

A. Michael Noll, EE '61

Electronic Computer — Friend or Foe?

This article was written by Mike Noll, a senior electrical, as a prerequisite to being elected to Tau Beta Pi, the national engineering honor society. Selected as the best essay from this semester's pledges, it will be entered in competition with similar efforts of the other 108 chapters of Tau Beta Pi throughout the country.

The science fiction of former years prophesying man's enslavement by his very own electrical and mechanical creations has been the recipient of much comical attention. But perhaps it now becomes necessary to look at our technology in a more serious vein with the purpose of analyzing and determining just how great a threat to our existence the engineer's creations might become.

Automation can rapidly be dismissed as any threat to man, but the growing use of electronic data processing machines or computers cannot be so easily dismissed. Some people often find themselves concerned with the question of whether these computers possess an ability to "think." The process of thought implies a mind similar to man's which in turn implies a soul, conscience, or whatever name one might want to use to describe man's intellectual center which differentiates him from other life upon this planet. This power which enables man to sense and know his very own existence or being implies a free will which no machine can be made to possess. Therefore, these machines do not possess an ability to "think" in the same manner as man.

Some thought must be given to try to discover in what circumstances the computer might become threatening to man. The machines which are being used for the handling of large volumes of accounting and filing

information perform only as instructed and make no decisions on their own. A minor source of difficulty with these office machines might be a large dependence on the machine itself. As an example, the storage of information on magnetic tape requires the computer's facilities to decode the information stored to a form understandable to man. A responsibility more than a danger exists that the people programming the initial installation of the computer consider all possible exceptions to normal procedure. The office computer can be readily dismissed then as any great danger to anyone other than the office employees temporarily displaced by the introduction of the machine into their company.

The really dangerous conditions exist when the computer is used to make logical decisions. In these circumstances the learning capabilities or ability to acquire knowledge from experience is exploited to its fullest. As an example, I.B.M.'s checker-playing 704 at first committed many mistakes, but with further experience the correct procedures were stored in the machine's memory, and the 704 acquired an ability to play a better game of checkers than the man originally responsible for the programming. This example shows that perhaps a damper should be placed upon the machine's learning ability so that it is impossible for the machine to modi-

fy an innocent program into a dangerous combination of instructions. The plans for communication and transfer of information between differently located computers over existing telephone or microwave facilities is also potentially dangerous. It thus becomes conceivable for many machines to transfer information among themselves into a dangerous combination at a speed and in a form understandable only to themselves unless man should avail himself of their decoding ability.

The machines which work in the offices are involved only with the large-scale handling of data; no decisions are made. It is when the computer is given the responsibility of making decisions that the real danger and crux of the problem comes to the front. It is only when these decision-making machines are given the responsibility of affecting the lives of millions of people, along with a mass communication network among themselves, and an attitude of estrangement on the part of their creators, designers, and programmers, that the explosive mixture has been created. It is only necessary now to light the fuse and wait for conceivably the most devastating weapon on the face of the earth to wipe out the whole of mankind, sparing possibly only the insect world. At this point some people might find themselves rolling on the

(Continued on Page 16)

Electronic Computer

(Continued from Page 8)

floor with laughter. Still others will decide that this is a new form of science fiction replacing the Buck Rogers of former years. The engineer will probably say that these machines are capable of doing only what they are told or programmed to do, and that they are the salvation of man from the drudgery of routine work and decisions. Yes, the engineer is correct when his points are applied to the office machine which deals only with volumes of files, facts, and figures and which makes no decisions on this information. However, the machine which analyzes the world situation and arrives at decisions upon which

the government is to shape its foreign policy, or the machine which analyzes still other facts and arrives at decisions concerning the economic situation of a country, the political situation, or the war situation must not be viewed as the savior of mankind. Those who find this danger comical or look upon it as fiction only give proof to the estrangement that is occurring between man, his thinking powers, and the computer.

What then, you ask, should we do? As mentioned before, the office-type data processing machine is harmless and need not be given much attention. However, the decision-making machines must be fought and stopped before the only remedy becomes the

axe and the sledgehammer.

The responsibility rests solely upon the engineer who is the factual creator of the reasoning and decision-making machine. The engineer is now placed in a predicament where he has to deal with the normal human dislike of being forced to make decisions. This is certainly no easy task since a basic human frailty is involved. A full realization by the engineer that the computer does possess dangers to our existence—and these dangers are not figments of the imagination—will be a step forward in the right direction. However, if the present attitude of estrangement by the engineer towards his computer creations continues, what then?