

stabbing at close quarters.

The World War rapidly re-introduced much of the old complications of front-line armament, again putting a premium on professional skill in killing. Up to the front, with rifle and bayonet, went grenades of half-a-dozen kinds, trench mortars, small-caliber cannon, automatic rifles, machine-guns, gas weapons of all degrees, flame-throwers, flares, rockets—a veritable orchestra of death. To the front also came tanks, and strafing planes flying low.

MATHEMATICS

Relativity Yields Formula Good for Many Machines

OF WHAT USE is relativity? This is a question frequently asked by the impatient layman. Theoretical enlightenment, the unification of diverse phenomena, etc., have been the kind of answer he has so far received. But now a more practical answer is given by Dr. Gabriel Kron of the Engineering Department of the General Electric Company at Schenectady. He finds that the mathematical methods of relativity, the famous "tensor theory" can be applied to dynamo electric machinery, in fact to all kinds of rotating electrical machinery.

And there is great advantage in so doing. Up to now, Dr. Kron points out, every different type of machine has a different mathematical theory, and the method that applies to one does not apply to another. Worse still, the same machine has many different theories according to the different engineers that have handled it, so that, as Dr. Kron says, we have as many separate theories as there are different types of machines and different types of engineers.

Months to Learn Theory

It takes several months, he says further, to learn the theory of one machine. Consequently each engineer knows thoroughly only his own machine. To know another he must start over again at the beginning.

Dr. Kron, instead, establishes a "set of tensors" for the "generalized machine" and shows how by a routine "transformation of coordinates" the formulae can be applied to any type of machine whatsoever. It takes no longer, or even so long, he maintains, to learn this general method than it

Probably no modern soldier is proficient in all modern front-line weapons; but with equal probability the long-enlistment soldier, such as the man of the German Reichswehr, has adequate command of several of them, just as a good orchestra musician can play half-a-dozen instruments acceptably.

Like the Pretorian Guard of Imperial Rome, a small, technically skilled force may make emperors—or break dictators.

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does to learn the theory of a single machine, and when the engineer has done so, he has the enormous advantage of having mastered every type of machine instead of only one.

In short, the tensor theory is like a universal language. It may be a little troublesome to learn, but once acquired you can get along without other languages.

Dr. Kron's method is presented in a formidable paper, ninety-one pages in length, in the *Journal of Mathematics and Physics* published by the Massachusetts Institute of Technology Press.

The Useful Tensor

The tensor theory was devised many years ago as a means of handling complicated sets of equations involving many unknowns and many dimensions of space. The tensor is a symbol that stands for a whole set of equations of a particular form. These symbols can be handled by themselves, thus saving the immense labor and possible confusion of writing down all the separate equations. The method has so far been applied only to the gravitational theory of relativity. Attempts to develop a universal unified field theory which should include both gravitational and electro-magnetic phenomena have so far failed. Dr. Kron's generalized theory of electrical machinery is, however, a kind of special unified field theory. It includes the electrical phenomena and the weight and inertia of the moving parts as well. He makes use of curved space and many spatial dimensions, even using when necessary an infinite number of dimensions.

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ETHNOLOGY

White "Witch Doctors" Scorned as Illogical

THE ENGLISH are the most illogical people living. This is the verdict of the African natives who associate with them.

And Dr. J. S. B. Leakey, British searcher for ancient human bones in Africa, who brought this news to the International Congress of Anthropological and Ethnological Sciences meeting in London, says:

"They are not unreasonable in thinking so."

The Africans are puzzled because the whites, so it seems to the blacks:

1. Practise witchcraft in many forms.
2. Attack witchcraft practised by the blacks.
3. Consider it wrong for Africans to punish members of their community practising black magic.
4. Refuse to punish people accused of killing by witchcraft on the ground that witchcraft is impossible.
5. Although attacking blackman's witchcraft, try to prevent Africans from using whiteman's "witchcraft."

Science as Witchcraft

The Africans are convinced that white men practise witchcraft, Dr. Leakey explained. And to support their contention they point to such modern marvels of science as chloroform, use of fingerprints in identifying criminals, making of photographs, which the natives consider is the catching of a man's shadow in a box, predicting eclipses, thermometers, blood tests, phonographs, radio, etc.

"We deny yet we fear witchcraft," Dr. Leakey observed. "We can not expect African natives not to believe in witches. It must be remembered that just 200 years ago the English condemned witches to death."

Dr. Leakey also contended that Europeans should go slow in attempting to change African marriage customs because the European models are seldom suitable for use among the natives.

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An entomologist reports that the coffee bean weevil has a curious head structure, the mandibles with which it grinds up its coffee-bean diet being entirely separate from the rest of its mouth—very much as if a human being had its teeth and jaws near his nose and the rest of his mouth where it is.