

## TECHNOLOGY

# War of the Computers: Nov. 3

On the evening of Nov. 3, there will be a war of computers, racing to predict the outcome of the day's elections—a war fought fully as fiercely as the elections themselves.

By DAVID F. NOLAN

➤ **FASTER THAN A SPEEDING BULLET**, the huge computers will labor through election night, attempting to predict the outcome of the day's races.

Programmed with secret formulas known only to a handful, these machines will have the answers almost before the questions have all been asked.

Their exact workings are being kept a well guarded secret, as each of our nation's three major radio-TV networks has invested millions of dollars in an attempt to be first with the most in the once-every-four-years election night guessing game. And the men with the best formulas will win.

At the start, the race will be even, for all three will be using the same information in making their projections.

This information will be gathered by a 100,000-reporter Network Election Service jointly operated by the three networks and the two major wire services. It will be given to each of the networks and wire services at the same time, and will be reported immediately to the American people and to the computers.

The computers have been programmed with information on past election results and on voting patterns of the population. As vote-tallies come in, they will be analyzed for the voting patterns and trends of this election, compared with past results and multiplied by carefully prepared formulas.

Hopefully, the result will be a successful guess as to what the final outcome will be.

There are several ways in which vote projections can be made. Each of them involves selecting a "sample population" from the voting population at large, and weighing each sample according to the number of voters it represents.

## Simple Methods

The simplest way to do this is to take a "random" sampling—picking every thousandth name out of a phone book would be an example of this type of sampling. Random sampling has the advantage of being simple but has several drawbacks.

First, unless the sample taken is very large, its accuracy is likely to be low. Second, although it gives an indication of overall trends, it does not show what factors are causing them. Third, it is likely to be slow in yielding information, especially if it is a large enough sample to be accurate.

A second method of sampling is that of picking "typical" communities to represent counties or states. This type of sampling

has some advantages over random sampling—results can be gathered faster, and will give an indication as to the voting pattern in different areas, for example.

However, like random sampling, it has its limits. Its accuracy is dependent on whether or not the precincts chosen actually are typical, and like random sampling, it does not clearly indicate what different voting groups are doing.

## Complex Methods

The third and most sophisticated form of sampling is "block" sampling. This type of sampling consists of picking "model" precincts, carefully chosen to represent specific voting groups. Examples would be an all-Negro low-income urban precinct in a southern state or a white Anglo-Saxon Protestant precinct in a midwestern farm state.

This type of sampling is very useful in analyzing the voting patterns of specific groups, but is limited in its applications for two reasons. First, not all voters can be categorized, and not all voters in a category vote with their "block." Second, voting behavior in a model precinct is not necessarily the same as elsewhere—Catholics in a predominantly Catholic district may vote differently from Catholics in a non-Catholic district.

Because each of the three basic methods of sampling has both its advantages and its drawbacks, all three types will be used in programming the election computers. Results based on these samplings will be compared not only with results of past elections, but also with each other, in order to get as accurate and complete a picture as possible of what is happening.

## Networks' Plans

Each of the three networks, ABC, CBS and NBC, has its own ideas on what to do and how to do it—and its own computer to do it with.

CBS, which announced Goldwater's victory in the California primary last June even before the polls were all closed, will be using the same system it used then. Called Vote Profile Analysis, or VPA for short, it was developed by pollster Lou Harris in cooperation with CBS and International Business Machines Corporation, and is a "block" analysis system.

The CBS projections will be made on a state-by-state basis, by an IBM 7010 computer. The information fed into this computer will first be "checked" on a smaller computer, the IBM 1440. CBS claims projections made with their system are accurate within two percent.

NBC, which used a computer effectively in 1960, will be on the scene again, this time with a Radio Corporation of America 3301 to aid them.

They will be using two separate systems in making their projections. One will be based on an analysis of especially-selected



IBM

**ELECTION-DAY COMPUTER**—The IBM 7010, one of the three computers to be used on Nov. 3, will try to predict the outcome of the election.

precincts, the other on a county-by-county tally of the whole vote—essentially a random sampling method.

The third major network, ABC, working in cooperation with the Burroughs Corporation, C-E-I-R Inc., and Oliver Quayle & Company, has plans at least as ambitious as those of NBC and CBS.

### Special Watch on "Key" States

Using a B-5000, Burroughs' newest computer, ABC plans to project the Presidential results in terms of both the popular and electoral vote, keeping a special watch on "key" states. They also plan to follow "key" races for Senator and Governor, and to do a running analysis of various economic, occupational, racial and religious "blocks."

ABC plans to do polling right up through election day itself, in order to have as accurate a picture as possible of what is going on. All three networks plan to use great caution in announcing any projected results.

The wire services have no plans to make any projections, either before, during or after the election, but will carry the results of the networks' projections, along with the actual "raw vote" tally.

The news media are not the only ones planning to use electronic data processing

equipment in this election. The politicians will be taking advantage of modern scientific developments, too.

Both the Republicans and Democrats use information-retrieval systems to keep tabs on the party, and Senator Goldwater's use of a "memory machine" has been well publicized.

Neither the "electronic card file" nor the "memory machine" is a computer, however. Both are simply information storage and indexing devices, and do not perform any mathematical manipulations.

The electronic vote-tabulating machines which will report the number of votes as the returns come in on election night are not computers either. They are simply large, high-speed "counters." A computer is both a counting *and* calculating device, though it can be used separately for either purpose. In addition it serves as an information storage device.

What effect these electronic devices will have on this and future elections is yet to be seen. The day of computer-dominated politics is still far in the future, but may yet become a reality. Writers of popular fiction have already begun to speculate on the possibility. But for the moment, it is still a human's game.

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### INVENTION

## Patents of the Week

**A special lollipop, a toothbrush substitute, that contains both acid and sweet substances may be the answer to the problem of tooth decay—By Ann Ewing**

➤ IF YOU ARE TIRED of your toothbrush, try a new kind of lollipop.

That is the suggestion contained in a patent issued by the U.S. Patent Office.

However, this special lollipop that might reduce tooth decay is not yet on the market. Whether it ever will be or not cannot be told because Lever Brothers Company, New York, will not say.

The lollipop would contain sweet and weak acid substances in combination. Studies by other scientists, including those at the Government's National Institute of Dental Health, Bethesda, Md., have shown that sugar increases the chances of dental decay. Other studies have indicated that acid also increases dental decay.

Both acid and sugar, on the other hand, increase the amount of saliva, and salivation has been found to reduce tooth decay. The two have been combined in a hard tablet that would take about five minutes to dissolve in the mouth.

Such a dental tablet was awarded patent 3,151,028, rights to which were assigned to Lever Brothers Company.

The tablet to remove food debris was developed by Donald Ian Hay, Bedford, England; Cornelius Schram, Pavenham, England; and Brian James Wagg, Sharnbrook, England.

They suggest that salt, which also increases salivation, could be added to the sugar and weak acid in the tablet or lollipop.

### Satellite Instrument Protector

A method of foaming plastics while a satellite or rocket is returning through the earth's atmosphere in order to protect and support the instrument payload when landing on water earned patent 3,150,387.

Frank M. Ballentine Jr. and the late George F. Look of Hampton, Va., developed the foam generator, which was used on a Cajun one-stage rocket fired in April, 1961. In-flight foaming, as reported in the patent, has been replaced by other methods, Mr. Ballentine said, but it could be developed further.

### Alloy of an Alloy

A process of making an alloy of an alloy, now in the research stage, was granted patent 3,150,443. Rights were assigned to E. I. du Pont de Nemours and Company, Wilmington, Del., by Guy B. Alexander and Paul C. Yates of Brandywine Hundred, Del., and William H. Pasfield, Sayville, N.Y.

Thoria-dispersed nickel in powder form, which is an alloy, is combined with other metals to form a double alloy having improved high-temperature characteristics and easy workability.

### 'Fooling' a Missile

The infrared radiation that jet aircraft spew behind them is imitated in a method

for "fooling" a missile, thereby changing its course from the intended target, that was awarded patent 3,150,848.

Most infrared detectors are made of lead sulfide, telluride, selenide or indium stibnide with germanium filters. Samuel E. Lager of Somis, Calif., has found that a mixture of a pyrophoric material, an oxidizer and an inhibitor such as polyglycol will, after burning, emit infrared radiation at just the wavelengths at which these detectors are most sensitive.

A jet plane leaving a series of these decoy targets in its wake could thus "fool" a homing missile. Mr. Lager assigned patent rights to the Government through the U.S. Navy.

### Other Patents of Interest

A rocket engine using liquid fuel in which the amount of thrust can be varied as needed. Frederick R. Hickerson of Newton, N.J., assigned rights to patent 3,150,485 to the Government through the U.S. Navy.

A power-operated hair brush that can be disassembled for cleaning. William D. Taylor of Wilmington, Del., and Le Roy Crookes of West Chester, Pa., assigned rights to patent 3,150,393 to Ronson Corporation, Woodbridge, N.J.

A series of chemical compounds useful as hypnotic agents and in the treatment of pre-menstrual tension. Albert Bowers and John Edwards, Mexico City, assigned rights to patent 3,151,132 to Syntex Corporation.

Two methods of using the gas called a plasma to accelerate space vehicles after they are above most of the earth's atmosphere. The Aerospace Corporation, Los Angeles, Calif., was assigned rights to patent 3,150,483. General Electric Company was given rights to patent 3,151,259.

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## Constant-Temperature Measurement Lab Opens

➤ THE DOORS to a new constant-temperature laboratory, where machines capable of measuring a few millionths of an inch are to be built, have been opened.

The laboratory will be kept at a near-perfect 68 degrees Fahrenheit. This is done in part by allowing air to enter the laboratory at floor level and taking it out at ceiling height, rather than the conventional ceiling-to-floor pattern. Moore Special Tool Company, Inc., Bridgeport, Conn., built the laboratory.

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## Glass Still Produces High-Purity Water

➤ AN ALL-GLASS still has been developed at the Corning Glass Works, Corning, N.Y., to produce high-purity water at the rate of ten liters per hour.

Weighing 95 pounds when operating, the still is contained in a rust-proof aluminum cabinet. All pieces of equipment with which the water comes into contact are electrically inert and corrosion resistant.

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