

INVENTION

Research Aided by Machine Solving Difficult Equations

New Device, Consisting Entirely of Mechanical Parts, Does Valuable "Thinking" for the Scientist and Engineer

A NEW MACHINE which can solve the complex mathematical problems arising in the course of scientific research has been made by Prof. V. Bush at the Massachusetts Institute of Technology.

The "differential analyzer," as Prof. Bush calls his mechanical thinker, will do for the advanced branches of science and engineering what the adding machine has done for business accounting methods.

When a physicist or chemist makes a guess or forms a theory about a scientific problem, he can often express it in the form of what he calls a "differential equation." This is a collection of mathematical symbols which has a perfectly definite meaning, but yet the scientist cannot test it directly by experiment. The equation must first be "solved."

The result of this process is a solution or "integral" which, though also an equation, has the advantage that all the quantities occurring in it can be measured in the laboratory. The obtaining of the solution often requires a high degree of mathematical skill and much patience.

Prof. Bush's new machine promises to do this difficult and frequently occurring job.

Discussed Two Centuries Ago

The possibility of using machinery to solve scientific problems was discussed in detail two hundred years ago by the famous German mathematician Leibnitz, who invented the differential calculus. Leibnitz's idea was to relegate to the machine those parts of the process of thought which are inherently mechanical and repetitive. But though he was a great genius and inventor he did not have the accurate machine tools, new alloys, thermionic tubes and photoelectric cells now available to the modern engineer.

The present status of physics and engineering is peculiarly favorable to a development such as Leibnitz imagined. The department of electrical engineering of the Massachusetts Institute of

Technology has devoted itself to this problem.

The new differential analyzer has already been used to solve problems of electric transmission and has been tested for precision. It consists entirely of mechanical parts. The main problems encountered in its construction have been those of backlash.

Science News Letter, October 17, 1931

Setting the World To Streamlines

From Page 247

It can be seen that the matter of streamlining is making many of the automotive world's engineers sit up and think, if they haven't done so already. Streamlining has a wide application, but the idea seems most revolutionary where it concerns the ordinary automobile.

It is hard to realize that if our automobile were properly shaped, it would give us, even at medium speeds, twice as many miles on a gallon of gas. If such a thing is possible, why has it not been put into use years ago?

The answer seems to be that only with the introduction of aircraft have there been possible speeds high enough to justify a consideration of air resistance. Furthermore, it is probable that most automobile manufacturers have been slow to take streamlining seriously because they felt that such odd designs in car bodies would not be popular with the motoring public. At any rate, it is evident that automobile styles have kept the same general outline for almost twenty years.

Extensive streamlining, some authorities say, is not practical at present because long streamlined bodies would waste space within the automobile and make the parking problem even more acute. In contrast, a leading engineer predicts rear-engined streamlined cars for America within the next few years and points to the success Germany has already had with streamlining.

Science News Letter, October 17, 1931

For
Home Economics
reading that is

Authoritative

Professional

Alert

Attractive

Read

Journal of
Home Economics

Authoritative

Official organ of the American Home Economics Association.

Professional

Deals with the application of modern natural and social science to **healthful nutrition, suitable clothing, proper housing, wise use of income, efficient home management, child care and parental education, and family relationships.**

Alert

New books reviewed and noted. Current magazine articles, abstracted news of local, national, and international interest.

Attractive

Typography, good; content, stimulating; arrangement, satisfying; appearance, artistic.

Send for free sample copy or send \$3.00 for one year (12 issues), \$5.00 for two years, to

101 East 20th Street

BALTIMORE, MD.

mentioning *Science News Letter* in your order.