

as a necessary consequence of Riemann's geometry, when one only makes the supposition that there exists a "principle of least action" the domination of which we observe everywhere in physics. It is very surprising that choosing the simplest form of this principle in Riemann's geometry which is suggested by a very natural requirement, we find a combination of two functions, one of which leads to gravitation and the other to electromagnetism.

We considered here only the fundamental facts of electromagnetism, viz. those connected with the field. A later elaboration must show whether there exists a possibility of understanding the inner structure of matter through this new unification of gravitation and electricity. The reason for this is that the whole theory is based upon the idea that the equations which we have found are

valid *everywhere*, without exception. The special character of "matter" can be understood only as a consequence of the fact that there are certain small regions in space where the field-intensity becomes very high and the usual approximation which is permitted in weak fields and which corresponds to the classical laws of the electromagnetic field, is no longer valid. These regions are to be considered as the representation of material particles. We can expect to explain in this way in particular the fundamental identity of the change of every electron, and possibly in general the existence of universal constants in nature.

At present no evidence has yet appeared which would tend to show a probable connection between this field-theory and modern quantum-theory.

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## CHEMISTRY

## Third Competitor Enters Race for Missing Element 87

**B**LINDNESS threatening Prof. Gustave A. Aartovaara of Helsingfors, Finland, in his search for the missing chemical element 87, has aroused the anxiety of scientists of the U. S. Bureau of Standards, who have been working with him in seeking one of the last two remaining building blocks of the universe. Glass fragments severely injured his eyes as a result of an explosion of his apparatus, reports state.

As a third competitor in the race to identify this elusive metallic element, Prof. Aartovaara of the Helsingfors Technical University, had sent a sample of his preparation to be examined by Dr. W. F. Meggers of the U. S. Bureau of Standards, whose report on the optical spectrum has just been announced. The announcement comes on the heels of a rival claim by Prof. Jacob Papish of Cornell University, who declared he found the missing alkali in the rare mineral samarskite. The third contestant for the honor of completing the chemists' periodic table is Prof. Fred Allison of the Alabama Polytechnic Institute, who first announced the discovery of the missing alkali about a year ago, through the use of a magneto-optic method of his own invention.

No specific evidence that the Finnish preparation actually contains number 87 has been found, Dr. Meggers an-

nounced, though the spectra of all the related alkali metals, including sodium and potassium, were found. The crucial lines in the optical spectrum, he declared, will lie in the infra-red region where investigation is troublesome. Only the X-ray spectrum, used by the Cornell scientists, can decide the question definitely, in Dr. Meggers' opinion.

On the other hand, Dr. Meggers doubts whether Prof. Papish has given convincing measurements actually proving the existence of number 87 in his extract.

Prof. Aartovaara's substance differs from those of Prof. Allison and Prof. Papish in that it is radioactive, as might be expected from its nearness to radium in the periodic table of chemical elements. The reported explosion that injured Prof. Aartovaara is believed to have been due to the action of the radioactive rays on the solution.

Chemists recall, however, that a radioactive alkali solution was examined in 1908 for the missing element by the German chemist, Ebler. None was found. The activity was due to a trace of a known radioactive element.

Similar hopes entertained by investigators about radioactive alkali preparations have all been unfulfilled in the past.

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## ASTRONOMY

## Faint Nebulae May be Most Distant Objects

**A** GROUP of faint nebulae, just visible through the large reflecting telescope of the Bergedorf Observatory, Hamburg, has been discovered by Dr. Walter Baade. He believes them to be considerably more distant than another group of faint nebulae, like those in the constellation of Ursa Major, the great bear, which he discovered several years ago. These have been shown, by astronomers at the Mt. Wilson Observatory, to be about 70 million light years distant.

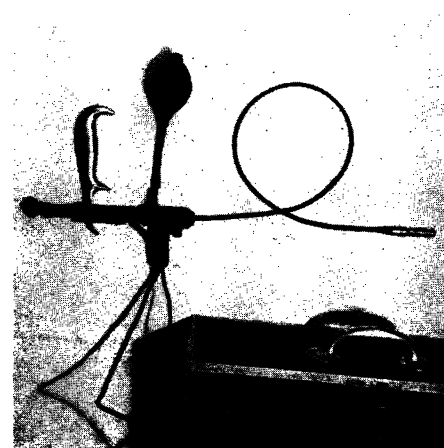
Only one more distant group of objects have been measured—some nebulae in the constellation of Leo, the lion—which appears to be about 105 million light years away. If the Ursa Major group is more than this, it will be the most distant object known to astronomers. The newly discovered nebulae are within a distance of about half a degree, the diameter of the moon, of the star Merak, the pointer farthest from the pole star, at the corner of the great dipper diagonally opposite the handle.

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## MEDICINE

## Camera and X-Rays Used to Locate Ulcers in Stomach

**A** COMBINATION of X-rays and a tiny camera which is lowered into the stomach now gives the physician or surgeon a means of determining more exactly the location of ulcers or other lesions in the stomach, Dr. P. E. Thal



### EIGHT STOMACH PICTURES

Are taken within the little bulb on the end of the spiral tube after it has been inserted in the organ.