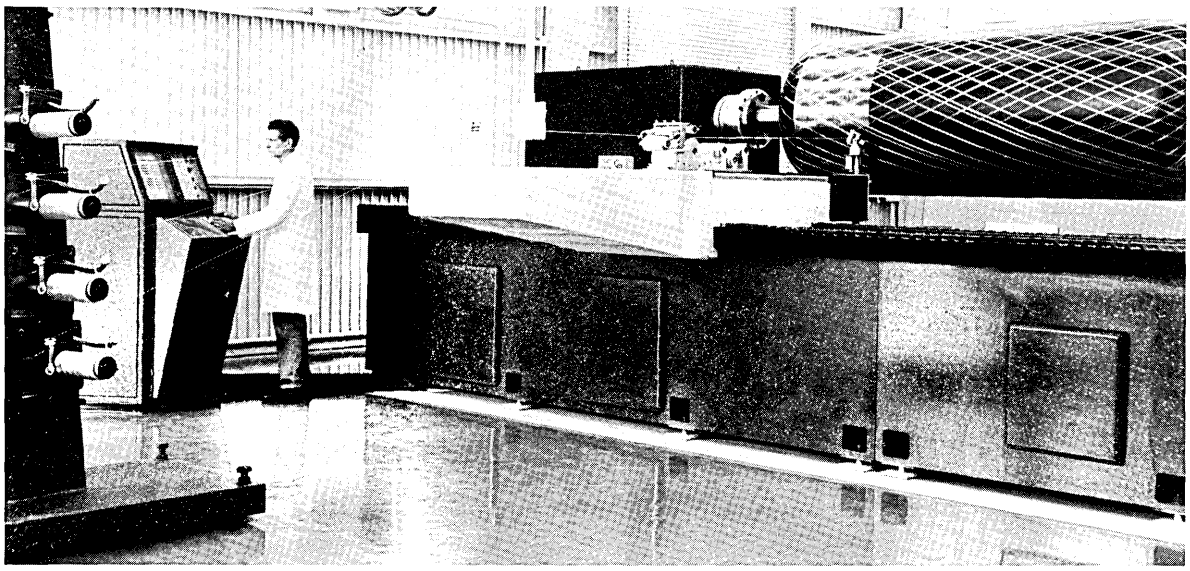
ARGUS, Automatic Programming Aid -- Minneapolis-Honeywell Regulator Co., Electronic Data Processing Division, Wellesley, Mass. The single reel of magnetic tape, being held by Betsy Delone, encompasses all the data originally hand-coded on the 10,000 special forms stacked beside her. 50,000 man-hours were spent preparing ARGUS, this automatic programming aid, and putting it on the reel. The company says ARGUS will cut in half the time needed to tell a Honeywell 800 electronic computer how to do its automated data processing work in business offices, and will save a firm as much as $1 million in preparing a large computer installation to perform its assigned tasks.

Hydra-Point, a pneumatic-hydraulic system for automating machine tools -- Industrial Division of Moog Servocontrols, Inc., East Aurora, N.Y. An operator inserts punched tape into the console of the Hydra-Point numerical control system. The power supply is shown in the center rear. It was developed as a result of experience in hydraulic control systems for missiles and aviation industry, and its advantages are said to be simplicity of design, speed of operation, accuracy, and low cost.



International Business Machines Corporation, Poughkeepsie, N.Y. -- The new Materials Distribution Center is completely oriented to a dual-processing IBM 305 RAMAC computer. It is used to maintain constant control of all parts and material from receiving platform through inspection and storage to delivery to their ultimate plant-floor destination.

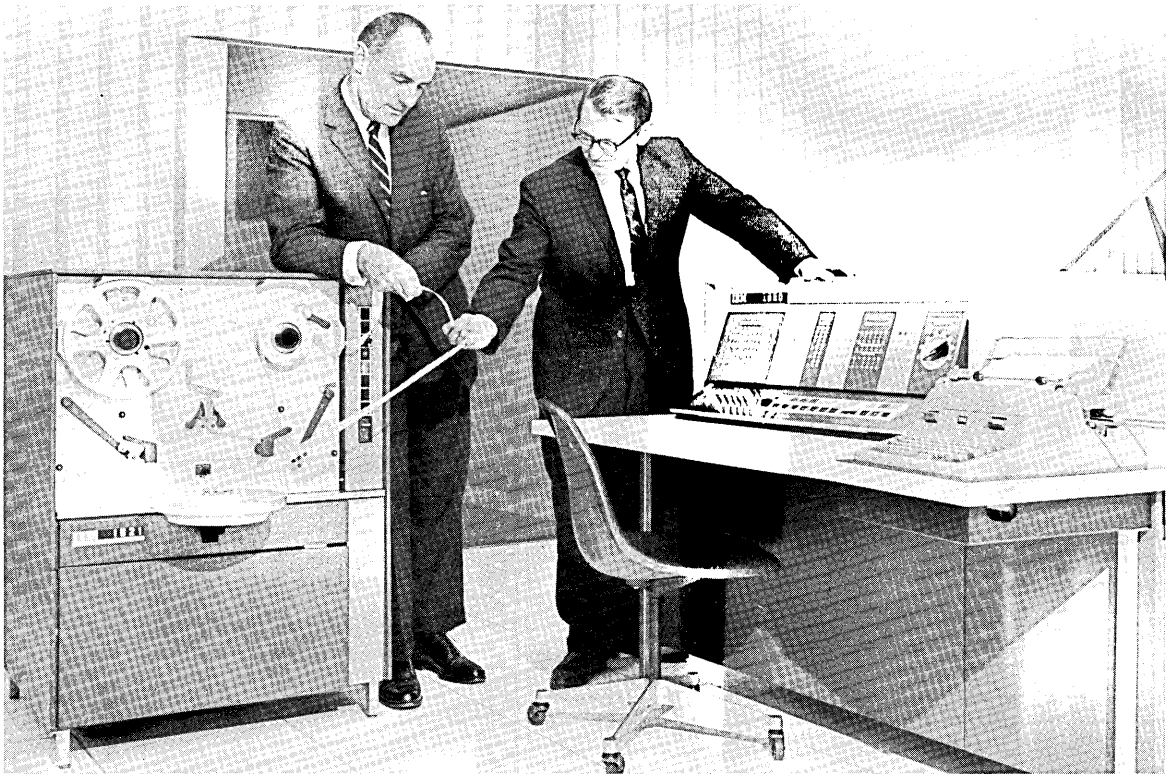
International Business Machines Corporation, Poughkeepsie, N.Y. -- The new Materials Distribution Center supplies more than 40,000 different parts and assemblies used in the manufacture of the large scale IBM 7000-series electronic computers and other IBM data processing equipment. Here is a view of part of the bulk storage area of the new plant.



"Director Control System" -- Thompson-Ramo-Wooldridge Inc., Michigan City, Ind. has developed for the Rohr Aircraft Corp., Riverside, Calif., a numerical control system for winding missile fuel tanks with fiber glass. The machine makes light, strong, rocket-engine cases for the larger and more advanced ballistic missiles. The shapes and winding patterns are determined by a computer, which in turn programs the machine to produce them.

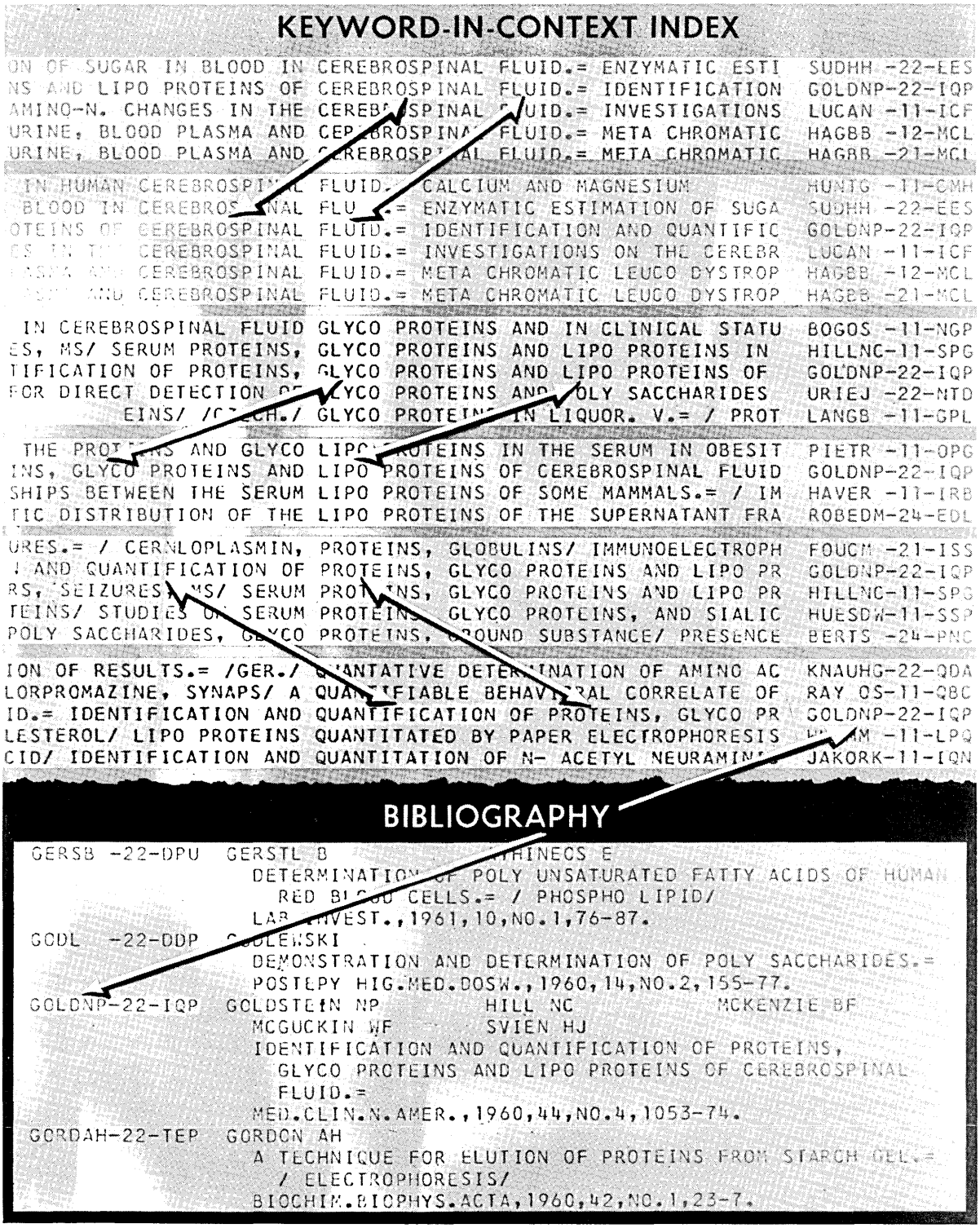
Honeywell 800's high-speed printer -- Honeywell Electronic Data Processing Div., Wellesley, Mass. The printer is a part of the Honeywell 800 Computer System installed at Fort Benjamin Harrison, Ind. The system handles the disbursement of more than $2 billion a year. This printer prints out 900 lines a minute, and is shown here being examined by (l. to r.) Col. Robert G. Davis, comptroller; Brig. Gen. F. J. Kendall, commanding general of Fort Benjamin Harrison and the Finance Center; and Rex Sears, chief of the Automatic Data Processing Division.

A class of U. S. postal workers is shown (below right) being retrained on the DigiFlex, an automated machine specifically designed to communicate new skills to persons displaced by automation. The students' stations are in foreground and left rear; the instructor's station is in right rear. The machine uses automation and human muscular reflex action to speed the training of hand and brain to new tasks. The Post Office Department is already using 55 DigiFlex machines for retraining postal clerks affected by automation. In addition to its automation system, DigiFlex also employs a projection screen and sound system (not shown). The machine is made by U. S. Industries, Inc., Silver Spring, Md.



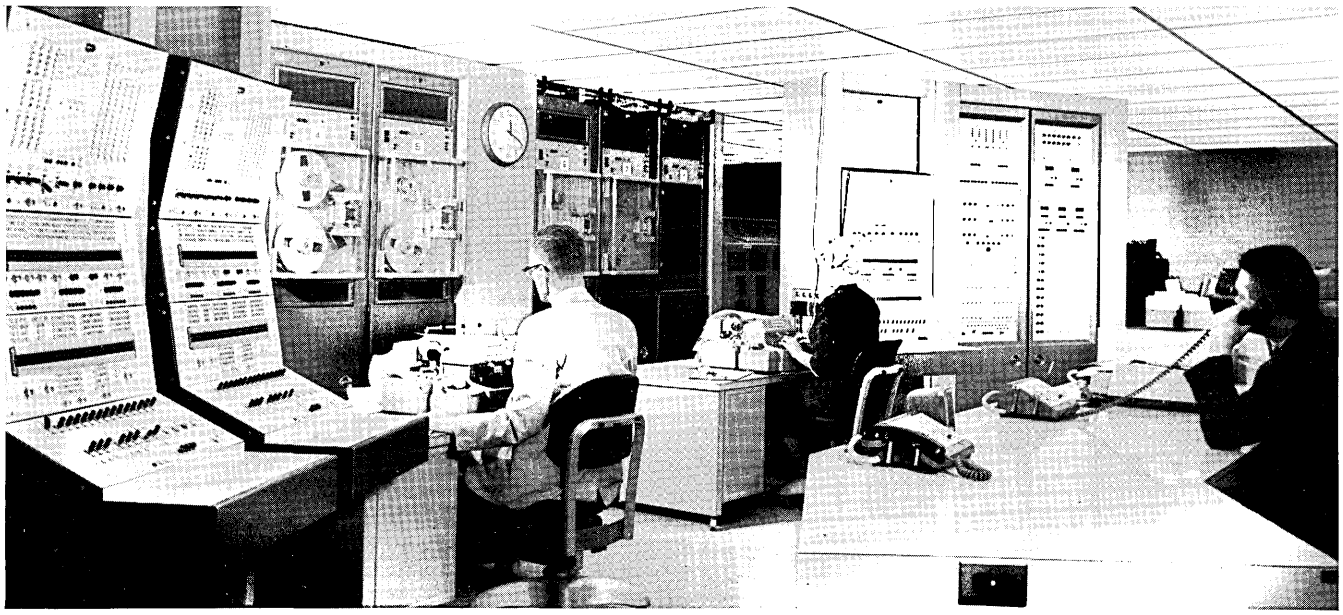
IBM 1620 Data Processing System -- International Business Machines Corp., White Plains, N.Y. Shown is a computer to compile stock tables. It is being installed by the Associated Press in its New York office. The system will receive a flow of financial data from stock tickers of four major exchanges, and through the computer, transmit to type-setting machines in newspapers all over the country. This will help the papers meet tight deadlines despite the increasing number of daily stock transactions.

Electronic Databossers (below left) -- Dashew Business Machines, Inc., Los Angeles, Calif. This machine is able to emboss and code-punch plastic plates. Plates created by the machine are used for credit-card plans, medical-care programs, production controls of various kinds, and other fields where source data needs to be imprinted or recorded into data-collection systems. The Databosser will emboss and code-punch up to 3600 plastic or metal plates an hour directly from punched cards, punched tapes, or magnetic tape. It will punch either binary or decimal codes. The input can be Hollerith code or any binary code configuration, and can activate the machine to emboss alpha-numeric information at the same time it code-punches the metal or plastic plates. The first commercial installation was at the D. H. Holmes Dept. Store in New Orleans, La.




Automatic Literature Searching -- International Business Machines, Corp., White Plains, N.Y. Shown here is a page from KWIC (Keyword-in-Context) Index to Neurochemistry. From this index, physicians and researchers find articles of interest on chemistry of the nervous system, including such diseases as multiple sclerosis. There are as many listings as there are keywords in the title of the article. The associated identification code at the right (upper part of photo) refers the searcher to the bibliography portion of the index (lower part of photo). The index was prepared from the file of Mimosa Frenk Foundation, Amsterdam. KWIC Index has been widely used since it was developed, and its applications include: chemical titles, dissertations in physics, medical titles, Science Abstracts of China.

At left, ticket agent Joan Perkins uses United Air Lines reservations system "Instamatic", to reserve a seat on an outbound flight from New York for a passenger at the Airlines Building on East 42 Street. Instamatic is the largest integrated electronic data processing system in the business world, and is only exceeded in size by the Air Force's early warning defense system. Instamatic took 33 months to build and install at a cost of some $16 million. Produced by The Teleregister Corp. of Stamford, Conn., Instamatic enables some 3000 United agents in 100 locations throughout the country to make reservations with remarkable speed -- in most cases less than one second. The electronic reservation record center is at Denver, Colo.



This is the central operating area for United Air Lines' Instamatic reservations system at the company's Reservations Control Center at Denver, Colo. The room contains the operating consoles for Instamatic's three electronic data processors. Between the consoles, at center, can be seen the magnetic tape units which store records of all reservations transactions. The network is 12,000 miles long and includes 61 cities.

# ACROSS THE EDITOR'S DESK

## News of Computers and Data Processors

## NEW APPLICATIONS

### ELECTRONIC COMPUTER AIDS BROADWAY DEBUT

An electronic computer system to schedule and plan a Broadway production will be introduced to Broadway by a theatrical producer and three young businessmen in connection with The Service Bureau Corp., a subsidiary of IBM.

Dalton Trumbo's forthcoming comedy, "Morgana," will be the first play to use PERT (Program Evaluation and Review Technique), a management control tool used in recent years by private industry.

PERT will be used to assist producers in reducing costs and time-consuming errors.

To use PERT, time estimates on production activities are fed into the computer, which analyzes the information to predict the date of opening night, plus the exact start and finish time of each step necessary to meet that date. From the approximately 200 activities to be completed on time, the computer report will draw attention to troublesome areas. Variations or problems that come up may be rescheduled by referring to the PERT report and the flow chart of the activities.

By applying the PERT technique to a Broadway play, the practicability of applying this system in the entertainment world will be tested.

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### FOOTBALL CONTEST ENTRIES JUDGED BY UNIVAC COMPUTER

There was no waiting for the announcement of winners in a recent football contest. Fans who participated in the contest, which hinged on the outcome of the Cleveland Browns-New York Giants game, had less than the usual weeks to wait for the outcome of the multiple-answer football contest.

Contest entrants predicted the Browns' score, the Giants' score, the number of passes they believed each team would complete, and the official paid attendance. A UNIVAC solid-state computer began judging entries at the rate of 36,000 per hour as soon as official game figures became available. The 40 most nearly correct predictions were established in descending order. The computer's high-speed printer printed out the list in about five seconds following the computer's calculations.

Use of a computer as a sole judge of a contest eliminates all possibility of human partiality.

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### BUILDING CONSTRUCTION AND OPERATING COSTS CALCULATED BY RCA 501 DATA SYSTEM

The Owens-Corning Fiberglas Corporation, Toledo, Ohio, has put its RCA 501 electronic data processing system to work calculating the economies to be realized through proper building insulation.

The Owens-Corning Dividend Engineering program makes use of the RCA 501 system at the corporation's headquarters. In preparing its program, thermo-economic data, amassed from 20 years of performance figures in thousands of industrial and commercial buildings, were used. Special forms are used by salesmen to list the data needed to evaluate a building design. On these forms figures can be entered on as many as four structural designs under consideration. The data is then forwarded to Toledo and fed into the RCA 501 which turns out a detailed plain-English summary in a matter of seconds.

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### COMPUTER-CONTROLLED LABORATORY FOR PSYCHOLOGICAL TESTING

At an Air Force Systems Command base at Hanscom Field in Bedford, Mass., a PDP-1 digital computer of the Digital Equipment Corp., Maynard, Mass. is helping 35 research psychologists of the Electronic Systems Div. design experiments in decision-making.

The computer-assisted laboratory for psychological testing will help experiments previously too long and tedious to carry out. The computerized laboratory can carry on five different experiments at once, without human controls.

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# ANNUAL INDEX

## for

## VOLUME 10, 1961

## of

## COMPUTERS AND AUTOMATION

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# The Eastern Joint Computer Conference —Some Highlights

Patrick J. McGovern
Assistant Editor, Computers and Automation

The exhibit halls of the Sheraton-Park Hotel in Washington, D.C., were filled with an estimated fourteen million dollars in computer equipment.

Over 5,900 exhibitors, speakers, officials, press, and registered delegates (supported by uncounted numbers of spectators from the general public) roamed through the exhibit halls, listened to technical papers, talked with new and old friends, and attended the trips, luncheons, cocktail parties, and banquet.

Hard-cover copies of the Proceedings, with a colorful orange and black dust-jacket, were seen travelling about in the hands of 3,900 registered delegates.

The "Science Theater", an innovation which showed motion pictures dealing with computer applications and technology, drew large crowds.

.....these were a few of the reasons that prompted EJCC Chairman Dr. Jack Moshman to pronounce the recent EASTERN JOINT COMPUTER CONFERENCE, held Dec. 12-14, a "tremendous success". "The exhibitors are happy; there was heavy traffic through the exhibit areas, and I am told a great deal of business was transacted. And the delegates who came to hear the technical program left no doubt that they found the papers interesting," he said.

As a bonus, twenty-two computer hardware manufacturers took advantage of an opportunity to display their wares at a second computer meeting held on the day following the three-day conference. This was the Computer Conference for Federal Executives, sponsored by the Bureau of the Budget to give governmental managers a chance to appreciate the potential usefulness of data processing equipment in their operations.

## The Technical Program

One of the obvious highlights of the conference was the presentation by seventeen-year-old David Malin of his work in simulating aspects of the organization and function of neural networks utilizing an electronic computer. He is a senior at Walter Johnson High School, Rockville, Maryland; he calls his system "CONTRANS" for "Conceptual Thought,

Random-Net Simulation". "Man has learned a great deal about the world around him", Malin explained "and has used his knowledge to shape the world more and more to his will. Eventually, he will reach the point where the important question will not be how to obtain his goals, but what his goals really are. At this point man's development of a sound theory of the nervous system would seem to be particularly vital. Through CONTRANS, I hope to contribute to the establishment of a closer relationship between experiment and theory in this field."

Another of the 29 technical papers that were painstakingly winnowed from the 242 submitted was also of biophysical interest: "The Digital Computer as an Aid in the Diagnosis of Heart Disease". One of five authors of this paper, C. A. Steinberg of the Airborne Instruments Laboratory of Deer Park, N.Y., explained that the cardiologist makes records of physiological variables related to the function of the heart, studies the resulting waveforms, and recognizes and measures the important parameters, comparing them mentally with those for normal and pathological patients. As a result of this comparison, he makes a diagnosis. Mr. Steinberg sees the computer as automatically recognizing and measuring the important parameters of these physiological waveforms. It can then characterize normal and pathological subjects and, on the basis of the parameters, classify the unknown subject. This work is still in the exploratory stage.

Other papers of interest were "Project Mercury Real-Time Computational and Data-Flow System" and "The Saturn Automatic Checkout System" -- both focusing attention on currently active space projects of the United States.

## The Exhibit Area

Ninety manufacturers of computers and peripheral data processing equipment displayed their newest products during the three-day conference. Included in the list were twenty manufacturers of full frames. About twenty-five exhibitors unveiled products that had never before been displayed.

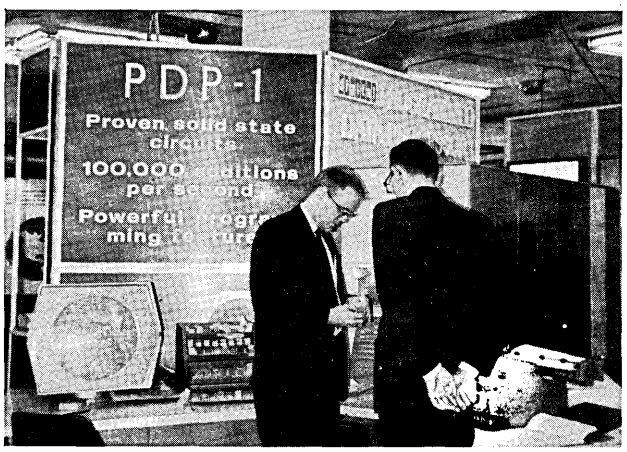
The Armed Services Technical Information Agency exhibit was a duplicate of the one in everyday use. ASTIA is the custodian of all military research and development documentation, with a library of 250,000 documents ranging up to 70 pages in length. The core of this somewhat sophisticated information retrieval system is a solid-state 80 Remington Rand Univac computer.

Closed-circuit television enabled visitors to the IBM exhibit to see how information is transmitted from a computer at the Armed Forces Supply Support Center in the Munitions Building in Washington, D.C., to another computer at the Sheraton Park.

Control Data Corporation, Minneapolis, Minn., showed its new 160-A desk-size computer; Bryant Computer Products, Walled Lake, Mich., introduced its disc files and new flying magnetic recording heads. Harvey-Wells Electronics, Inc., Natick, Mass., had the first public showing of its general-purpose low-priced computer, which sells for less than $20,000.

Other new products included the BIAX high-speed core memories for computers and for other digital applications -- made by Aeronutronics, Newport Beach, Calif. Omnitronics, Inc., Philadelphia, Pa., showed its Model ETR-7 electrostatic coded tape recorder; Photocircuits Corporation, Glen Cove, N.Y., exhibited its "Phototrol" speed control system.

Electronic Memories, Inc., Los Angeles, Calif., displayed a core memory for satellite or space vehicles; C. P. Clare, Chicago, Ill., showed its Clareed dry reed relays. A live demonstration was given by Computer Control Company, Framingham, Mass., exhibiting the 16-mc H-PAC digital module; an ultrasonic device for cleaning magnetic tape was a new product by General Kinetics, Arlington, Va.



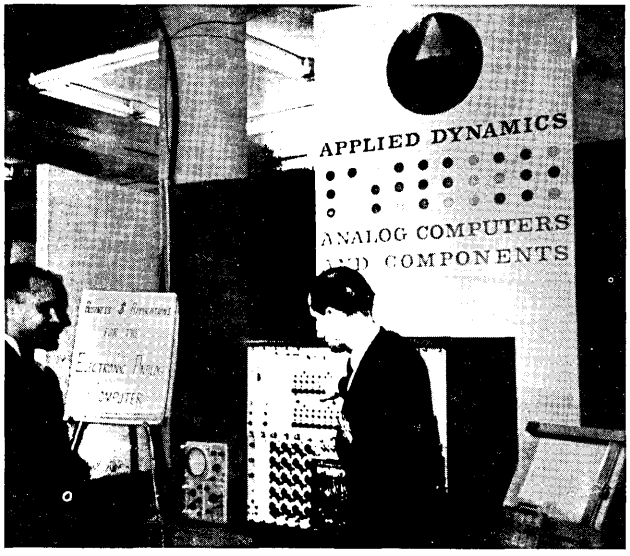

One of the interesting demonstrations of computer virtuosity given at the EJCC was the rendition of Bach music produced by the PDP-1 computer. The unit, made by the Digital Equipment Corporation of Maynard, Mass., used a program developed for the TX-0 computer at Mass. Inst. of Technology.

PICO-BITS were seen from DI/AN Controls, Inc., Boston, Mass.; Comcor, Inc., Denver, Colo., introduced its new analog computers; Consolidated Electrodynamics, Pasadena, Calif., exhibited its Type DR-2700 digital magnetic tape recorder/reproducer. Electronic Associates, Long Branch, N.J., gave a demonstration of its new TR-48 analog computer.

Parallel data communications equipment for use with the Bell System's DATA-PHONE was displayed by Tally Register Corporation, Seattle, Wash.; Indiana General Corporation, Valparaiso, Ind., displayed its new Ferrite memory core products; Computer Systems, Inc., Monmouth Junction, N.J., signalled the debut of its Type 5800 DYSTAC iterative computer; Digitronics Corporation, Albertson, N.Y., gave EJCC delegates a look at its DIAL-O-VERTER magnetic terminal system, and its Model 2500 photoelectric paper tape reader.

Micro Switch Division of Minneapolis-Honeywell, Minneapolis, Minn., exhibited a series of long-pulse "one-shot" pushbutton and switch assemblies. GPS Instrument Company, Inc., Newton, Mass., showed an analog computer with expanded bandwidth, increased repetition rate, and logic control for automatic iterations.

A demonstration that attracted considerable interest was "Business Applications for the Electronic Analog Computer" by Jerome Kennedy of Applied Dynamics, Inc., Ann Arbor, Michigan.




Jerome Kennedy of Applied Dynamics, Inc., Detroit, Mich., gives his "Business Applications for the Electronic Analog Computer" demonstration. He is receiving interested attention from another analog enthusiast, Robert Yeager of Electronic Associates, Long Branch, N.J.

## The Future of the Joint Computer Conferences

The recent Washington EJCC was the first one to be sponsored by a single organization, the American Federation of Information Processing Societies (AFIPS). AFIPS was born on May 10, 1961 at a meeting held during the 1961 Western Joint Computer Conference, at Los Angeles, Calif. There it was decided that a new organization should inherit the control and coordination of the two national computer conferences that have been held each year in the U.S. by the National Joint Computer Committee (NJCC). The latter organization was formed in 1951 by three societies, IRE, AIEE, and ACM, for the sole purpose of sponsoring and coordinating the Joint Computer Conferences, Eastern and Western.

However it became clear since that time that a national organization was needed that could promote "the advance and diffusion of knowledge of the information-processing sciences..." Therefore, the three societies that made the NJCC (the American Institute of Electrical Engineers, the Association for Computing Machinery, and the Institute of Radio Engineers) founded AFIPS as a permanent organization.

During the opening section of the Conference, the Chairman of the Governing Board of AFIPS, Dr. Willis H. Ware, of The RAND Corp., outlined the scheduling changes in the future semi-annual computer conferences. These alterations will eventually allow the Spring computer conference to be held on the East Coast with the prospect of more sympathetic weather conditions than previous Eastern computer conferences have enjoyed. The Fall computer conference will eventually be moved to California where milder winter weather conditions may be expected.

The schedule for this changeover is:

1962 Spring Joint Computer Conference:
May 1-3, 1962, San Francisco, Calif.
1962 Fall Joint Computer Conference:
Dec., 1962, Philadelphia, Pa.
1963 Spring Joint Computer Conference:
May, 1963, Detroit, Mich.
1963 Fall Joint Computer Conference:
Dec., 1963, Los Angeles, Calif.
1964 Spring Joint Computer Conference:
May, 1964, Boston, Mass.

Computer people can expect that future conferences will be able to maintain and continue the progress of the recent joint computer conference, under the aegis of AFIPS.

# New Computing Centers

## COMPUTING CENTER FOR YALE UNIVERSITY

Four computers have been installed in the newly-constructed Computer Center at Yale University, giving Yale one of the most versatile computing centers in the country.

The equipment, consisting of the IBM 709, 1401, 1620, and 610, will be used for highly technical computation in the sciences and social sciences. A certain amount of instructional work to provide training of graduate students and faculty in the use of the computing center is also planned.

The four high-speed computers along with 17 auxiliary data-processing machines were purchased by a grant from the National Science Foundation.

## I.C.F. ESTABLISHES COMPUTER CENTER

The Instrument Corporation of Florida has just established a Computer Center at Melbourne, Fla., for use by both ICF and the public.

This is the first IBM 1620 computer in the central Florida area to be made available to the public. Services of the center include machine operators, analysts, and programmers. ICF is also making available their own scientists, engineers and computer experts on a consulting basis to outside groups for special problems.

## COMPUTING CENTER FOR UNIVERSITY OF NOTRE DAME

Plans for a Computing Center at the University of Notre Dame, South Bend, Indiana, have been announced. Creation of the new facility has been aided by a gift from the Sperry-Rand Corporation of a million dollars. A Remington Rand UNIVAC 1107 thin-film memory computing system with related peripheral equipment will be installed in the new building. Completion of the center, at a cost of more than $3,000,000, is expected in the fall of 1962.

The new facility will be used for such work as measuring the effects of radiation of chemical, physical, and biological systems -- in support of the U. S. AEC $2,200,000 Radiation Laboratory planned at the University.

# SOFTWARE NEWS

## NEW INTERPRETIVE ROUTINE FOR THE RECOMP III COMPUTER

Autonetics Industrial Products of Long Beach, Calif., held demonstrations of its advanced programming techniques for their Recomp computers at the Eastern Joint Computer Conference in December in Washington, D.C.

The new interpretive routine for the Recomp III computer (RIP 3000) enables persons not yet trained on computers to use one after only a few hours of instruction. A feature of the new RIP 3000 technique is the small amount of memory used for program storage. RIP utilizes only about 1000 words of the Recomp III's 4096 word memory. The simplified RIP format can therefore accomnodate problems up to 3000 words.

## COMPUTER ANALYSIS OF EQUIPMENT NEEDS

The Radio Corporation of America, New York, N.Y., has developed a new program to provide potential data system users with an electronically-determined analysis of their equipment needs.

This Automatic System Timing program (AST) involves computer evaluation of all the factors in a data-handling job. The computer provides the basis for a decision as to the best equipment complement for the job to be done. It also prints out a list of alternates and what can be expected of them.

The AST program does not stop with initial system selection. A mounting or changing work load can be swiftly evaluated to determine the additional or modified equipment needed to handle a new situation in an efficient manner.

## AUTOMATICALLY PROGRAMMED TOOLS (APT) PROGRAM

The Armour Research Foundation of Illinois Institute of Technology was named by the Aerospace Industries Association to direct the nationwide activities of their Automatically Programmed Tools program.

APT is a computer routine which translates English language directions for numerically controlled machine tools into a sequence of instructions on perforated tapes which can be accepted directly by the machine tool. Completely automatic production of critical metal parts is possible with the system.

# NEW INSTALLATIONS

## COMPUTER BANKING SYSTEM INSTALLED IN TACOMA, WASHINGTON

Installation of one of the first computer banking systems in the State of Washington, using magnetic tapes for all record keeping, has been announced by the Puget Sound National Bank of Tacoma.

The new IBM 1401-1412 magnetic tape system includes a high-speed reader-sorter which can read information printed on checks in magnetic ink, while simultaneously sorting them at the rate of 54,000 checks per hour. Also included in the system are IBM proof-inscriber units which print the amount on the incoming check in magnetic ink prior to its mechanical processing. It also proves each deposit slip and performs a preliminary sort into as many as 32 different classifications.

Each of the bank's 12 banking locations will be able to give any customer the exact balance of his checking account as it was at the end of the previous day. The installment loan accounts receive faster posting from the computer system. More information is received in less time, enabling better management control of the installment loan operation.

This new solid-state IBM computer system replaces an earlier IBM system which was installed in July, 1959.

## SAVINGS BANK IN NEWARK, N. J., EXPANDS EDP INSTALLATION

The Howard Savings Institution of Newark, N. J., will expand its automatic account-handling system from three offices to all seven offices in the spring. The system is known as Telefile, and is made by Teleregister Corp., Stamford, Conn.

All the bank's records will be stored on the central magnetic memory. But tellers located in any office have immediate access to the central records. Any new transaction entered by a teller automatically updates the central magnetic record.

The initial conversion began in August 1961, and the system has proved to be 100% accurate and reliable. Telefile is described as being both on-line and off-line. "On-line" work includes deposit and withdrawal transactions which occur during bank hours. "Off-line" work, such as mortgage transactions, can be handled in non-banking hours.

## BURROUGHS B251 VISIBLE RECORD COMPUTER SYSTEM INSTALLED BY MIAMI BANK

The First National Bank of Miami, Fla., is pioneering use of an electronic computer that works directly with conventional bank accounting forms. The B251 system allows the bank to retain its ledger records. At the same time it gives increased capacity to cope with the mounting paper work which passes through the bank every day.

A second B251 system and a Burroughs B270 computer for proof and transit will be installed at First National during the coming year. The total system is valued at about one million dollars.

The B251 computer system operates on documents encoded in Magnetic Ink Character Recognition (MICR) symbols, the "common language" of banking. The bank's special checking accounts will be processed on the new computer system starting immediately. Personal and business checking accounts will be added until all accounts in the demand deposit classification are being run through the system.

As the remaining equipment is installed, cost accounting and savings accounts will be put on the computer systems. The general ledger application will be processed on the new equipment at a later stage in the conversion to complete electronic accounting.

## PACE UNIT TO BE USED WITH IBM 709

Ford Motor Company's Aeronutronic Division, Newport Beach, Calif., has received an analog computer that can electronically simulate actions 50 times faster than they occur.

PACE® (Precision Analog Computing Equipment) was purchased from Electronic Associates, Long Branch, N. J.

This computer eliminates hand setting of dials and circuits. The company expects the new analog computer to reduce operating time by 100 to 1 and increase total capacity by 50 per cent. Equipment to modify existing analog computer facilities was received in the same shipment.

The PACE computer is the second step in expanding Aeronutronic's Analog Computer Facility. The final step will be taken around the first of the year, when an analog magnetic tape system and an analog-to-digital conversion system will be installed. The equipment will permit tying the Analog Computer Facility to the IBM 709 Computer so that the special talents of each can be applied to single problems.

## AIR FORCE COMBAT LOGISTICS NETWORK TO HANDLE 100 MILLION WORDS DAILY

Three types of advance-design RCA computers will give the Air Force Data Communications one of the world's largest and most advanced data communications system. It will connect 350 air bases, depots and stations around the country through five message and switching centers.

Western Union Telegraph Company is the Systems Manager of ComLogNet (Combat Logistics Network). RCA is designing, producing and installing the special data handling and high-speed switching equipment.

The RCA computers are designed to perform control, checking and auxiliary data processing functions. The system will be capable of handling more than 1000,000,000 words daily with each message being processed automatically on a security and priority basis.

The five main centers will act as "clearing houses" for the tributary bases. A typical ComLogNet switching center will consist of 120 racks of equipment, containing 155,000 transistors, more than 600,000 resistors, 155,000 capacitors and nearly 800,000 diodes. Each center will have at least five computers -- two Accumulation and Distribution Units (ADU), a pair of Communication Data Processors (CDP), and a tape search computer.

The ADU is a special-purpose digital computer utilizing both wired and stored-program techniques. The CDP is a transistorized high-speed digital computer. The tape search unit is a transistorized off-line, high-speed computer which provides each center with the facility for automatically searching magnetic tapes for messages or portions of messages. It extracts the information and records the data on magnetic tape, punched paper tape, or "hard copy" in plain English.

## IBM 1401 INSTALLED IN TRUCKING INDUSTRY

Navajo Freight Lines, Inc., Denver, Colo., is said to be the first company in the trucking industry to install an IBM 1401 tape computer.

At the end of 1961 one and a half million freight bills had been processed by the computer. All of the trucking company's financial statements are turned out nine days after the current month closes. The 1401 tape system can handle all of Navajo's accounting in half the time it used to take.

The IBM 1401 system as used in the Navajo Freight Lines installation consists of: the 1401 processing unit; the IBM 1402 card read-punch; the IBM 1403 printer; and up to six magnetic tape units.

## ATOMIC ENERGY OF CANADA LTD. WILL USE BENDIX G-20

Plans have been made to install a Bendix G-20 computer system with the Atomic Energy of Canada, Ltd., Chalk River, Ontario early in 1962.

The solid-state G-20 will be used to solve basic physical problems in the design of nuclear reactors.

## NEW IBM COMPUTER FOR WALL STREET

The William S. Morris & Co., Wall Street, N. Y., bond dealers, have received the first new IBM 1410 computer to be delivered to any U. S. company. This company expects to use the computer to maintain up-to-date records on offerings and buyers' requests.

The 1410 is an intermediate-size computer which can make 30,000 logical decisions or perform 10,000 additions or subtractions per second. The central processing unit of the computer contains 40,000 characters of magnetic core storage; the system can transfer data from one location of memory to another in 4.5 millionths of a second. It can read, write and compute simultaneously.

## BALTIMORE BANK TO HAVE ELECTRONIC SYSTEM

The Union Trust Company of Baltimore, Md. has become one of the first banks in Maryland to install an electronic system for check handling and other banking functions.

The new installation is an IBM 1401/1412 data processing system. It will be used to process a daily average of 80,000 checks and deposits, servicing all demand deposit accounts. The system is also capable of processing corporate and personal trust accounting, savings, consumer credit, mortgage and commercial loan accounting.

# New Firms, Divisions, and Mergers

## SYSTEM CONSULTANT GROUP FORMED

Formation of Computer Dynamics Corporation, Silver Spring, Md., has been announced by Vincent R. Grillo, Jr., President and Chairman of the Board of Directors.

This is an organization of professional data processing specialists established to provide contractual assistance to users of electronic computers in the development of efficient and productive information handling systems and programs. Among the services offered by this company are: application analysis and feasibility studies; equipment evaluation; system design; programming; and post-installation system audits.

Headquarters have been established in the American National Bank Building, Silver Spring, Md. Five branch centers are scheduled for New York, Boston, Chicago, Los Angeles and San Francisco.

## FORMATION OF A NEW DIVISION BY ITT

International Telephone & Telegraph Corp. announced the creation of the ITT Information Systems Division, an advanced record communication and digital systems group.

The new division will be a part of the ITT U. S. Commercial Group with headquarters in New York City. Its services will be available on a worldwide basis.

## LIBRASCOPE ENGINEERING BRANCH IN WASHINGTON, D.C.

General Precision's Librascope Division has announced the establishment of an engineering branch in Washington, D.C. G. L. Stancliff, Jr., has been named Director of the branch.

The Washington Engineering Branch will perform research and development work on advanced computer systems and sub-systems, facilitating coordination between Librascope and its customers in the Washington area.

## INVAC CORPORATION IN EXPANSION PROGRAM

Invac Corporation of East Natick, Mass., a manufacturer of punched-paper-tape equipment, has purchased all of the outstanding shares of stock of Reed Mfg. Co. of Waltham, Mass. Reed Mfg. Co., a precision machine and instrument manufacturer, will continue its present operations as a wholly owned subsidiary of INVAC Corp.

Plans are being made for consolidating the operations of Invac Corporation and its subsidiary in one location at a later date.

## DURA CORPORATION HAS NEW SUBSIDIARY

J. Thomas Smith, president of Dura Corp., Oak Park, Mich. and Paul E. Becking, president of Automatic Writing Systems, Inc., announce the acquisition by Dura of Automatic Writing Systems, Inc., of Detroit.

The name of the acquired company has been changed to Dura Business Machines, Inc. It will be operated as a subsidiary of Dura Corp.

Dura Business Machines is engaged in the engineering, manufacturing and distribution of peripheral equipment for high-speed electro-mechanical writing and data processing. A program for the establishment of sales and service offices on a national basis has been initiated.

## GE SETS UP THREE REGIONAL COMPUTER SUPPORT CENTERS

The computer department of the General Electric Co. of Phoenix, Ariz., has announced establishment of three regional field support centers for installation, service and maintenance of computer installations across the nation.

The new centers will be in Los Angeles, Chicago, and Hartford, Conn.

## IFIPS ADMITS ITALY AND ARGENTINA

The International Federation for Information Processing Societies has ratified the membership of Italy and Argentina bringing the total number of member countries to nineteen.

# NEW CONTRACTS

## MELLON BANK ANNOUNCES 'TOTAL AUTOMATION SYSTEM'

A contract has been signed between the Mellon National Bank & Trust Co., Pittsburgh, and the National Cash Register Company. NCR will supply 45 special magnetic encoders to be used in conjunction with the bank's multi-million-dollar electronic accounting system now in operation. The Mellon Bank will then be able to process electronically all transactions from all departments.

NCR has developed a special "Class 41" system for the Mellon Bank. An encoder was devised to handle all kinds of documents, not only the standard-size checks and deposit slips. It encodes information in MICR figures on checks and deposit slips, and also handles non-standard and exceptional documents such as bonds, coupons, mutilated documents and other irregular papers. Once a document has been proved and imprinted with magnetic ink, other electronic equipment will automatically read the information into the computer system.

The Mellon Bank has now invested approximately $2.5 million in automation equipment and plans to add another $1.5 million worth of equipment during the next year and a half.

## ELECTRONIC COMPUTING SYSTEM FOR MICHIGAN BANK

The Community National Bank, Pontiac, Michigan, is converting all of its record processing to an electronic computer system. The Burroughs Corp., Detroit, has received an order for a B270 system.

The B270 magnetic tape data processing system will handle the bank's proof and transit work, demand and time deposit accounting, loans, money orders, Christmas Clubs, cashiers' checks, and Series "E" bonds in addition to stockholder accounting, the securities portfolio, balance sheet, and profit and loss statement. The payroll and accounts payable work is also scheduled for the computer system.

The B270 system ordered includes a solid-state central processor, a card reader, a high speed sorter-reader, four magnetic-tape units and a line printer. Peripheral equipment consists of seven printers of amount and account number and an accounting machine coupled to a keypunch.

## DIGITAL COMPUTER-CONTROL SYSTEM FOR DETROIT EDISON COMPANY

Leeds & Northrup Company, Philadelphia, Pa., has received an order from the Detroit Edison Company, Detroit, Mich., for a digital computer-control system to improve the efficiency of power generation and distribution to its some 1,226,000 customers.

The order includes an LN 3000 digital computer for economic dispatch, unit scheduling and billing; an advanced solid-state control system; and a new console for the dispatcher's office. The computer-control will automatically regulate 40 generating units on a lowest cost basis when completed.

## SYRACUSE UNIVERSITY'S COMPUTING CENTER ORDERS IBM 7070

The current work load at the Computing Center of Syracuse University, Syracuse, N.Y., is such that the need for a newer and larger computer in the near future is obvious. An IBM 7070 data processing system has, therefore, been ordered from International Business Machines Corp., N. Y. This is a high-speed general-purpose computer system adaptable to a wide range of scientific and commercial applications. Its modular design permits easy expansion of the computer, if this becomes necessary. A variety of programming systems is offered including FORTRAN, COBOL and AUTOCODE. The new system is scheduled for installation in the summer of 1963.

## BRITISH POST OFFICE ORDERS ELLIOTT COMPUTER

A National-Elliott 803 Electronic Digital Computer has been ordered by the Post Office from Elliott-Automation Ltd. of London. It is for use at the Satellite-system radio station on the Lizard, Cornwall, in connection with transatlantic tests of communication satellites next year.

The computer will be used to convert predicted orbital information obtained from the U. S. Minitrack world-wide network of tracking stations into steering instructions on punched tape for the purpose of controlling a paraboloid steerable aerial of 85 ft. diameter at the Post Office radio station.

## ROBERT HALL WILL LEASE HONEYWELL 800 COMPUTER

Minneapolis-Honeywell EDP Division, Wellesley Hills, Mass., reports the signing of a contract to lease Robert Hall Clothes, Inc., New York, N. Y., a large-scale Honeywell 800 computer. Delivery will be made in 1962.

BEHAVIOR OF NERVOUS SYSTEMS TO BE STUDIED

Two contracts were awarded by the Air Force Office of Scientific Research to support studies by Librascope's Laboratory for Automata Research, Glendale, Calif. The studies are part of a five-year-old Librascope program of basic research in intelligent machines and self-adaptive mechanisms.

The contracts cover studies of hypothetical nerve nets, analog simulation of neural behavior, relation of classical association psychology to data processing and digital computers, behavior of mutually inhibiting nerve nets, and simulation of the cardiac ganglia of lobsters.

MACHINE TRANSLATION STUDY CONTRACT TO TRW

Thompson Ramo Wooldridge Inc. RW Division, has been awarded a $119,000 contract by the National Science Foundation (NSF) for advanced experimental work in the automatic machine translation of a wide range of technical and non-technical Russian language text. General purpose computers and associated input-output equipment will be used.

The broad objectives of the RW effort will be to see how far machine translation techniques can be extended and generalized. Under the contract RW will also examine the effectiveness and efficiency of available equipment, and suggest modifications to the RW program that will make it compatible with future equipment.

MILITARY PERSONNEL TRAINING IN USE OF MOBIDIC

The Department of Specialist Training, U. S. Army Signal School, Fort Monmouth, N.J. has awarded a $214,000 contract to Sylvania Product Support Organization, Needham, Mass., a division of Sylvania Electric Products, for training of military personnel in the use of Sylvania's MOBIDIC (Mobile Digital Computer).

This will provide for 17 classes over a 13 month period during which approximately 260 selected Army personnel will be trained in maintenance, operation and programming of the MOBIDIC computer. MOBIDIC is a high-speed mobile computer. It is a versatile multi-purpose computer developed for general military service.

SYLVANIA'S WALTHAM LABS -- AIR FORCE AWARD

The Air Force awarded a $48,000 contract to Sylvania Electric Products Inc., Waltham Laboratories, Waltham, Mass. for development and installation of two prototype electroluminescent weather information data display systems.

The display system will decode and display weather messages up to 72 characters in length. This information will be transmitted from weather observation sites on an Air Force base to the display unit.

The Meteorological Development Laboratory of the Air Force Cambridge Research Laboratories will have technical cognizance over the development of the display system.

NAVY CONTRACT FOR PACKARD BELL

Packard Bell Electronics has received a $195,000 contract from the U. S. Navy Ordnance Research Laboratory at Pennsylvania State University. Packard Bell's Computer Division, Los Angeles, Calif., will design and construct a computer-controlled digital system to be used in a classified research project.

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# NEW PRODUCTS

NEW MEDIUM-SIZE SOLID-STATE ANALOG COMPUTER

Electronic Associates, Inc.
Long Branch, N. J.

An analog computer able to handle complex engineering and research problems, yet housed in a desk-sized cabinet has been developed.

Known as the PACE TR-48, the computer may open a new market for analog computer use, particularly in the aerospace and process sciences. It can be powered by an ordinary electrical outlet; and it does not require air conditioning. Its design and solid state construction eliminates the need for a specially trained maintenance staff.

The TR-48 can perform both sequential or iterative calculations. Therefore in a simulation problem, parts of the machine can operate at high repetitive speeds, while the remainder of the computer operates in real time or at slower repetitive speeds on other problem variables. This capability permits the TR-48 to solve design problems such as multi-dimensional flow and heat transfer, which would ordinarily require a larger computer.

The computer contains up to 48 operational amplifiers, 60 coefficient potentiometers and 23 other computing components (i. e. multipliers, function generators, etc.). All problem parameters and variables may be monitored on the electronic digital voltmeter via a convenient push button readout system.

## TRW-530 STORED LOGIC COMPUTER

TRW Computers Co., a div. of Thompson Ramo Wooldridge Inc., Canoga Park, Calif.

The TRW-530 is the third of this company's line of industrial control computers. The computer is tailored to the needs of each user through the use of Stored Logic.

Instructions are programmed in memory. The program itself, therefore, specifies the logical organization of the TRW-530 at any moment. The command structure can be modified at any time without hardware modification, and commands can be added for such special calculations as instrument conversion or matrix inversion.

TRW computers are being applied to chemical and petrochemical plants, refineries, cement manufacturing plants, nuclear and steam power plants, missile development, television program switching, and research. These computer systems have logged over 300,000 hours of operation with a reported reliability in excess of 99%.

## TAC - TRANSISTORIZED AUTOMATIC CONTROL

Dale's Associates
Culver City, California

This firm has announced a new transistorized automatic control unit which makes data accumulation and automatic electronic control available to engineers and scientists at a comparatively low price.

This device is completely solid-state. It features (1) computational ability from internally-stored instructions; (2) simple one-plus-one command structure; (3) high reliability because of a low component count; and (4) parity checking of all memory operations.

TAC has application as an on-line process control component, an automatic check-out system, an electronic component quality control device, and as a versatile system component. It is compatible with high-speed general purpose computers and other digital equipment. It may be integrated into existing systems.

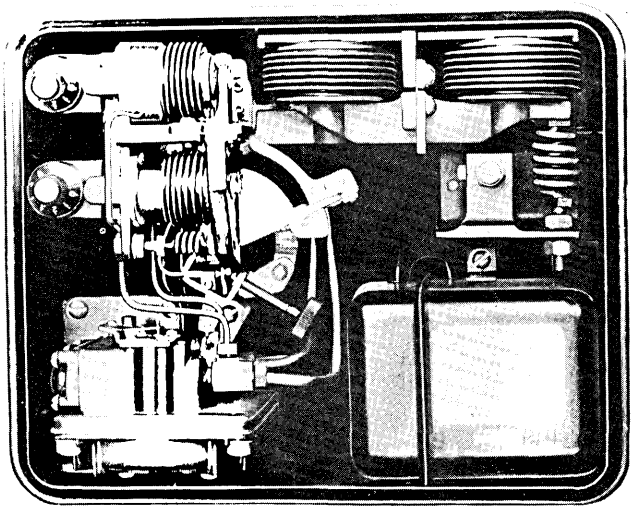
## COMPLEX MATHEMATICAL OPERATIONS PERFORMED BY PNEUMATIC ANALOG COMPUTER AND CONTROLLER

The Bailey Meter Company
1050 Ivanhoe Rd.
Cleveland 10, Ohio

This company has available a pneumatic analog computer that performs control functions as well as complex mathematical operations.

This device is designed for use in pneumatic computing-control systems for flow, pressure, temperature, etc., in power and process industries. The equipment is designated the Bailey Pneumatic Analog Computer and Mini-Line® Controller.

The pneumatic analog computer mechanism can be installed to perform various mathematical computations and control functions. The functions performed are determined by the manner in which external connections are made.



## TELEX T-3300 -- DATA SYSTEMS PRINTER

Telex/Data Systems Division
Telex Park
St. Paul 1, Minn.

The Telex T-3300 is the first of a series of line printers developed by this company. This will provide 300 line-per-minute speed at a cost comparable to character-at-a-time units and includes all features of more expensive devices.

The T-3300 has a density of ten characters per inch, 64 character types, 132 standard print positions, program-controlled line spacing, and character synchronization through a mechanically linked photodiode code-wheel system.

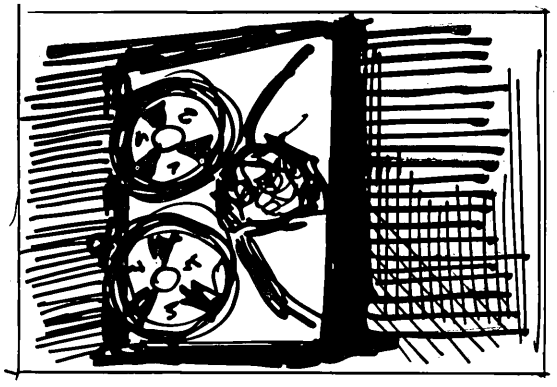
## NEW AUTOMATIC TYPEWRITER

Dura Business Machines, Inc.
a subsidiary of Dura Corporation,
Oak Park, Michigan

A new automatic typewriter for the production and reading of punched tape has been introduced.

This electro-mechanical machine (called the MACH 10) is designed to use the new sphere principle electric typewriter with interchangeable type styles. It produces punched-paper tape in machine language for other high-speed office machines, such as: communications equipment, high speed computers, tabulating equipment, embossing and addressing machines, and numeric controlled machine tools.

The MACH 10 has a standard typewriter keyboard. While an original letter or information is being typed, a tape is produced. The tape is then re-inserted as the control for the automatic production of additional typings. The tape can be perforated at the speed of 3 words per second, under either manual or automatic operation.



## MAGNETIC-TAPE CERTIFIER

Cybetronics, Inc., Waltham, Mass.

This firm has developed an automatic inspection system for locating defects which may cause loss of information in tapes used for computers, instrumentation, telemetering and control systems.

The tape certifier inspects magnetic tape on its present transport. All channels of the tape are inspected simultaneously at preset densities of up to 560 bits per inch, in a single pass at full transport speed. The transport can be returned to regular service as soon as the certification is completed.

## PROGRAM "ANALYZER"

Applied Data Research, Inc.
Princeton, N. J.

An IBM 709-7090 program "analyzer" has been developed by this company. The analyzer examines all instructions in an IBM 709-7090 program and produces a list. It cross references each operand address with the instruction and location affecting it. An entire 32,000 word memory can be analyzed at one time at output speeds of 640 instructions per minute.

This kind of program analysis is useful in locating errors during program checkout and in making changes to instructions and constants during and after debugging.

## SPECIAL PURPOSE TAPE TRANSLATOR

McDonnell Aircraft Corp.
St. Louis 66, Mo.

The McDonnell Automation Center has developed the Interface Model 73, a small self-contained special-purpose tape translator.

This device can be used for connecting a variety of digital tape transports to the IBM 7000 series computers. Its operation is automatically controlled with a minimum of manual adjustments.

Features included in the Interface Model 73 are: (1) modular construction; (2) solid state circuitry; (3) regulated power supply with metered outputs; (4) optional manual reset control; and (5) adjustable outputs to accommodate a variety of environmental noise conditions.

## INDICATOR TUBE OPERATES OFF TRANSISTORS

Amperex Electronic Corp.
230 Duffy Ave.
Hicksville, L.I., N.Y.

An indicator tube designed specifically for use with transistors has been developed.

Designated the type Z550M, it is a cold cathode, gas-filled tube which requires less than 5 volts at less than 50 microamperes to produce a discharge. The indication is a bright red neon glow which is viewed through the dome of the tube envelope.

# NEW COMPONENTS

### HIGH SPEED, MAGNETIC STORAGE DRUM

Cognitronics Co.
Briarcliff Manor, N. Y.

A small-space magnetic storage drum Model 4-20 is available. This device provides a high-speed storage component for data reduction and processing systems with pulley and belt drive permitting selected drum speeds to 25,000 rpm. The drum has a capacity of up to 50 tracks with individually adjustable heads. Head inductance per coil is 65 microhenries. Normal playback signal of 40 mv is obtained at 2400 ips.

Matching read-write printed circuitry is available.

### TELEX MASS MEMORY SYSTEM

Telex/Data Systems Division
Telex Park
St. Paul 1, Minn.

This company has developed a mass memory system. The two models, Telex I and Telex II, are disc file memories, which combine large storage capacity and rapid access time.

The Telex I uses sixteen 31-inch discs to store more than 154 million bits of information. The Telex II has 64 discs which provide capacity in excess of 617 million bits.

### NEW POWER SUPPLY CIRCUIT TECHNIQUE

Atlas Controls Inc.
Natick, Mass.

A new power supply circuit technique which offers advantages over the conventional transistorized series regulator has been developed by this company. One of its applications is in computer circuitry because it combines good transient response with low dissipation and minimum space.

The technique is called bilevel series regulation. This method has, it is believed, the following advantages over conventional or pre-regulated units: (1) an estimated 20% to 30% higher efficiency; (2) fewer series elements and capacitors; and (3) in certain applications at low temperatures and high currents, where aluminum electrolytic capacitors are not suitable, this technique will make tantalum capacitors economically feasible in many cases.

### "ELECTROLIZED" DRILLS USED IN PREPARING CIRCUIT CARDS

Morse Twist Drill & Machine Co.
New Bedford, Mass.

The Philco-2000 electronic data processing system uses over 18,000 printed circuit cards. Many of these cards are made of epoxy resin glass fiber which is too rugged for conventional drills.

Philco engineers turned to high-speed steel "electrolized" drills manufactured by this company. "Electrolizing" a drill -- a patented process -- is done by coating its surface with a hard, dense alloy. This permits the tool to cut through such difficult materials as epoxy.

### CONSTANT CURRENT MEMORY CORE FOR WIDE TEMPERATURE EXCURSIONS DEVELOPED

Electronic Memories, Inc.
9430 Bellanco Drive
Los Angeles 45, Calif.

This company has designed a new computer memory core for use in computers used in adverse environments. It is called the ISODRIVE core.

This memory core does not require drive current compensation over a temperature range of -55°C to +100°C. It will be produced in 50 mil and 40 mil OD sizes.

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# PEOPLE OF NOTE

### GE'S HEAVY MILITARY ELECTRONICS DEPARTMENT HAS NEW MANAGER

Fred Gangberg has been named Manager--Administration & Personnel for the Systems Operation of General Electric's Heavy Military Electronics Department, Syracuse, N.Y.

NEW MARKETING MANAGER AT AERONUTRONIC

Steig Gavelin has been appointed manager of Marketing for Electronics Operations at Ford Motor Company's Aeronutronic Division in Newport Beach, Calif. He has been with Aeronutronic since 1959 and was formerly manager of Market Planning and Analysis.

THE SCOTT AWARD -- 1961

J. Presper Eckert (left) and Dr. John W. Mauchly (right) have been awarded the John Scott Medal for their contribution to the welfare of mankind by the invention of the first electronic computer. Eckert and Mauchly built the first electronic computer, ENIAC, 15 years ago at the University of Pennsylvania. Designed to compute firing tables, the computer was also put to work on other scientific problems.

Later they built UNIVAC, the first commercial electronic computer. The company which they formed was later absorbed by Remington Rand.

Eckert is now a vice president of the Remington Rand UNIVAC division of the Sperry Rand Corporation.

Two years ago, Mauchly founded Mauchly Associates of Fort Washington, Pa. The firm specializes in the applications of new mathematical techniques to the solution of management problems.

The Scott Award was founded in 1816; its medal is inscribed "To the most deserving". There are years in which no one receives it. Among others who have received this award are: Marie Curie, Orville Wright, Dr. Jonas Salk, Sir Alexander Fleming, Charles Kettering, and Dr. Vannevar Bush.

SOUTHLAND ELECTRONICS LEADERS NAMED TO DIRECT 'WESCON'

Leadership of WESCON (Western Electronic Show and Convention) for 1962 has been given to four Southern California electronics executives.

Donald C. Duncan, president of Duncan Electronics, will serve as chairman of the 1962 WESCON board.

Bruce S. Angwin, western regional manager of GE's receiving tube department, will be Chairman of the executive committee.

Edward C. Bertolet, vice president of Behlman-Invar Electronics is convention director.

S. H. Bellue, vice president of Osborne Electronics, will be show director.

The 1962 Western Electronic Show and Convention will be held in the Los Angeles Memorial Sports Arena August 21-24.

ROYAL McBEE CHOOSES OVERSEAS CHIEF

John F. Ballard has been elected president of Royal McBee International, Inc., a subsidiary of the Royal McBee Corporation. Mr. Ballard formerly was general manager of Royal McBee Nederland, N.V., a Dutch subsidiary and vice president in charge of sales for Royal McBee International. He is succeeding A. F. Niendorff, who has retired.

F. J. Berrendorf, successor to Mr. Ballard as general manager of Royal McBee Nederland, has been elected senior vice president of Royal McBee International.

## A REPORT ON COMPUTERS AND WAR SAFETY CONTROL

*(Continued from Page 16)*

There is already existing a very fine model of War Safety Control: International Air Traffic Control. It came into existence because farsighted men of many nations saw that air transport had to be international and world-minded, and so air traffic had to govern itself well enough so that national governments would leave it alone to expand. Among other things, Air Traffic Control makes the traffic rules around airports, so that every airplane flying into an airport, no matter what its nationality, knows just what it is supposed to do—so as to avoid collisions which everybody wants to avoid.

Why not make a similar control system so that nations avoid other collisions that almost everybody wants to avoid?

Of course those people who want to fish in troubled waters will not like War Safety Control. Those people who make their living out of whipping up sentiment against someone else and exaggerating dangers from other countries will not like War Safety Control. But the great majority of people who want to stay alive in the face of danger from nuclear war should welcome a world-wide system: (1) for showing that some highly exaggerated collisions are fictitious; (2) for signaling ahead of time when nations are on a collision course and signaling soon enough so that the collisions can be avoided.

Of course, if two nations want to collide, and the two nations are among the biggest nations in the world, then it is hard to imagine how collision can be avoided. But so long as a powerful majority of each nation wants to avoid the collision, then it should be possible to organize a control system to focus on possible collision courses and point out other paths that do not involve collisions.

### Spying and Not Spying

Now about spying. There are many kinds of ways of gathering information. You can read books, articles, papers, published in Country M. This is fair. You can say to people in Country M that your job is to help run the War Safety Control organization—won't they please answer your questions? That is fair. Or you can conceal who you are and what you are trying to do, and try to dig up information under false pretenses. This is not fair; this is spying. And no honorable man will do this kind of thing. And worse still, you can threaten death to get information out of people. This is not fair; this is torture, and this is wrong.

But there are other ways of gathering information besides asking people and reading reports; you can make observations and you can gather information with machines. In regard to observations, take for example the problem of War Safety Control and guided missiles. In order to guide a missile to its target, high precision gyroscopes and accelerometers are necessary in an inertial guidance system. (See the chapter "Inspection for Disarmament: High Precision Gyroscopes and Accelerometers" by Eugen A. Avallone, Asst. Prof. of Mechanical Engineering, City College of New York, in the book "Inspection for Disarmament" edited by Seymour Melman, Columbia Univ. Press, New York, 1958). The modern gyroscope, and the accelerometer also, must be *extremely* small, precise, light, and reliable; and the gyroscope itself may be no larger than a ping pong ball. The bearings and gears required are two key elements for constructing this kind of device. If an aggressor should contemplate a surprise attack with 200 missiles, he would probably need 1500 gyroscopes and accelerometers. Yet in the United States there are only about half a dozen plants capable of taking on this production quota. Machine tools needed for the purpose would total about 900. The employees needed to produce them would be about 1400. Some of the machine tools (jig borers for example) are very special. Also, electric power requirements would be high. The following could be observed by a War Safety Control force: large plant size; the size of an employee population; use of considerable power; ultra-precision machine tools. If a nation was cooperating with War Safety Control, no spying would be involved in these observations.

In regard to gathering information with machines, take for example the time when the stopping of underground nuclear tests was still being seriously discussed in Geneva. At that time Dr. Hans Bethe of Cornell proposed supplementary inspection stations of robot machines. Like the weatherman's radiosonde that rises through the air giving signals of temperature, pressure, wind direction, etc., the robot inspectors would make reports automatically to central manned inspection stations, about earthquake movements in their vicinity. They would be unable to spy; their locations and their specific capacity to report would be precisely known.

Any information-gathering system approved by Country M and Country N and used fairly and equally in both Country M and Country N ought to be acceptable. So I see no need whatever for drawing a parallel with the police state of George Orwell's "1984." Between black and white there are many shades of gray; between maximum forced extraction of information and minimum hit-or-miss or biased gathering of information, there is the stage of reasonable, agreed upon, gathering of information. Besides, human society for a long time to come will contain people who would rather die than be informers on their family and friends (unless a crime has been committed). An eyewitness once told me of a Jew in a concentration camp in Nazi Germany, who was found out to be part of a group of prisoners who had constructed an illegal radio for listening to the British Broadcasting; he was a little unprepossessing man, but for fear that he would inform on his friends under Nazi torture, he committed suicide with poison. I don't even know his name, but I admire him deeply.

### Uncolored Information

The information produced by a multi-national technological War Safety Control system ought to be interesting and important. Perhaps best of all it would tend to remove the provincial coloring of news which takes place in almost all newspapers over the world,

the childish casting of all drama in terms of good guys and bad guys.

Also, it helps the pushers of buttons know the meaning of pushing them. I wish that every captain of a Polaris submarine could journey to Moscow and Leningrad, Stalingrad and Vladivostok, so that he would see at first hand the men and women, little girls and boys, and babies, who will be destroyed by the hundred thousand when he presses the button for the Polaris submarine missile. And I wish that every Russian officer who is charged with launching missiles from hidden bases in Russia could visit New York and Chicago, Boston and Los Angeles (that is an easy target because the area is so dry that any large fire there is likely to produce a firestorm), so that he could see the men and women, school children and babies whom he will destroy by the million when he presses his button. The existence of War Safety Control would lift from both of these officers the dread and horrible burden which now rests on them.

### The Role of Computers

In War Safety Control, a prominent role must be played by computers. In the first place, if exactly the same program is used for handling the information coming in, no matter which country is being assessed, we ought to have a guarantee that there would be far less bias in the results produced by the computer, than if the results were produced by human beings calculating. The increase of objectivity would be most valuable.

In the second place, there will undoubtedly be a vast quantity of information to process, and only a short time available to process it. This compels the use of a computer.

In any problem in which there is too much information for human beings to handle easily, a computer is likely to be useful. If there is too much information for the computer to handle easily, then since not all information is equally important, the computer can be programmed so that it pays attention to information in the sequence of its importance. Methods of successive approximation are well known and can be used in many ways.

Third, to achieve War Safety Control, a great deal of research and development can be usefully done. Large government contracts are possible and likely. War Safety Control is likely to contribute more to the safety of countries than additional weapons. After all, after you have enough overkill capacity to kill everybody in enemy Country N three times, why invest in overkill sufficiently to kill them 5 times over? Why not invest in something like War Safety Control?

Besides, War Safety Control (unlike Arms Control or Disarmament) does not require or imply any present reduction of existing armaments. Only if at some future time War Safety Control is demonstrably working and working well, then it will become reasonable to reduce armaments. The expense of adequate War Safety Control, however, either fortunately or unfortunately, is likely to be large; and so the loss of future defense contracts may be more than balanced by the acquisition of War Safety Control contracts.

Finally, from the point of view of keeping alive 100% of the people of the United States and other countries, War Safety Control offers the promise of prevention, rather than the devastating "cure" (if it can be called that) of nuclear retaliation.

## 3. SOME THOUGHTS ON "CONTROL OF WORLD CRISIS"

**Ned Chapin**
**Associate Professor**
**San Francisco State College**
**San Francisco, Calif.**

### Author's Proposals

Let me organize my thoughts about Howard G. Kurtz's 1961 report entitled "The Future Research Challenge:—Control of World Crisis," into the following major categories: the author and his audience, what the author proposes, the benefits the author claims for his proposals, the arguments the author advances, and my comments. In setting down some of my thoughts, I shall limit myself to a discussion of Mr. Kurtz's proposals for "War Safety Control" (hereafter referred to as WASCO).

Mr. Howard G. Kurtz is a senior associate in the management consulting firm of Handy Associates, Inc. in New York City. He with his wife, Harriet B. Kurtz, are authors of the article "War Safety Control," which appeared in October in *America; National Catholic Weekly Review*. Mr. Kurtz graduated from the U. S. Army Flying School in 1929 and has had extensive experience with Pan American World Airways, American Overseas Airlines, and American Airlines. He holds a college degree in the field of industrial engineering.

Mr. Kurtz prepared his report for the Foundation For Instrumentation Education and Research in New York City. It would be expected that a report prepared for such a group might include a discussion of ways of identifying and cultivating markets for instruments and equipment. Some pages in the report do carry a discussion of these topics, but these topics are not the heart of this report. The report is really directed toward a larger audience of anyone working in the technical or scientific pursuits for it is this group to whom the author appeals for support.

The author's four main proposals I shall identify as proposals A, B, C, and D. Proposal A is long-range, for the author proposes that a WASCO organization of world-wide scope be established operating under the United Nations or its successor. The mission of the WASCO organization would be to make possible a war-safe world to protect the people of all nations against future war. In form and operation, it would be a military organization but would be beyond the reach of any veto power and would lie outside the sphere of domination by any interest group or nation. This WASCO organization would have armaments superior to any national military might (it would have a "world monopoly on safety strength"). In carrying on its day-to-day functions, it would place great stress on non-lethal weapons, on inspection, and on analyses of voluminous data of military concern throughout the world. The WASCO organization

would not supersede the military efforts of individual nations, which for example would continue to use such techniques as spies, the author proposes.

Proposal B advanced by the author is a near-term proposal because the author is of the belief that Proposal A could not be implemented immediately. For immediate implementation, the author proposes that each major nation (and the United States in particular) do several things: increase the responsibility of its primary administrative officer (such as the President of the United States) to include providing leadership toward WASCO; increase the responsibilities and hence probably also therefore the staff of the foreign affairs officer (such as the Secretary of State) to handle the international and political details involved in implementing WASCO; increase the responsibility and hence probably also the staff of the services supplying and obtaining data from foreign nations, as for example, providing propaganda for WASCO; and increase the responsibilities and hence probably the staff of the military establishment and its various arms by including among their functions, the development of embryonic techniques and forces which could be later used by a WASCO organization.

The author believes that proposals A and B could not be effective without his C proposal. In this, the author advocates active research and development work to develop the capacity to control world crises, to declare scientific war on war, to clarify the public need for national security, to create new and improved military technologies that could be used by a WASCO organization, to find new political forms and organizations that could make WASCO effective throughout the world, and to make new social and political inventions that could be used in implementing WASCO.

The author believes, however, that proposal C would not be undertaken unless his proposal D is accepted, and hence he presents proposal D as his major near-term proposal. In this, the author advocates that scientists and technicians throughout the world (and specifically in the United States) rise up and discredit the "experts in national security" by declaring at least that proposals A, B, and C are technologically feasible.

For WASCO as outlined in the author's proposals, the author claims a number of benefits. In the first place, the author claims it would end war and bring world crises under control. Second, he claims it would assure freedom from war for all nations. Third, he claims it would offer a course of action which involves neither the advantages nor disadvantages of either militarism or pacificism. Fourth, he claims it would assure freedom for each nation and assure that each nation would be free from the control or domination of its government or of its economy from any other nation or from the United Nations. Fifth, he claims it would require for its implementation no surrender of national sovereignty by any nation. Sixth, he claims it is something that the peoples of the world will come to realize offers the only way they can find the safety and security essential to life and progress.

Among the more important of the arguments the author advances in support for these proposals and his claimed benefits are the following: each nation fears foreign military power and each increase in such power increases world insecurity—WASCO would allay these fears; people will demand WASCO; any disarmament in effect negotiates away any nation's security; world security is becoming scientifically possible to achieve; WASCO would not be world government; and the future security of any nation cannot be assured by increasing the military budget and it cannot be assured by a continuance of any strategy of defense and deterrence such as that presently nominally followed by the United States.

### Reviewer's Comments

In brief, Mr. Kurtz appears to have advocated three things. First, he advocates an increase in governmental functions and bureaucracy. The trend of government has been to more and bigger, so this seems like nothing new, although it may be more palatable to Democrats than to Republicans in general. It is certainly acceptable in general to most civil servants for well-known reasons. Second, the author advocates the development of new techniques for waging war, including non-lethal weapons and extensive intelligence systems. To some degree, this is the present policy of this nation, and as such, it is likely to receive a warm reception from some quarters.

Third, the author advocates research and development to find some way to take the two previous points from the individual nations that have developed them, and to put them under the control of the United Nations. If the equivalent operation be done to individual persons, it smacks of confiscation. If done on a national basis, it would appear to be equivalent to a loss of sovereignty, because in practice, most nations seem to equate liberty and sovereignty on the international level. With support as weak throughout the world as it is for the United Nations, it seems unlikely that nations could be induced to give over to the United Nations things which they have at great cost developed as a de facto part of their national function. In short, it seems to me that Mr. Kurtz's claim to the contrary notwithstanding, the real question is one of political feasibility, and partly on an international level.

My comments on this report—or more properly, tract—prepared by Mr. Kurtz are not numerous. First, the appeal of this tract is emotional. Some of the tone of the tract can be sensed from some of its phrases: "bold new vision," "moral and political leaders for the first time have . . . a choice," "beyond the imagination," "fabulous new challenge," "bold new action," "majestic competition," "mammoth next challenge," "majestic new U. S. Grand Strategy," "fantastic proposition," "magic spell," etc. In general, the emotional appeals in this tract appear to ride on the coattails of the strong sentiments that can be aroused in anyone who experienced the loss of loved ones in a war, or who has witnessed at close range, while living through a war-time period, the concomitant destruction and degradation of human beings, human values, and human worth. Because of its stress on the emotional appeal, this tract will win few friends among the audience that the author is presumably trying to woo, the scientific and technical community. Most

persons in that community prefer even the emotionally attractive proposals to be rationally defensible.

The tract is badly organized and this greatly weakens it. There are violations of logic in its organization. The organization is neither good journalistic organization nor good expository organization. The author has not even made his proposals in clear specific form. The author has mixed statements of his proposals with statements of the benefits he claims and with his arguments, and the result is an organizational mish-mash. In different sections, the author appears to be advocating different things because his organization fails to show clearly the relationships and subordination among the proposals, arguments, and claimed benefits.

The arguments advanced by the author appear generally weak. In some cases, such as the "will demand," the "not world government," and the "allay fear" arguments, the author makes simple statements and leaves them unsupported. Other arguments such as the "national security" and "disarmament" arguments, have well publicized counter arguments which the author dismisses or disdains to note, except by referring to some of their supporters as "medicine men." Other arguments such as "world security becoming scientifically possible" could have been advanced with as much soundness in 1700, in 1800, and in 1900, as today.

In general, the author in advancing his arguments ignores the host of alternative proposals that have been advanced by others in this area. The author's arguments in this tract rarely attempt to defend his proposals against other proposals in a comparative sense. Rather the arguments rallied by the author generally appear to be designed to deflect the reader's attention away from the alternative proposals rather than to show the alternatives as deficient or defective. By thus ignoring the alternative proposals, the author in effect seems to leave them still standing.

A serious sin of omission, in my opinion, is the author's failure to draw and observe clearly an important distinction. He allows to be inferred that the technical feasibility of an alternative is a measure of the desirability of that alternative. In general, this doctrine is known widely to be often false. The fact the author tacitly calls upon it extensively does not strengthen the author's tract. Many of the persons who signed their names to a statement that appears on page three of the tract undoubtedly felt that they were expressing an opinion only about technical feasibility, yet their expression has been used in a way that makes it appear that these persons endorse the proposals in the tract as being the most desirable of all alternatives that have been advanced in this area.

The police state tone to this tract I find very disquieting. The author advocates sending "fast boats chugging about the busy harbors" and "up the rivers" anywhere in the world, and "the high seas and even remote shores" he advocates be on a regular patrol. The author advocates the routine presence of "inspectors in factories" and the use of "border patrols." The author advances no permitted substitutes for domestic revolution, for all domestic military power he proposes be controlled down to the level of domestic police requirement. And the author advocates that "every citizen become an intelligence agent for the safety of mankind."

These proposals smack of the type of political organization discussed in George Orwell's *1984*. The training of the citizen begins in the home, it will be recalled, and Orwell tells of the child who informs upon his parents for the safety of "mankind" (which is identified with the state). The author indicates that the WASCO organization, instead of being a "dread 'big brother' spying in every maiden's window, . . . will be formed to (instead in) the highest and noblest traditions as the friend and protector of people of all patriotisms and of all beliefs . . . (The personnel of the WASCO organization) will be trained to be welcomed as firemen who will sacrifice their lives, if necessary, to put out the fires of war before the flames destroy the citizens they are protecting." Such passages are more than slightly suggestive of the "doublethink" needed to foist off on the people a police state.

## 4. COMMENTS ON "CONTROL OF WORLD CRISIS"

**John W. Carr, III**
**Research Computation Center**
**University of North Carolina**
**Chapel Hill, N. C.**

I am very pleased to see Mr. Kurtz's proposal being circulated, although I question some of the ideas, myself, that he proposes. The more such ideas that are produced, the more likely that we will obtain a workable system for solving the present-day problem, composed out of national sovereignty and scientific speed-up, all rolled into one. I certainly appreciate your willingness to publish this, and hope that the ideas will be discussed, debated, and evaluated by all of your readers.

I think Mr. Kurtz has proposed one possible way, not of sublimating man's past and presently continuing desires to fight, but of, in some way, corraling it. He does not, except briefly, face up to the problem of the vested interest already present, particularly in the United States and the Soviet Union, in the continuation of large defense establishments. Instead, he appears to propose, as the only solution, the creation of a supra-defense organization, with its own research and development (and fund granting) agencies, its own defense contracts, its own Pentagon, perhaps its own service academies, its own WACS, WAVES, or WAFS, etc. Although the latter burdens are apparently important enough for me to accept at the present time, I would need more and better arguments than Mr. Kurtz has produced to convince me of the usefulness of their duplication on another level.

If Mr. Kurtz's proposal is the only possible way of solving the problem (and I am not even convinced it is *a* way of solution), then I would certainly accept it. On the other hand, there are many options that might still sublimate the natural human tendency for brawling and at the same time perhaps allow transferral over a period of time without undue dislocation, of much of the work of the defense establish

ments into more effective channels as far as world security is concerned.

One obvious area is that of the exploration of space. The United States has failed, it appears to me, to make use even of the resources of her friends and allies around the world in this much less military of operations. If one started first with a NATO project, might not later a joint US-USSR-United Nations project for colonizing the moon (or Mars) be a useful way to let off the pent-up energy built up within all of the defense establishments? The National Geophysical Year showed that scientists can cooperate far beyond their governments. Given common goals, might not both scientists and governments from differing national states cooperate in a fashion mutually beneficial to all?

Their worst critics have never accused, as far as I can learn, the leaders of the Soviet Union of knowingly acting against their own interests. The present political leaders are closely related to the present scientific leadership. Should there not be common, supranational activities which the governments and scientists of the USA and USSR could find of mutual interest? Perhaps "War Safety Control" is such an activity, but there may also be other, more quickly accepted ones, more reasonable as well. I, myself, would prefer to have a few less indigenous Communist parties, a few less CIA's, a few less atom bomb stock-piles, in my brave new world of the future—and also, hopefully, no need for telemeters on freight cars reporting to headquarters, "war safety games" on computers, individual nations with "their own spy networks" to find out cheaters and "their own counter-spy experts trying to fool" the system.

I am all for Mr. Kurtz speaking out, often and long. I think his scientifically oriented document leaves out much of the realities of life: religious and political theology, economics, population growth, various standards of living, even people, to the knowledge of which the humanists, as well as scientists, could contribute. I somehow suspect that, like Technocracy, a scientist-only future will not work. Without including scientists, on the other hand, the future power-pattern is unpicturable. Let's talk about Mr. Kurtz's "War Safety Control," for contrast's sake, but let's also ask for much deeper and much more realistic descriptions of what is possible (and desirable) in the future.

## 5. COMMENTS


### Dr. Theodore P. Wright

**President, Flight Safety Association**
**Chairman, Cornell Aeronautical Laboratory**
**Formerly Vice President, Research, Cornell Univ.**
**Ithaca, N. Y.**


In the consulting report entitled "The Future Research Challenge—Control of World Crisis," Howard G. Kurtz discusses at some length his concept of War Safety Control systems.

Howard Kurtz has been working for a considerable number of years on this problem. One of his first documents, entitled "Common Man Up in the Air," had a very wide circulation and a very large and favorable response. In this he develops the theme that fear is a universal factor and uses as background his experience in air transportation. He has then prepared subsequent documents leading finally to his War Safety Control concept. One of the principal requirements for establishing any system that will be effective is to make it so sound, both in concept and in operation, that all nations including Russia and the U. S., will have a feeling of increased security.

In order that War Safety Control may be effective, all nations must really want peace. This is the first difficulty we encounter since we must ask the question, "Do all nations really want peace?" Probably the people of all countries do, but whether all governments do is certainly to be questioned. This implies that one of the important barriers is censorship and "iron curtains"; how can they be penetrated? No system can be put into effective use if outside views are withheld or distorted when presented to the people of a country.

A second barrier is the stated determination of some nations such as Hitler Germany (and in the opinion of many people the Soviet Union) to achieve world domination. This is, of course, directly opposed to the whole concept of War Safety Control.

One should ask, "What do we have now in the way of world organization which is presently quite effective in preventing or reducing the size of wars and which could be used as the base for War Safety Control operations?" There is, of course, the United Nations. I therefore think that it is extremely important that the United Nations receive the unqualified support of all those who are interested in achieving world peace. One factor of the War Safety Control program is a United Nations enforcement agency or police force.

In the consulting report to which I referred to above, Kurtz goes into great detail concerning the War Safety Control concept. This is essentially an inspection system. Even the achievement of world inspection against arms buildup is in itself difficult as indeed is indicated by Russia's opposition to H-bomb testing moratorium. China's attitude is also to be reckoned with. In short, all nations of the world must have the will to achieve peace. Certainly military preparations in an H-bomb-missile age, do not assure security for anyone. We now even doubt whether military preparations will be effective in deterring the start of World War III, whether this is triggered by accident or by desire on the part of some nations.

Kurtz brings out the fact that his suggested system must be developed gradually, starting out by organizational setups in each nation. Here he indicates that present government departments can continue to function with added responsibilities placed on them pointing towards peace rather than war. He cites the National Security Council, the State Department, the Defense Department, and the Information Agency as groups who would have such functions added to their present responsibilities. With these national efforts, the job could then gradually be shifted into the United Nations on an international basis.

The inspection systems which will be necessary, many of them of an electronic nature, must be studied by scientists and they, through research must be able to state that the job can be done. After this is so stated, then it is up to leadership in government to proceed as rapidly as practicable. Of course, this whole thing is tremendously expensive but one must note that it will undoubtedly be far less expensive than present military buildup costs.

Mr. Kurtz goes into the operations of the War Safety Control under the United Nations in considerable detail. He touches on the inspection system coordination and particularly, enforcement to prevent infractions to the rules which have been established. Here he brings in the U. N. police force operating in the air, on the sea, and on land and the types of weapons that they could presumably use. The operation of an international air police force is one to which I have given considerable attention in the past and I believe it can be made to work. He then cites the need for U. N. political surveillance of the police force which might have been established in order to assure that this force itself does not get into a dictatorial use, thereby itself becoming a menace.

In the survey report, Mr. Kurtz brings out several specific things which I believe voluntary organizations can help to implement. He gives very apt examples and analogies to show what he is getting at in these passages of the report. For instance, on page 7, he indicates the need for silencing the voices of those wanting to continue military buildup solely because of their selfish interests. On page 8, he indicates the need for establishing public credibility for the whole concept. Then on page 9, he indicates the need for silencing the voices of those whom he designates as experts who state, "It can't be done." And finally, on page 12, he indicates the need for impressing on the public that the U. N. with increased responsibilities for the War Safety Control function is not world government but as a matter of fact, is quite the reverse as this whole system points towards development of nations along their own lines but under the assurance that War Safety Control will make it possible for them to progress without fear of other nations.

I can assure you that this whole job is such a big one that one must not be impatient but rather persistent, and that one must not be afraid as fear destroys rationality.

## 6. RESEARCH PROGRAM ON ARMS CONTROL

**Dr. L. C. Van Atta**
**Director Hughes Research Laboratories**
**Malibu, Calif.**

High-level support for a research program on arms control is rapidly increasing, both in the Pentagon and in the new U. S. Arms Control and Disarmament Agency. The trend is toward increased emphasis on a unilateral program of action and on tension reduction as a means toward national and world security. I am now working with Mr. Franklin P. Huddle of ODDR&E in the Department of Defense on a comprehensive Arms Control plan incorporating some of these new concepts. This report should be distributed early in 1962 as an unclassified document. I hope it will provide guidance to the many who have shown an active interest in this subject.

## 7. COMMENTS

**Chauncey D. Leake**
**Chairman, Board of Directors**
**American Association for the Advancement of Science**
**Hamilton Hall**
**Ohio State University**
**Columbus 10, Ohio**

I am glad to know that **Computers and Automation** is making a report on the proposed program, "War Safety Control," as suggested by Howard G. Kurtz. The really important matter about this proposition is to get a clearer understanding as to whether or not it is technologically possible. Your readers should be in an excellent position to pass judgment on this important point. If the answer is "yes," then it would seem to me that it would be worthy of an all-out effort on the part of research scientists all over the world to help put it into effect.

## 8. COMMENTS

**Morton M. Astrahan and S. L. Janofsky**
**San Jose, Calif.**

We are glad of the opportunity to comment on "Control of World Crisis" by H. G. Kurtz. We do not feel that devoting a lot of space in **Computers and Automation** to this proposal will help the cause of world peace. The style of the report, e.g., the lavish use of bold face capitals and the discrediting a priori of everyone who might venture objections, is all rather shoddy, and reminds one of a patent medicine ad guaranteeing to cure all our illnesses with unspecified ingredients. The report is filled with O.K. words, organization charts, and scientific gadgets, but it glosses over the enormous and universally recognized problems which are social and political, not technical.

To say that the technological means are at hand to guarantee the safety of the world from war is dangerous nonsense. To suggest that so many dollars and so many executive orders and so many break-throughs and so many war safety games will lead *inevitably* to a world safe from war is not science but a cult prophecy.

As to the proposal to guarantee the peace with an all-powerful military force, we feel with Lord Acton that "Power corrupts, and absolute power corrupts absolutely."

Only one page at the end of the report is devoted to raising some of the tough political questions which are the really important issues. These questions have all been raised more articulately elsewhere; and more thorough, if less pompous, efforts have long been under way to answer them.

By all means let us endorse a simple proposal to apply, to a study of how to prevent war, some of the kind of organized effort that it is so tragically easy to apply to studying how to wage war. But let us not burden this effort by starting with "The Solution."

## 9. COMMENTS

**Andrew D. Booth**
**Department of Numerical Automation**
**Birkbeck College**
**University of London**
**London, England**

Mr. Kurtz presents at considerable length a synopsis of what in fact amounts to George Orwell's "1984." There are two points on which his proposals should be judged. The first of these, effectiveness, the second, practicability. On the point of effectiveness obviously any opinion one might give is an entirely personal one. I would have thought that in a world dominated by politicians who appear to be unwilling and undesirous of making concessions in the interest of international unity, the possibility of obtaining acceptance for the War Safety Control proposals was very small indeed. On the score of practicality, I think that there is no doubt that, at the present time, the idea of a central computer keeping track on all people and material is not possible at all.

The largest computers at present in existence, and even those which appear likely on the five-year basis, have storage capacities whose inadequacy may be reckoned by the fact that they would be incapable of storing, for example, all of the coded information regarding existing world patents. How much therefore are they likely to fall short of the requirements for Mr. Kurtz's proposals? Quite apart from this, one can think without undue difficulty of many means by which the War Safety Control proposals could be overcome. It is hardly worth entering into details of these here, because the ideas as a whole seem so impractical.

In saying these things, I should make it clear that I in no way imply any lack of genuineness on Mr. Kurtz's part. Obviously any sane man, and this appears to exclude all politicians, wishes for world peace. When one talks to the people in Moscow, New York, London, Paris, and so on, all are concerned for the avoidance of war. If one reads the political utterances which appear in the papers, however, it is quite clear that the politicians, and presumably their masters, the military, are most unlikely to fall for this line at all.

## 10. SOME REBUTTAL

**Howard G. Kurtz**

Our objective is to stir up the widest possible pro and con discussion on the credibility of the War Safety Control concept, but the comments in A. D. Booth's letter to you of November 29th give no evidence that he even took time to read the report through before commenting.

Your letter made it clear to him that you asked for evaluation within the field of his own special competence. Once he leaves the laboratory in which his judgments have some validity, he lives in a tortured world in which all politicians are evil men conspiring to destroy the world . . . and in which all politicians are insane, etc. There is no credibility in this kind of comment.

There is no suggestion in my report for "a computer keeping track on all people," or of any "Orwell 1984" or of any of the features he holds up to object to.

The problem is back here in the world of reality. If the Kremlin should conquer or dominate the world, it would certainly set up a military system commanded from Moscow, to try to make certain that no nation ever attempted to mobilize national military forces to threaten, or wage war; such a world-wide war-prevention system would be conceived and operated.

Without waiting for that event, are we capable of visualizing a more moral concept of a world military safety organization capable of assuring that no nation could mobilize or threaten war on other nations, while assuring the national independence and political sovereignty of each nation? There is increasing realization that the technology that creates weapons of war also is capable of creating the enforceable safety disciplines to see that those weapons cannot be used.

A great deal of comment and criticism and disagreement is needed on this real problem which was raised.

I would welcome Booth's criticisms after he had read the report through.

## 11. COMMENTS

**Ralph H. Tripp**
**Past President**
**Instrument Society of America**

It is certainly clear that if the War Safety Control concept is to be taken seriously, one of the first steps must be to form a high level group of men together with the necessary facilities to study, plan and eventually make specific proposals and specifications bearing on the proposed project.

From the hardware standpoint it seems to me that the following projects are among those to be considered:

1. A study and delineation of those materials or items that will need to be monitored.
2. A study and evaluation of the conditions under which the subject monitoring must be done.
3. Using results of the first two steps mentioned above, design and fabricate, inventing if necessary, instruments that will perform the required function.
4. Evaluate the number of inputs to be expected from the various monitoring instruments and plan a communications network and a display system that will be reliable and readily understandable.

I trust that these ideas will be a contribution in crystallizing this movement.

## 12. COMMENTS

**H. Burke Horton**
**Former Director of Operations Research**
**Office of Civil & Defense Mobilization**
**Executive Office of The President**

If we believe in survival, we have to believe ultimately in some rational world control of weapons. The technical talents which produced these weapons must now provide effective means for their control. Control of world crisis, or War Safety Control, is the next challenge. It is a credible next research and development goal.

# CALENDAR OF COMING EVENTS

Jan. 15-17, 1962: Symposium on Optical Character Recognition, Dept. of the Interior Auditorium, C St. between 18th & 19th St., N.W., Washington, D. C.; contact Miss Josephine Leno, Code 430A, Office of Naval Research, Washington 25, D. C.

Feb. 6-7, 1962: Symposium on Redundancy Techniques for Computing Systems, Dept. of the Interior Auditorium, C St. between 18th & 19th St., N.W., Washington, D. C.; contact Miss Josephine Leno, Code 430A, Office of Naval Research, Washington 25, D. C.

Feb. 7-9, 1962: 3rd Winter Convention on Military Electronics, Ambassador Hotel, Los Angeles, Calif.; contact IRE Los Angeles Office, 1435 So. La Cienega Blvd., Los Angeles, Calif.

Feb. 12-16, 1962: 4th Institute on Information Storage and Retrieval, American University, Washington, D. C.; contact Dr. Lowell H. Hattery, Director, Center for Technology and Administration, The American University, 1901 F St., N.W., Washington 6, D. C.

Feb. 14-16, 1962: International Solid State Circuits Conference, Sheraton Hotel & Univ. of Pa., Philadelphia, Pa.; contact Richard B. Adler, Rm. C-237, MIT Lincoln Lab., Lexington, Mass.

Feb. 27, 28-Mar. 1, 1962: Symposium on the Application of Switching Theory in Space Technology, Lockheed Missiles and Space Co., 1123 No. Mathilda Ave., Sunnyvale, Calif.; contact Kenneth T. Larkin, Lockheed Missiles & Space Co., Sunnyvale, Calif.

Mar. 8-10, 1962: 10th Annual Scientific Meeting of the Houston Neurological Society, Symposium on Information Storage and Neural Control, Texas Medical Center, Houston, Tex.; contact William S. Fields, M.D., Symposium Chairman, Houston Neurological Society, 1200 M. D. Anderson Blvd., Houston 25, Tex.

Mar. 13-15, 1962: Symposium on Application of Statistics and Computer to Fuels and Lubricants Research Programs (Unclassified), Granada Hotel, San Antonio, Tex.; contact Roy Quillian, Southwest Research Inst., Box 2296, San Antonio 6, Tex.

Mar. 26-29, 1962: IRE International Convention, Coliseum & Waldorf-Astoria Hotel, New York, N. Y.; contact E. K. Gannett, IRE Headquarters, 1 E. 79 St., New York 21, N. Y.

April 2-5, 1962: Annual Meeting of POOL (LGP-30, RPC-4000, and RPC-9000 Electronic Computer Users Group), Penn-Sheraton Hotel, Philadelphia, Pa.; contact Dr. Henry J. Bowlden, Union Carbide Corp., P. O. Box 6116, Cleveland 1, Ohio

April 9-13, 1962: Business Equipment Exposition, McCormick Place, Chicago, Ill.; contact G. H. Gutekunst, Jr., Mgr., Press Information, Business Equipment Manufacturers Exhibits, Inc., 235 E. 42 St., New York 17, N. Y.

April 11-13, 1962: SWIRECO (S. W. IRE Conference and Electronics Show), Rice Hotel, Houston, Tex.; contact Prof. Martin Graham, Rice Univ. Computer Project, Houston 1, Tex.

April 16-18, 1962: Symposium in Applied Mathematics on "Interactions Between Mathematical Research and High-Speed Computing," at American Mathematical Society and Association for Computing Machinery Symposium, Atlantic City, N. J.; contact Mrs. Robert Drew-Bear, Head Special Projects Dept., American Mathematical Society, 190 Hope St., Providence 8, R. I.

April 24-26, 1962: 12th Annual International Polytechnic Symposium, devoted to "The Mathematical Theory of Automata," United Engineering Center, 345 E. 47 St., New York, N. Y.; contact Symposium Committee, Polytechnic Inst. of Brooklyn, 55 Johnson St., Brooklyn 1, N. Y.

May 1-3, 1962: Spring Joint Computer Conference, Fairmont Hotel, San Francisco, Calif.; contact Richard I. Tanaka, Lockheed Missile & Space Div., Dept. 58-51, Palo Alto, Calif.

May 22-24, 1962: Conference on Self-Organizing Systems, Museum of Science and Industry, Chicago, Ill.; contact Mr. George T. Jacobi, COSOS Conference Sec'y, Armour Research Foundation, 10 W. 35 St., Chicago 16, Ill.

May 28-June 1, 1962: Colloquium on Modern Computation Techniques in Industrial Automatic Control, Paris, France; contact French Association of Automatic Control (AFRA), 19, Rue Blance, Paris 9, France.

June 19-22, 1962: National Machine Accountants Association International Conference, Hotel Statler, New York, N. Y.; contact R. Calvin Elliott, Exec. Dir., NMAA, 524 Busse Highway, Park Ridge, Ill.

June 27-29, 1962: Joint Automatic Control Conference, New York Univ., New York, N. Y.; contact Dr. H. J. Hornfeck, Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, Ohio.

July 18-19, 1962: Data Acquisition & Processing in Medicine & Biology, Whipple Auditorium, Strong Memorial Hospital, Rochester, N. Y.; contact Kurt Enslein, Brooks, Inc., 499 W. Comm. St., P. O. Box 271, E. Rochester, N. Y.

Aug. 21-24, 1962: WESCON (Western Electronics Show and Conference), Los Angeles, Calif.; contact WESCON, 1435 La Cienega Blvd., Los Angeles, Calif.

Aug. 27-Sept. 1, 1962: 2nd International Conference on Information Processing, Munich, Germany; contact Mr. Charles W. Adams, Charles W. Adams Associates, Inc., 142 the Great Road, Bedford, Mass.

Sept. 3-7, 1962: International Symp. on Information Theory, Brussels, Belgium; contact Bruce B. Barrow, Postbus 174, Den Haag, Netherlands

Sept. 3-8, 1962: First International Congress on Chemical Machinery, Chemical Engineering and Automation, Brno, Czechoslovakia; contact Organizing Committee for the First International Congress on Chemical Machinery, Engineering and Automation, Vystaviste 1, Brno, Czechoslovakia.

Oct., 1962: National Symposium on Space Elec. & Telemetry, Miami Beach, Fla.; contact Dr. Arthur Rudolph, Army Ballistic Missile Agency, R & D Op. Bldg. 4488, Redstone Arsenal, Ala.

Oct. 8-10, 1962. National Electronics Conference, Exposition Hall, Chicago, Ill.; contact National Elec. Conf., 228 N. LaSalle, Chicago, Ill.

Oct. 29-31, 1962; 15th Annual Conf. on Elec. Tech. in Medicine and Biology, Edgewater Beach Hotel, Chicago, Ill.; contact Dr. J. E. Jacobs, 624 Lincoln Ave., Evanston, Ill.

Nov. 13-15, 1962: NEREM (Northeast Res. & Engineering Meeting), Boston, Mass.; contact NEREM-IRE Boston Office, 313 Washington St., Newton, Mass.

Dec. 4-5, 1962: Eastern Joint Computer Conference, Bellevue-Stratford Hotel, Philadelphia, Pa.

# Readers' and Editor's Forum

## FRONT COVER: ANTENNA FOR COMMUNICATION SATELLITE

The front cover shows a tracking antenna for the experimental communication satellite called Telstar projected by Bell Telephone Laboratories and scheduled to be launched in the spring, 1962. Two of these antennas, one at Andover, Maine, and one at Cape Canaveral, Florida, are being built by Radiation, Inc., Melbourne, Florida, under contract with Bell. The antenna tracking system will: (1) find and locate the satellite as it appears on the horizon, without precise knowledge of the satellite's orbit; (2) lock on to a VHF signal beacon transmitted from the satellite; (3) connect and direct a very precise tracking system; (4) connect and direct a horn antenna to establish communication with the satellite; (5) transmit coded signals from the ground so as to turn on and off the transmitting and receiving equipment in the satellite. Computing equipment is associated with the directing of the antenna.

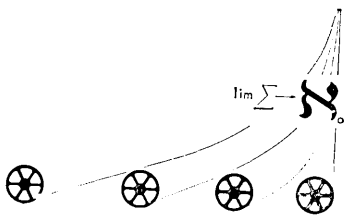
## GIGACYCLE COMPUTERS

Among the 30 computer papers scheduled for presentation during the meeting of the American Institute of Electrical Engineers, January 29 to February 2, 1962, at the Statler Hilton Hotel, New York, N. Y., are a number of papers on gigacycle computers, computers operating 1000 times faster than megacycle computers.

Wednesday, January 31, at 9.00 a.m. is the "Gigacycle Computer Symposium I," with Samuel Levine, Teleregister Corp., Stamford, Conn., as chairman. Papers include "An Introduction to Gigacycle Computers" by Douglas Hogan, Department of Defense, Washington 25, D. C.; "Gigahertz Computer Circuitry" by G. L. Hollander, Hollander Associates, Fullerton, Calif.; and "Applications of Gigacycle Computers" by Louis Fein, Palo Alto, Calif.

Gigacycle Computer Symposiums II, III, and IV take place Wednesday afternoon, Thursday morning, and Thursday afternoon, and present 12 more papers, one of them being "Reliability in Non-repairable Kilomegacycle Computers" by John Tooley, Texas Instruments Co., Dallas, Texas.

It is evident that the computer field will contain not one but many revolutions, in components, speed, cost, reliability, applications, and power to handle information.

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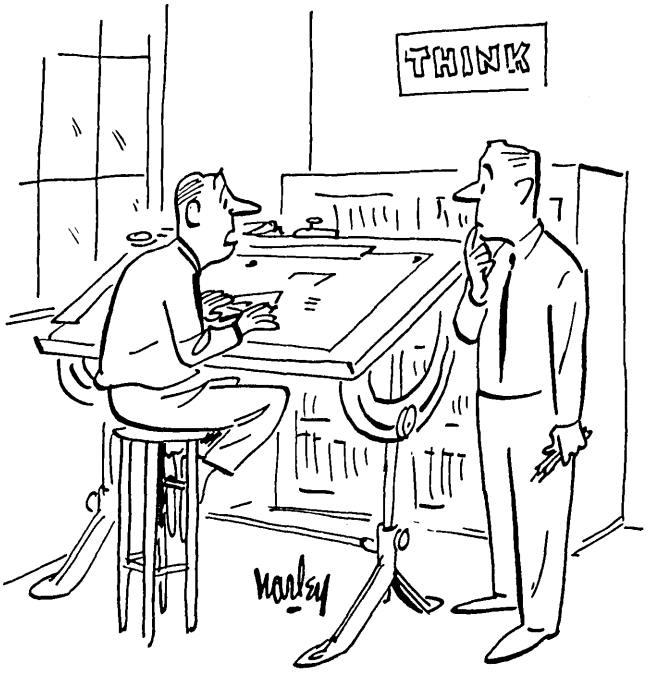


*"I know it's silly, but I can't help worrying about the day when there'll be automatic appliances made by automatic machines DESIGNED by automatic designers."*

# Books and Other Publications

**Moses M. Berlin**
**Allston, Mass.**

We publish here a survey of articles related to computers and data processors, and their applications and implications, occurring in certain magazines.

The purpose of this type of reference information is to help anybody interested in computers find articles of particular relation to this field in these magazines.

For each article, we publish: the title of the article / the name of the author(s) / the magazine and issue where it appears / the publisher's name and address / two or three sentences telling what the article is about.

**McCracken, Daniel D. / A Guide to FORTRAN Programming / John Wiley & Sons, Inc., 440 Park Ave. South, New York 16, N. Y. / 1961, printed, 88 pp, $2.95**

FORTRAN, a computer language which can be used by those with no knowledge of "coding," is discussed in detail. The author explains the uses of the language as applied to the IBM 709 and 7090 computers. The first eight chapters discuss: "Constants, Variables, and Expressions," "Arithmetic Statements, Functions," "Input and Output Statements," "Transfer of Control," "Subscripted Variables," "The DO Statement," "Further Information on Input and Output Statements," and "Functions and Specification Statements." Chapter nine discusses eight case studies, i.e., applications. Two appendices discuss: "Relation to Actual FORTRAN-type Compilers" (for nine IBM computers, the Philco 2000 ALTAC, Honeywell Algebraic Compiler, and Control Data 1604), and "Statement Sequencing and Punctuation." Answers to exercises are given throughout the text. Index.

**Leondes, Cornelius T., Editor / Computer Control Systems Technology / McGraw-Hill Book Co., Inc., 330 West 42 St., New York 36, N. Y. / 1961, printed, 649 pp, $16.00**

This book presents, for the engineer and advanced technician, a compendium of work in the theory and applications of computers which are used to control processes and systems. The authors are leading university faculty members and industry people in the field. In Part I, "Computer Technology," they discuss basic analog and digital computer theory, error analysis, and design techniques. Part II, "Control Technology," includes information about control system theory, random processes in automatic control systems, optimal control problems in discrete-time systems. The third and final part, "Applications to Complex Systems," describes computer control of air traffic, nuclear reactors, machine-tool assembly and navigation of space vehicles. Index.

**Vajda, S. / Mathematical Programming / Addison-Wesley Publishing Co., Inc., Reading, Mass. / 1961, printed, 310 pp, $8.50**

An introduction to linear and non-linear programming, with an emphasis on mathematical routines, is given. The first chapter discusses, briefly, the subject matter to be covered, giving examples of the problems which are solvable by machine. In the remaining twelve chapters the author discusses: General Algorithms, Algebras of Linear Inequality and Duality, Parametric Linear Programming, Discrete Linear Programming, Stochastic Linear Programming, and Dynamic Programming. An appendix discusses matrices. Exercises, solutions, bibliography and index.

**Proceedings of the Second International Conference on Operational Research / John Wiley & Sons, Inc., 440 Park Ave., New York 16, N. Y. / 1961, printed, 810 pp, $15.00**

The papers presented at the conference held in France, during Sept., 1960, are here published. The titles include: "Some Methodological Aspects of Operations Research," "The Measurement of Human Factors," "Control of Production," and "New Methods in Mathematical Programming." The paper, "Computers and Operational Research," is of particular interest to computer people. It discusses the effect of computers on operations research—wider applications of simulation, greater flexibility in decision-making applications—and the effect on computers, of operations research. The papers on applications include: "The Application of Operational Research Methods to the Steel Industry," "Military Applications of Operational Research" and "The Application of Operational Research Methods to Transports." Those papers which are published in French are followed by English abstracts and vice versa.

**Solodovnikiv, V. V., editor / Automatic Control and Computer Engineering, Vol. I / Pergamon Press Ltd., 122 East 55 St., New York 22, N. Y. / 1961, offset, 502 pp, $15.00**

This book contains twenty-four papers presented at a 1958 conference on Automatic Control and Computer Engineering, in the U.S.S.R. The papers analyze the problems of developing and applying modern computer design to its fullest potential. Control by computer, special-purpose machines, automation of manufacturing processes, and analog and digital systems are discussed. The book provides information on Russian technology which, as is clear from many of the papers, differs significantly from that in the U. S.

**McNerney, John Peter / Installing and Using an Automatic Data Processing System / Division of Research, Harvard Business School, Boston 63, Mass. / 1961, printed, 315 pp, $3.00**

This book discusses the problem of installing and using data processing systems for business control and decision making. A detailed case study is presented which analyzes the Brighton Mfr. Co.'s use of data processing. The author, who conducted the study while serving as Instructor at the Harvard Business School, includes three parts: Background and Systems Evaluation, The Data Processing Investigation and its Results, and Evaluation of Automatic Data Processing at Brighton. The book includes the Appendix, "Note on Economic Order Quality." Thirty-three exhibits supplement the text.

**Eckman, Donald P., editor, and 15 authors / Systems: Research and Design—Proceedings of the First Systems Symposium at Case Inst. of Technology / John Wiley & Sons, Inc., 440 Park Ave. South, New York 16, N. Y. / 1961, printed, 310 pp, $8.50**

Fourteen papers delivered at the symposium are here published. Among the titles: "Below the Twilight Arch—A Mythology of Systems," "The Use of Operations Research in the Study of Very Large Systems," "A Problem in the Design of Large-Scale Digital Computer Systems," "Evolutionary Design of Complex Systems," and "Systems Engineering from an Industrial Viewpoint." Index.

**Lerner, Daniel, Editor / Quantity and Quality / Free Press of Glencoe, Inc., 640 Fifth Ave., New York 19, N. Y. / 1961, printed, 221 pp, $4.50**

The contributions of eight distinguished scientists and philosophers to a Hayden Colloquium on Scientific Method and Concept are here published. The eight: John G. Kemeny, Harold D. Lasswell, Wassily Leontief, Daniel Lerner, Walter A. Rosenblith, Joseph J. Spengler, S. S. Stevens, and Victor F. Weisskopf. It is generally their intention to "explore the perennial dialectic of quantity and quality as it relates to basic methodological issues in contemporary mathematics, physics, psychophysics, neurophysiology, politics, economics and economic history."

**Gilbert, H. D., Editor / Miniaturization / Reinhold Publg. Corp., 430 Park Ave., New York 22, N. Y. / 1961, printed, 306 pp, $10.00**

The design, manufacture, maintenance, and reliability of miniature devices in computers, satellites, medicine and other fields are discussed. Sixteen papers by sixteen experts in particular areas of the subject are here presented. The editor, President of the Miniature Precision Bearings Co., provides an "Introduction: Miniaturization as a Concept." The largest chapter discusses the role of miniaturization in computer design, offering information on accomplishments and an exegesis of existing problems. A chapter on "Miniaturization for Space Travel" is included. Index.

**COBOL: Report to Conference on Data Systems Languages / Supt. of Documents, U. S. Govt. Printing Office, Washington 25, D. C. / 1961, mimeographed, 177 pp, $1.25**

The current specifications of the Common Business Oriented Language (COBOL) and a description of terminology are presented. An introduction outlines objectives of the program and a history of its development. Nine chapters discuss: Characters and Words, Data and Procedure Divisions, Special Features, etc. In each chapter many examples of usage are given. An appendix covers "Elective COBOL—1961."

**Kellogg, D. A., Lt. Col. / Machine Translation: A Review and Analysis Report, ARO Report #4, PB 171189 / Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. / 1961, mimeographed, 51 pp, 50c**

An interesting and explanatory review of machine translation research sponsored by the U. S. government in general and the

Army in particular is here presented. The present status of various projects is described and plans for the future are discussed. An introduction provides definitions of the technical terminology in the report. Samples of translations by machine are compared with translations by human beings.

**Automatizace, no. 8, 1961 / Publishers of Technical Literature, Spalena ul. 51, Praha 1, Czechoslovakia / 1961, printed, 35 pp, free on request (specimen copy)**

This edition of the Czechoslovakian-language publication (with English table of contents) includes the following articles: "Multipurpose Digital Control Computers for Industrial Automation," "Economic Aspects of Complex Automation of Primary Metallurgical Production, part II," "Medical Applications of Automation," part II: "Automation Possibilities at Examining the Patients." A review of Soviet analog computers and the general characteristics of digital computers developed in Europe are included.

**Willey, E. L., A. d'Agapeyeff, Marion Tribe, B. J. Gibbens and Michelle Clark / Some Commercial Autocodes: A Comparative Study / Academic Press Inc., 17 Old Queen St., London, S. W. 1, Eng. / 1961, printed, 53 pp, $2.50**

The features and specifications of nine autocodes (automatic programming codes) are listed and briefly discussed. The codes are: Flowmatic—B O, IBM Commercial Translator, COBOL, CODEL, FACT, Elliot's, NEBULA, SEAL, and I. C. T. COBOL. A number of charts are included which list the input and output media for each code system, and such information as procedures, arithmetic techniques, logic, etc. Examples of statements in each system are given.

**Adjustments to the Introduction of Office Automation—Bulletin No. 1276, U. S. Dept. of Labor / Supt. of Documents, U. S. Govt. Printing Office, Washington 25, D. C. / 1960, offset, 87 pp, 50 cents**

This reports findings of the Bureau of Labor Statistics from a study to determine the effects in twenty offices, of the implementation of data processing. Eleven chapters, thirteen charts or tables, and ten appendices present the objectives of management in using computers and data processing, how well the objectives were accomplished, the effect on employees, in particular older employees, and the extent of reassignment and unemployment.

**Electronic Data Processing—Subject Bibliography of Periodical Literature—1960 / Lybrand, Ross Bros., & Montgomery, 2 Broadway, New York 4, N. Y. / 1961, offset, 71 pp, limited distribution**

This bibliography of articles from approximately 75 periodicals is classified according to subject and within the subject headings, alphabetically according to title. The articles range from business applications including banking, insurance company uses and industrial controls, to the military and pure science applications. Periodical index.

**Impact of Automation, Bulletin No. 1287, U. S. Dept. of Labor / Supt. of Documents, U. S. Govt. Printing Office, Washington 25, D. C. / 1960, printed, 114 pp, 60 cents**

Twenty articles on technological changes due to the implementation of automation by industry are published. The articles are grouped under the headings: General Surveys of Automation and Technological Developments; Effects of Automation on Industrial Relations in General and on Specific Collective Bargaining Relationships; and Adjustments to Automation: Summaries of Case Studies and Articles on Office Automation. The articles previously appeared in the Monthly Labor Review during the past five years.

**Bionics Symposium: Living Prototypes—The Key to New Technology, Wright Air Devt. Div. Technical Report 60-600 / Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. / 1960, offset, 499 pp, cost ?**

The 29 papers delivered at the symposium Sept. 13-15, 1960, are here published. A general session which opened the symposium includes a discussion of the background from which bionics arose. Four technical sessions: The Life Sciences in Bionics, Analysis of Biological Principles, Physical Analogs of Biological Components and Subsystems, and Mechanical Realization of the Higher Functions of Living Systems, deal with current theories devices and techniques. The final session discusses the potential value of bionics, procedural methods and difficulties and possible social consequences.

**Coordination of Information on Current Scientific Research and Development Supported by the United States Government / U. S. Govt. Printing Office, Washington, D. C. (or Hon. Hubert H. Humphrey, Senator from Minnesota) / 1961, printed, 286 pp, cost ?**

There are approximately 160,000 research and development projects under direct U. S. Government sponsorship yet there exists no indexed inventory of what is being done by whom. This report attempts to describe the situation and points up the existing duplication and the futile repetition of experiments. The report is a good source of information on some of the research currently in progress. Proposals for ameliorating the situation are given.

**Harris, L. Dale / Introduction to Feedback Systems / John Wiley & Sons, Inc., 440 Park Ave. South, New York 16, N. Y. / 1961, printed, 363 pp, $10.50**

This book explains basic concepts of feedback which the engineering student can use as a foundation for advanced study. The author is Head of Electrical Engineering at the University of Utah. Nine chapters set forth the common principles of communications theory and control systems. Among the titles: "Mathematics and Physical Systems," "Response of Feedback Systems—Introducing Synthesis," "Feedback Control Systems," "Sinusoidal Methods of Analysis," and "Oscillating Systems." Four appendices discuss: LaPlace Transform, Roots of Higher Order Equation by Root-Locus, Transfer Functions of Physical Systems, and Real Axis Departures of Root-Locus Branches. Index.

**Garfield, Eugene / An Algorithm for Translating Chemical Names to Molecular Formulas / Institute for Scientific Information, 33 South 17 St., Philadelphia 3, Penna. / 1961, photo offset, 68 pp, cost ?**

This paper describes an algorithm which was checked by a computer for validity and which will be helpful to chemists confronted by nomenclature problems. The computer program which accomplishes translation of chemical names to molecular formulas is discussed. The paper's four parts are: Organic Chemical Nomenclature—Historical Background, Intellectual Indexing Tasks Requiring Study, Structural Linguistics Approach to Chemical Nomenclature, and the Algorithm. An appendix summarizes the principles of the algorithm and furnishes a detailed example of its use. Twelve tables; bibliography; author and subject indexes.

**U. S. S. R. Pushes Mechanization of Accounting and Calculating Operations, U. S. Joint Publications Research Service—8659, OTS: 61-31, 565 / Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. / 1961, mimeographed, 16 pp, 50 cents**

Two articles, originally published in the Russian-language periodical, *Bukhgalterskiy Uchet* are here published in English: "Planning the Mechanization of Accounting and Calculating Operations in the National Economy," by N. Belkin; and "For More Extensive Mechanization of Accounting and Calculating Operations," by S. Sazonov.

**Smirnov, G. D. / Electronic Digital Computers, / Pergamon Press, 122 East 55 St., New York 22, N. Y. / 1961, photo offset, 104 pp, $6.50**

This English translation from the Russian discusses the mathematical fundamentals and logical procedures for constructing computers. The characteristics of computer circuitry are described. Among the twelve chapters are: "The Components of Digital Computers," "Arithmetic Units," "The Control Unit," "Monitoring the Computations," and "Applications of Electronic Digital Computers."

**Zoss, Leslie M., and B. Chester Delahooke / Theory and Applications of Industrial Process Control / Delmar Publishers, Inc., Mountainview Ave., Albany 5, N. Y. / 1961, printed, 256 pp, cost ?**

This book, aimed at the engineer and advanced technician, furnishes information about the basic theory and applications of process control. The first part discusses Fundamentals of Industrial Control Theory, including: "Control Considerations," "Exponential Lag—Step and Frequency Response," "The Closed Loop," and "Control System Design." Part Two, Applications of Industrial Control Processes, includes: "Food Preservation," "Air Conditioning," "Reactor Control," "The Textile Industry," and "The Brewing Industry." An appendix explains some of the nomenclature. Index.

**Knight, Geoffrey, Jr., and Derek S. Henderson / Classification System for Computer Abstracts on Cards / Cambridge Communications Corp., 238 Main St., Cambridge 42, Mass. / 1960, printed, 24 pp, free**

A system is described for the classification of abstracts of significant papers which pertain to mathematics, automation and computers, on cards. Under headings such as General, Computer Mathematics-Logic, Equipment, and Use of Computers, numbers are assigned to each article and card, which also have a general letter code.

**Algo, The Algebraic Compiler for the Bendix G-15 / Bendix Corp., Computer Div., Los Angeles 45, Calif. / 1960, printed, 28 pp, free on request**

The algebraic compiler for the Bendix G-15 computer, uses a language similar to the terminology and symbology of algebra. In seven chapters, the language, data, control statement, program arrangement, subroutines and arrays are discussed. A typical program that the compiler can handle, is included. Index.

# Who's Who in the Computer Field

## (Supplement)

A full entry in the "Who's Who in the Computer Field" consists of: name / title, organization, address / interests (the capital letters of the abbreviations are the initial letters of Applications, Business, Construction, Design, Electronics, Logic, Mathematics, Programming, Sales) / year of birth, college or last school (background), year of entering the computer field, occupation / other information such as distinctions, publications, etc. An absence of information is indicated by — (dash). Other abbreviations are used which may be easily guessed like those in the telephone book.

Every now and then a group of completed Who's Who entry forms come in to us together from a single organization. This is a considerable help to a compiler, and we thank the people who are kind enough to arrange this. In such cases, the organization and the address are represented by . . . (three dots).

Following are several sets of such Who's Who entries.

**System Development Corp, 2500 Colorado Ave, Santa Monica, Calif**

Abel, Robert / Asst CC Prgmg Leader, . . . / ABMP / '33, Univ of Ill, '57, prgmg supvsr

Allan, William D / Prgmr, . . . / P / '30, Colorado Univ, '59, prgmr

Arnold, Robert J / EDP Prgmr, . . . / MP, real time / '34, John Carroll, '57, EDP oper

Avritt, Gordon D / Prgmg Analyst, . . . / AP / '33, Orange Coast Coll, '58, prgmr

Becerra, Guadalupe C / EDPM Shift Supvsr, . . . / AP, systems analysis / '32, Santa Monica City Coll, '56, EDPM Supvsr, EAM oper

Bessler, Bill / Prgmr, . . . / P / '21, Texas U, '57, prgmr

Boose, Richard W / Prgm Analyst, . . . /AP / '26, Univ of Akron, '57, prgrm analyst

Borad, Donald A / Prgmr, . . . / AMP / '33, UCLA, '56, Jr engr

Bradford, Frank / Comptr Prgmr, . . . / MP / '34, Univ of Calif, '59, prgmg

Brandstatter, Warren C / Prgrm Analyst Senr, . . . / ABMP / '33, Tarkio, '57, system analyst

Chaney, Thomas A / Sen Prgmg Analyst, . . . / AMP / '30, Kearney State Teachers Coll, '57, prgmg analyst

Clopton, William H / Comptr Prgmr, . . . / ADLMP, future potential of miniature computers / '36, UCLA, '59, prgmr trainee

Coale, Jack M / SAGE System Training Leader, . . . / Command / Control Systems / '23, Colorado State Coll, '59, psychologist

Coles, Norman / Prgmr Analyst, . . . / L, system analysis, prgmr training and instruction, computers and behavioral simulation / '30, UCLA / '56, —

Compton, T R / Prgm Analyst, . . . / AP / '34, North Texas State Coll, '57, prgmr

Coyne, John D / Prgm Analyst, . . . / AP / '32, Northeastern Univ, '57, prgm analyst

Everett, C P / Prgmr, . . . / P / '24, Los Angeles State, '59, prgmr

Fisher, David E / Prgm Analyst, . . . / AMP / '32, UCLA, '59, prgmg & prgm analyzing

George, Daniel A / Prgm Analyst, . . . / AP, system desgn and applcn / '31, San Jose State Coll, '57, prgmr

Holtkamp, Esther / Prgmg Analyst, . . . / P / '30, Mary Manse Coll, '57, div adapter

Hotzinger, Alfred / Prgmr, . . . / P / '33, NY State Coll for Teachers, '59, comptr prgmr

Jennings, Morgan E, Jr / Prgmr Analyst, . . . / P / '32, Univ of Mass, '58, prgmr analyst

Johnson, L Wayne / Prgm Analyst Senr, . . . / ALP, automated teaching devices / '28, Michigan State Univ, '57, prgmg supvsr

Jones, Billy M / Prgmr, . . . / AMP / '34, Sam Houston State, '59, mathematician

Jordan, Douglas L / Unit Head, . . . / P / '30, Harvard, '57, prgmg analyst

Keddy, J Richard / Prgmr, . . . / ABMP / '36, Colby Coll, '60, prgmr / Phi Beta Kappa

Kornbaum, Harold F / Prgmr Analyst, . . . / AMP / '26, Iowa State Univ, '57, asst mathematician

Larson, Rodney R / Prgmr, . . . / P / '31, Univ of South Dakota, '58, prgmr

Lathrop, Joseph W / Sector Prgmg Leader, . . . / ABLMP / '30, Denver Univ, '56, accountant

Marks, Thomas F / Prgmg Leader, . . . / LMP / '23, Univ of Wisconsin, '57, comptr prgmg

McKay, David A / Comptr Prgmr, . . . / AMP / '32, Heald Engrg Coll, '59, prgmr

McKee, Roger L / Prgm Analyst, . . . / ADMP / '34, UCLA, '59, mathematician

McKenna, John P / Prgmr, . . . / ABP / '31, Penn State Univ, '59, prgmr

McMurtrie, Richard L / Div Prgmg Leader, . . . / P / '31, Harvard, '56, prgmr

McNelley, Donald B / Training Analyst, . . . / ALP / '34, Univ of Alabama, '59, training

Miller, Charles M / Prgmr, . . . / AMP / '35, Simpson Coll, '59, comptr prgmr

Moha, James A / Prgmg Analyst, . . . / A / '27, Univ of Minn, '56, prgmr

Moore, Eugene / Asst Prgmg Leader, . . . / P / '30, Temple Univ, '56, prgmr

Moriarty, Robert A / Sector Prgmg Leader, . . . / P / '28, New York Univ, '56, prgmg analyst

Myhre, Marvin / Prgmr Analyst Trainee, . . . / P / '36, —, '60, prgmr analyst trainee

Nangle, John E / Assoc System Training Leader, . . . / A / '29, Michigan State Univ, '59, psychologist

Osterberg, Thomas W / Comptr Prgmg Analyst, . . . / MP / '32, Univ of Wisconsin, '57, comptr prgmg analysis

Pyle, Marion A / Comptr Prgmr, . . . / ADMP / '31, Southeastern State Coll, '59, prgmg

Reilly, Dorothy / Prgmr, . . . / DMP / '36, Univ of Wisconsin, '60, prgmr

Roberts, John W / Prgmr Analyst Senr, . . . / AP / '23, RIU, ISTC, '57, tech coordinator and suprvsr

Schaefer, Donald G / Prgmr, . . . / MPS / '35, Wisconsin State Coll, '60, prgmr

Scroggins, John L / Prgmg Analyst, . . . / AP / '32, Purdue Univ, '57, mathematician

Sheppard, John / Prgmr Analyst Senr, . . . / ABLP / '28, Central Mich Univ, '57, prgmr

Skrukrud, Allan M / Asst Sector Prgmg Leader, . . . / P / '31, Univ of Minn, '57, prgmr

Smolsky, Edward / Prgmr, . . . / P / '38, El Camino, '59, prgmr

Spindler, David A / Systems Analyst, . . . / BMP / '35, Wisc State Coll, '59, prgmr and systems analyst

Stewart, William A / Sector Prgmg Leader, . . . / P / '24, Ohio State, '56, prgmr

Trogdon, Jimmy J / Prgmr, . . . / P / '31, Southwest Mo State Coll, '60, comptr prgmr

Votel, John W / Prgmg Analyst Senr, . . . / P / '30, Univ of Dayton, '56, prgmr analyst

Wargo, John / Prgmr Analyst, . . . / AP / '30, General Motors Inst, '57, prgmr analyst

Watson, John F / Prgmr, . . . / P / '35, Univ of Minn, '60, prgmr

Weber, Philip C / Prgmg Analyst, Senr, . . . / AB, data processing systems / '24, Northwestern Univ, '56, systems analyst

Wenzel, Edward C / Prgmg Analyst, . . . / MP / '34, Wisc State Coll, '56, prgmr

York, Ronald L / Sector Prgmg Leader, . . . / P / '31, Omaha Univ, '57, —

Zigeler, John C / Prgmr Analyst Senr, . . . / ALP / '34, Univ of Iowa, '57, prgmr analyst

**Computer Control Co, 2251 Barry Ave, Los Angeles 64, Calif**

Chamorro, R D / Mktg Mgr, . . . / ABDELS / —, USC and UCLA, '53, mktg mgr

Fenaughty, A L / Vice Pres, . . . / ABDELS / —, Columbia Univ, '53, exec

Halligan, Sidney J / Aplns Engr, . . . / ABDELS / —, Iowa State Coll, '55, aplns engr

Jurich, Samuel / Dev Engr, . . . / ADEL / —, Univ of Ariz, '48, dev engr

McMillan, Malcolm / Analyst, . . . / ADELMP / —, UCLA, '50, analyst

Sprong, D C / Chf Engr, . . . / ABDEL / —, —, '42, engrg exec / "Dual Purpose Digital Computer Is Also Differential Analyzer"

Timm, John / Compr Engr, . . . / ADEL / —, Calif Inst of Polytechnics, '55, compr engr

Tonai, Ichiro / Compr Engr, . . . / ADEL / —, UCLA, '54, compr engr

Waller, R W / Dev Engr, Section Hd, . . . / ADEL / —, UCLA, '54, dev engr

Ward, Wm E / Section Hd, . . . / ADEL / —, UCLA, '51, compr engr

## WHO'S WHO IN THE COMPUTER FIELD

From time to time we bring up to date our "Who's Who in the Computer Field." We are currently asking all computer people to fill in the following Who's Who Entry Form, and send it to us for their free listing in the Who's Who that we publish from time to time in **Computers and Automation.** We are often asked questions about computer people—and if we have up to date information in our file, we can answer those questions.

If you are interested in the computer field, please fill in and send us the following Who's Who Entry Form (to avoid tearing the magazine, the form may be copied on any piece of paper).

Name? (please print) .....

Your Address? .....

Your Organization? .....

Its Address? .....

Your Title? .....

Your Main Computer Interests?

( ) Applications
( ) Business
( ) Construction
( ) Design
( ) Electronics
( ) Logic
( ) Mathematics
( ) Programming
( ) Sales
( ) Other (specify):

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Year of birth? .....

College or last school? .....

Year entered the computer field? ....

Occupation? .....

Anything else? (publications, distinctions, etc.) .....

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When you have filled in this entry form please send it to: Who's Who Editor, **Computers and Automation,** 815 Washington Street, Newtonville 60, Mass.

Price, B Gregg / Digital Comptr Group Head, Bendix Corp, 11600 Sherman Way, North Hollywood, Calif / MP / '29, San Diego State Coll, '54, digital computer group head

Priesman, Ira / Human Factors Specialist, System Development Corp, Euster AFB, Battle Creek, Mich / AB / '33, Univ of Minn, '59, psychologist

Przelenski, Henry P / Systems Analyst of the Div, Organization and Systems Dept, Convair-Astronautics Div, General Dynamics Corp, San Diego, Calif / AB, feasibility studies, conversion techniques, integrated data prcg / '25, Univ of Detroit, special 1 yr course in elec computrs, '56, systems analyst

Ratz, Alfred G / Chief Engr, Ortholog Div of Gulton Industries, Inc, P O Box 37, Princeton Junction, N J / airborne electronics systems for missiles and aircraft / —, Univ of Toronto (BA, MA, PhD), '47, —

Renz, Allen G / Vice Pres, Compumatix, Inc, 440 So Brentwood, St Louis 5, Mo / management / '30, Washington Univ, '55, management consultant / pres St. Louis chptr Natl Mach Accints Assoc, Bd mbr of Pool, computer user's group, Bylaws comm of JUG, Joint Users Group

Rizzo, Michael / Sr. Prgmg Analyst, System Development Corp, Winters Ave, Paramus, N J / ALMPS / '29, City College of N Y, '56, prgmr

Rockwell, Robert A / Spec Engr, Sr, Lockheed Missiles-Space Div, Sunnyvale, Calif / LM / '28, Univ of Buffalo, '53, engr computer / Phi Beta Kappa, Amer Assoc for Advancemt of Science, mbr Amer Rocket Soc

Rogaczewski, Jerome S / Res Asst, Univ of Mich Res Inst, Willow Run Airport, Ypsilanti, Mich / AEL / '37, Univ of Mich, '59, — / mbr IRE, "Automatic Checkout of Missile Electronic Circuits by Digital Computer Methods," coauthor

Rosenbaum, Robert H / Head, Computer Lab, Melpar, Inc, Applied Science Div, 11 Galen St, Watertown 72, Mass / LMP / '35, MIT, '56, res engr-mathematician

Rothwell, Bruce / Computer-Prgmr, General Electric Co, River Rd, Schenectady, N Y / MP, numerical analysis / '35, Providence Coll, '60, prgmr

Rubin, Paul M / Computer-Prgmr, System Development Corp, Santa Monica, Calif / ABP / '32, Univ of Maryland, '56, computer-prgmr

Rusk, Gerald E, II / Systems Analyst, Formulation Section, The National Cash Register Co, Electronics Div, 1401 E El Segundo Blvd, Hawthorne, Calif / ABDEP / '32, Univ of Calif, '58, analyst-prgmr

Russo, Edward M / Consultant, Price Waterhouse & Co, 56 Pine St, New York, N Y / AB / '23, NYU, '55, management consultant

Sackman, Bertram S / Mathematician, Mitre Corp, Bedford, Mass / AM / '34, American U, '56, mathematician / various reports

Scharff, Jack A / Chief, Electronic Prgmg Branch, U S Bureau of the Census, Economic Operations Div, Suitland, Md / AP / '20, Columbia Univ, '52, prgmg and systems administrator

Schneider, S Joseph / Systems Analyst-Prgmr, IBM, Kingston, N Y / ABP / '21, LIU (BS), NYU (MA), '56, — / "Worth Reading" editor for Systems and Procedures Quarterly

Schreur, Harm K / Applied Science Representative, IBM, 2911 Cedar Springs Rd, —, — / ABCDELMPS / '31, Piedmont Coll, '59, applied science rep

Segel, Ronald R / Head, Electronic Data Processing Group, Daniel, Mann, Johnson & Mendenhall, 3325 Wilshire Blvd, Los Angeles 5, Calif / A / '25, UCLA, '50, — / Computer Automation of Super Markets, General Study of Information Storage and Retrieval, addressed various conventions

Seidman, Herbert / Systems Engr, Daystrom Control Systems, 4455 Miramar Rd., San Diego, Calif / DEL / '30, Polytechnic Inst of Brooklyn, '57, circuit, logic designer / "Use of a Digital Computer to Improve the Reliability of Electronic Circuit Design," "Engineering is a Profession"

Sherman, P M / Mbr Technical Staff, Bell Telephone Laboratories, Murray Hill, N J / DLP / '30, Cornell, Yale (MS, PhD), '59 — / "Table Look-at Techniques"

Simpson, Alfred V / Consultant, Information Processing and Transmitting Equipment, General Electric Co, Schenectady, N Y / ABPS / '08, Northeastern Univ, '53, accountant, controller

Smith, Barnaby P / Vice Pres, Harper Associates, Inc, 180 Broadway, New York 38, N Y / Personnel Recruiting / '22, Emerson Coll, '56, personnel consultant

Smith, Roy Morgan / Planning Representative, IBM Product Development Lab, Poughkeepsie, N Y / ABCDELMPS / '31, San Francisco State, '58, marketing res and planning

St. Clair, J D / Operations Engr, Western Electric Company, Inc, Dept 9215, 204 Graham-Hopedale Rd, Burlington, N C / AMS, operations res / '35, Abilene Christian Coll, '57, operations engr


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# NEW PATENTS


## RAYMOND R. SKOLNICK

**Reg. Patent Agent**

**Ford Inst. Co., Div. of Sperry Rand Corp., Long Island City 1, New York**


The following is a compilation of patents pertaining to computer and associated equipment from the "Official Gazette of the U. S. Patent Office," dates of issue as indicated. Each entry consists of patent number / inventor(s) / assignee / invention. Printed copies of patents may be obtained from the U. S. Commissioner of Patents, Washington 25, D. C., at a cost of 25 cents each.

### August 29, 1961

2,998,594 / Henry L. Jones, Endicott, N. Y. / I.B.M. Corp., New York, N. Y. / A magnetic memory system for ternary information

### September 5, 1961

2,999,228 / Richard J. Facciola, Rego Park, N. Y. / Sperry Rand Corp., Ford Inst. Co., Div., New York, N. Y. / A memory device for analog computers.

2,999,229 / Llewellyn H. Thomas, Leonia, N. J. / I.B.M. Corp., New York, N. Y. / A shift register using solid state devices.

### September 12, 1961

2,999,636 / Glenn E. Hagen, Manhattan Beach, Calif. / Alwac International Inc., a corp. of Panama / An electronic computing device.

2,999,637 / Winfield S. Curry, Jr., Anaheim, Calif. / Hughes Aircraft Co., Culver City, Calif. / A transistor majority logic adder.

2,999,639 / Daniel M. Lipkin, Philadelphia, Pa. / Sperry Rand Corp., New York, N. Y. / An analog multiplying device.

3,000,000 / Kenneth R. Eldredge, Palo Alto, Calif. / G.E. Co., New York, N. Y. / An automatic reading system.

3,000,001 / Robert M. Brink, New Canaan, Conn. / Time, Inc, New York, N. Y. / A parallel binary comparator circuit.

3,000,001 / David C. Weller, Lake Mohawk, N. J. / Bell Telephone Lab., Inc., New York, N. Y. / A magnetic memory array.

### September 19, 1961

3,000,556 / Lawrence L. Bewley, Covina, and Jerry F. Foster, Arcadia, Calif. / Burroughs Corp., Detroit, Mich. / A data conversion system.

3,000,562 / Robert J. Froggatt, Norwood Green, Southall, and Nigel D. Robinson, Hillingdon, Eng. / Electric and Musical Ind., Lim., Hayes, Middlesex, Eng. / An output converter for digital computers.

3,001,089 / Theodorus J. Tulp, Eindhoven, Netherlands / North American Philips Co., Inc., New York, N. Y. / A transistor memory device.

3,001,090 / Theodorus J. Tulp, Eindhoven, Netherlands / North American Philips Co., Inc., New York, N. Y. / A transistor memory device.

3,001,140 / John W. Beck, San Jose, Calif. / I.B.M. Corp., New York, N. Y. / A data transmission system.

3,001,178 / Dudley A. Buck, North Wilmington, Mass. / Arthur D. Little, Inc., Cambridge, Mass. / An electrical memory circuit.

### September 26, 1961

3,001,469 / Roger A. Davis and Alan R. Hewitt, Letchworth, Eng. / International Computers and Tabulators, Lim., London, Eng. / A data registering apparatus.

3,001,693 / John T. Parsons, Traverse City, and Floyd E. Harwood, Ypsilanti, Mich. / Parsons Corp., Traverse City, Mich. / A data handling system.

3,001,706 / Alec Trussell, Letchworth, Eng. / International Computers and Tabulators, Lim., London, Eng. / An apparatus for converting data from a first to a second scale of notation.

3,001,707 / Raymond Bird, Letchworth, Eng. / International Computers and Tabulators Lim., London, Eng. / An electronic digital calculating apparatus.

3,001,708 / Edward L. Glaser, Altadena, and Lloyd W. Cali, Monrovia, Calif. / Burroughs Corp., Detroit, Mich. / A central control circuit for computers.

3,001,710 / Munro K. Haynes, Poughkeepsie, N. Y. / I.B.M. Corp., New York, N. Y. / A magnetic core matrix.

3,001,711 / Robert Frohman, Gardena, Calif. / The National Cash Register Co., Dayton, Ohio / A transistor adder circuit.

3,001,712 / Thomas B. Horgan, Endwell, N. Y. / I.B.M. Corp., New York, N. Y. / A beam switching tube logic circuit.

3,002,108 / Fred Sterzer, Monmouth Junction, N. J. / R.C.A., a corp. of Del. / A shift circuit.

3,002,183 / Sadia S. Guterman, Dorchester, Mass. / Raytheon Co., a corp. of Del. / A digital computer.

### October 3, 1961

3,003,071 / Robert A. Henle, Hyde Park, N. Y. / I.B.M. Corp., New York, N. Y. / A transistor logical circuit.

3,003,137 / Hrand L. Kurkjian, Hyde Park, N. Y., and Eric G. Wagner, U. S. Army / I.B.M. Corp., New York, N. Y. / A binary signal storage system.

3,003,138 / Leo M. Piecha, Los Angeles, Calif. / Hughes Aircraft Co., Culver City, Calif. / A magnetic core memory element.

3,003,139 / Kenneth C. Perkins, Lynnfield, Mass. / General Electronic Lab., Inc., Cambridge, Mass. / An electrical information storage system.

3,003,140 / Hewitt D. Crane, Palo Alto, Calif. / Burroughs Corp., Detroit, Mich. / A magnetic core negation circuit.

### October 10, 1961

3,003,695 / Roy W. Reach, Jr., Sudbury, and William N. Kahn, Brighton, Mass. / Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. / A data processing apparatus.

3,003,698 / Friedrich Kuhrt, Nurmberg, Germany, and Eberhard Braunersreuther, Geneva, Switzerland / Siemens-Schuckertwerke Aktiengesellschaft, Erlangen, Germany / A ratio computing apparatus.

3,004,109 / Pierre M. Lucas, 11 Rue Abbé Derry, Issy-les-Moulineaux, Fr., and Michel Marcel Rouzier, 22 Chemin des Postes, Clighy-sous-Bois, France / — / A high speed memory testing device.

3,004,242 / Vladimir P. Honeiser, Paramus, N. J. / International Telephone & Telegraph Corp., Nutley, N. J. / A data read-out system.

3,004,244 / Hewitt D. Crane, Palo Alto, Calif. / Burroughs Corp., Detroit, Mich. / A digital circuit using magnetic core elements.

3,004,245 / Hewitt D. Crane, Palo Alto, David R. Bennion, Loma Mar, and Fred C. Heinzmann, Palo Alto, Calif. / Burroughs Corp., Detroit, Mich. / A magnetic core digital circuit.

3,004,246 / Samuel D. Harper, Newton Highlands, Mass. / Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. / An electrical apparatus for storing and manipulating digital data.

3,004,251 / Raymond Rapacz, Sea Cliff, N. Y. / Sperry Rand Corp., a corp. of Del. / A digital to analogue converter.

# ADVERTISING INDEX

Following is the index of advertisements. Each item contains: Name and address of the advertiser / page number where the advertisement appears / name of agency if any.


American Telephone & Telegraph Co., 195 Broadway, New York 7, N. Y. / Page 3 / N. W. Ayer & Son, Inc.

Bendix Computer Div., 5630 Arbor Vitae St., Los Angeles 45, Calif. / Page 11 / Shaw Advertising, Inc.

Business Electronics, Inc., 420 Market St., San Francisco 11, Calif. / Page 49 / Graham Kislingbury, 988 Market St., San Francisco 2, Calif.

Computron, Inc., 122 Calvary St., Waltham, Mass. / Page 52 / Larcom Randall Advertising, Inc.

Control Data Corp., 501 Park Ave., Minneapolis 15, Minn. / Page 7 / —

Houston Instrument Corp., Box 22234, Houston 27, Tex. / Page 45 / Richard L. Minns Advertising, Inc.

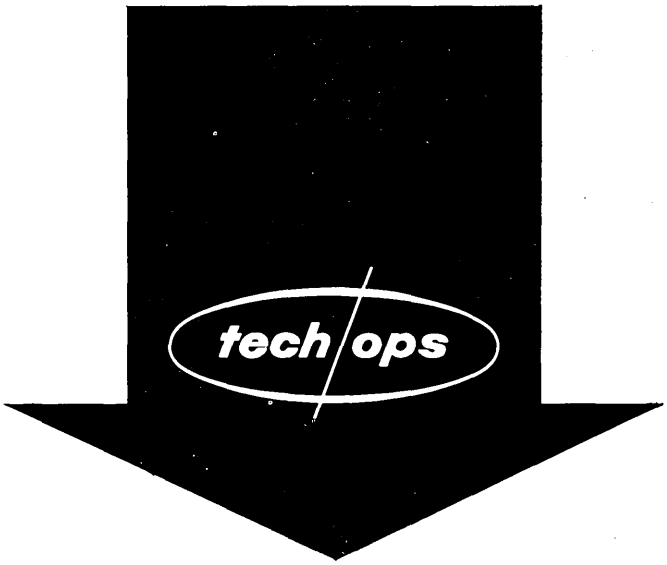
International Business Machines Corp., 590 Madison Ave., New York 22, N. Y. / Page 5 / Benton & Bowles, Inc.

Litton Systems, Inc., Data Systems Div., Canoga Park, Calif. / Page 13 / Compton Advertising, Inc.

National Cash Register Co., Main & K Sts., Dayton 9, Ohio / Page 9 / McCann-Erickson, Inc.

Technical Operations, Inc., South Ave., Burlington, Mass. / Page 51 / Edwin F. Hall Advertising

Statistical Tabulating Corporation, 104 So. Michigan Ave., Chicago 3, Ill. / Page 2 / Fred H. Ebersold, Inc.

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- *Development of programming systems (assemblers, compilers, translators, generators, string handling packages, and the like). We have constructed and are using CL-1 and are now ready to build a more powerful computer language.*
- *Simulation techniques: using high-speed computers to determine the impact of new operational procedures, plans or equipment, when direct experimentation is too costly or otherwise impractical.*
- *Analysis and programming for command control systems; status and employment of resources; routing and scheduling; information storage, retrieval and display; report generation.*
- *Evaluation of large, complex weapons and communications systems, studies of logistic systems to increase operational efficiency.*
- *Mathematical analysis and its application to operational problems; e. g., queueing theory, linear programming, inventory control analysis, equations describing combat operations.*

Scientists who fare best in our environment essentially have the problem-solving approach coupled with a specialty in one or more of the following fields: programming; programming systems; information storage, retrieval and display; simulation models; command control systems and man-machine war games. In addition to programming scientists on a senior level, appointments are also available for promising programmers of lesser experience.

*Contact Mr. Kingsley Andersson*

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