

How To Make Fudge???

...by: Martha Moore

What makes up a wind tunnel's mind?
What makes up a woman's mind?

Questions every man has pondered (at least the latter one)...two questions I have often wondered about.

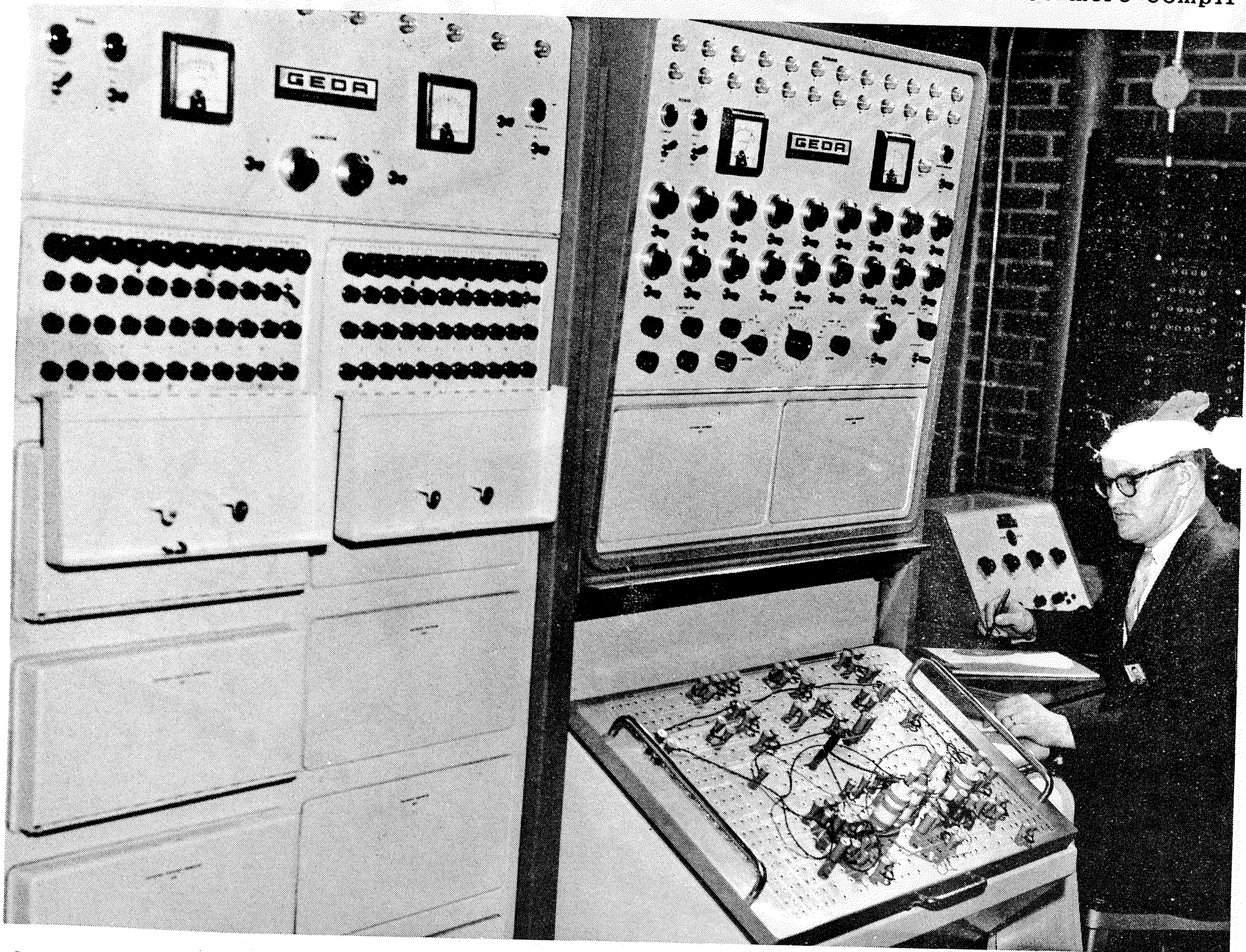
One afternoon, as I was passing through the Main Control Room of the Engine Test Facility, I noticed a small room enclosed in glass. Wondering the significance of such a room, I decided to investigate. As I entered, a large machine with hundreds of buttons and lights was flickering off and on. The additional machines

reminded me of a room filled with pinball machines.

'Mac' McGregor, of ETF's Control Section, was busy pushing a number of buttons so I waited until he had a few minutes and asked my questions.

He explained: "the 'monster' I was looking at was an analog computer." The word computer rang a bell but analog was something else.

My first question was what is an analog computer? His answer: "It is much like a slide rule but solves more compli-



A QUICK ANSWER — is recorded on the oscillograph portion of the analog computer. Mac McGregor watches the answer come in to a problem fed the 'monster' just a few seconds earlier. Yep, the answer is right.

ated mathematical problems. The mathematics which describe the behavior of the system (how the engine and its test cell will act under certain test conditions) can be set into the computer to represent the entire system."

He went on to say, "before the computer can be put to use, say in the case of a study or design, the engineer must first write the equation or equations. The problem may be too difficult to solve analytically (working the problem manually), so they put it to the computer."

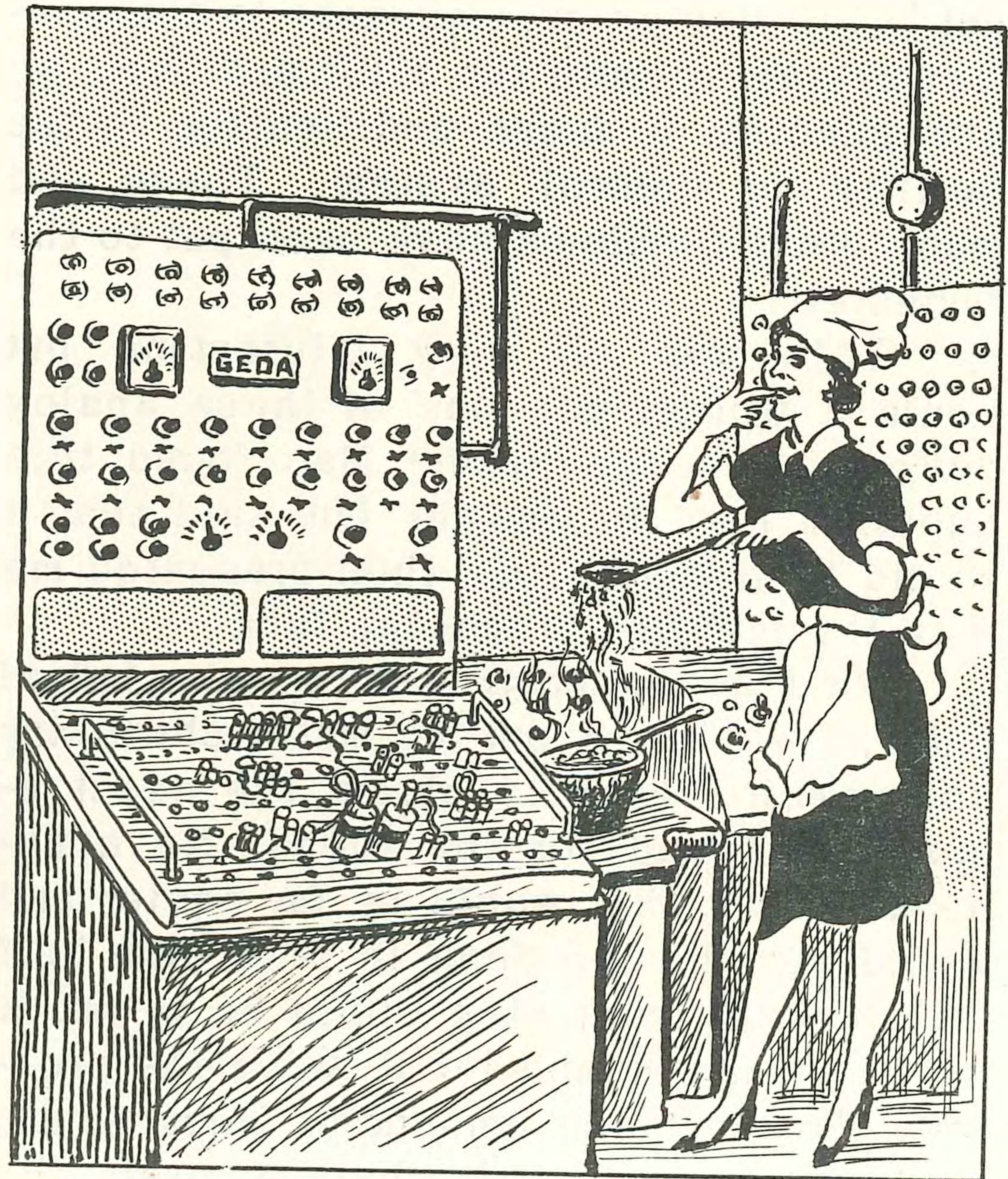
Actually the analog has three general uses in the Engine Test Facility; as a simulator, tester and computer.

At this point I was even more confused. Mac then explained the general uses of the computer in these different ways.

As a simulator it's used in checking out a new system still in the design stage (such as portions of the RJA). In this way, the possibility of any changes in modification and/or reconstruction can be eliminated before the actual facility is constructed.

It was becoming somewhat clearer. As a tester, it's used to determine the performance of a system or part of a system under operating conditions. (The performance of a system? Surely the computer couldn't control this?) Mac pinpointed it: the analog enables tests to be performed near design limits which might be dangerous to one's life and also the equipment under actual operating conditions. This was fantastic, that an analog computer had so many functions.

Finally, as a computer the analog furnishes solutions to equations or problems with a high degree of accuracy. There was something else I wanted to know. Could the analog computer do more than what you put to it? No; it only does what you tell it to do. In the case of a wrong equation you wouldn't receive a correct answer.



"THIS "ANALOG FUDGE" IS YUMMY!"

After the problem is put to the computer it is analyzed and the answers are presented in wave forms (lines) on an oscillograph. Then these wave forms are interpreted by the engineer for the correct answer.

Now what are the specific problems programmed for this analog computer in the Engine Test Facility? Also, is it possible for anyone other than an engineer to completely understand all this?

Mac assured me that it could get rather technical but he felt that with a little research and study, even I could use one of these analog computers.

There are of course many problems which are programmed for the computer.

One of the problems is to simulate a turbo-jet engine or any other engine, so that customers of AEDC may have access to a method of checking engine controls before it's actually placed in a test cell.

Another use to which the analog has been put is its use as a component in the control system of both the ETF and RJA, in emergencies or under modification to the facility or control system. These and many other problems have been put to the 'monster'.

This was all very interesting but could a woman use one of these analog computers in the home? Mac found this question hard to answer but said that it would be possible. He then presented me with the problem of making fudge.

What a wonderful way to make fudge! First, I would get out my math, chemistry and physics book to obtain the exact equation needed for the fudge. No cookbook for me, this would be far easier and would get the job done in less than half the time. My next step would be to put it to the computer and let it solve the problem. The problem: amount of ingredients, time of cooking and when to start the beating. The computer would then solve my problem and if desired, it would do the actual work for me. I would then program the computer to sense the quality of the fudge. My fudge would not only have the exact ingredients but would cook at the right temperature. I told Mac the problem of when to remove the fudge from the fire was my biggest concern. Even this problem could be solved and the possibility of the fudge burning was nil.

I told Mac that the first thing I planned on doing was to order an analog computer from "Sears", Surely they had them in stock and as far as the price, I could make monthly payments and have it payed for in no time. Hold on to your hat he said, I doubt that you could ever afford an analog computer. The price, approximately \$45,000.00.

I thanked him for his time and left a little bewildered. As I turned to leave, he was back at the 'monster', the analog computer.