



Uncurling Ferns

**F**ERNS are beginning to come up in woods all over the northern half of the world just now, wherever spring has arrived. There are hundreds of species of them, and they vary in structure and appearance as widely as can well be imagined. Yet they all open up their leaves in exactly the same way: by rolling them out of a tight spiral coil. Not only the main stem, but each leaflet, and in the fine-leaved ferns each subdivision of the leaflet, faithfully repeats this pattern.

Ferns are practically alone among plants in opening their leaves in this way. Only one other group, the cycads of tropical and subtropical lands, have this leaf-uncurling habit. And it is pretty well agreed that cycads and ferns are children of a common ancestry.

There is something very appealing to the basic esthetic sense of mankind in this graceful spiral pattern, so that we see these uncurling young fern leaves in all sorts of decoration and design. Sometimes they are even credited with influencing a design, when the resemblance is probably only coincidental.

Thus, it is often asserted that the elaborately carved and molded heads on the croziers used as badges of office by bishops of the Catholic and Episcopal churches are modeled after the tips of uncurling fern leaves. This idea seems to have arisen since artists, striving to make ecclesiastical decorations always more beautiful, added leaves and even flowers to the carvings of the crozier-heads.

Actually, however, these croziers originated as simple shepherd's crooks, to symbolize the churchmen's "pastoral" relation to the faithful. It was the enthusiasm of the artists that curled the simple crook shape into a spiral and proliferated so many ornaments on it.

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## PHYSICS

## Super-Speed Cosmic Rays "Clocked" by Scientist

**L**IGHT travels exceedingly fast; and 10,000,000,000 volts of energy is a lot. A cosmic ray electron whizzing along with the speed of light and having this much energy is not an easy thing to handle; not exactly the sort of thing you would time with a stop watch. But physicists can measure energies of cosmic rays, thanks to magnetism and the Wilson cloud chamber.

Heretofore rays having energies up to four billion volts have been measured but none higher. Now comes word from Paris that ten billion volt rays have been mastered.

To measure such energies, physicists see how much a ray is bent by a magnetic field. Given strong enough magnets, theoretically any energies could be measured. But strong magnets are expensive.

## PHYSIOLOGY

## Hypnotic "Sleep" Not Same As Real Sleep, Waves Show

**H**YPNOTIC "sleep" is not at all like real sleep, at least in the physiological state of the brain.

Evidence to this effect has been produced at the private research laboratory of Dr. Alfred L. Loomis, in "brain wave" studies conducted jointly by Dr. Loomis, Prof. E. Newton Harvey of Princeton University, and Garret Hobart of the Loomis Laboratory. Brain waves were registered from the same person in waking, normal sleeping, and hypnotic states. The wave patterns produced under hypnosis were like those of a waking rather than a sleeping person.

The researchers therefore conclude, "It would seem that the term hypnotic 'sleep' is not a correct one for the hypnotic state, at least as measured by this criterion." (*Science*, Mar. 6).

Brain waves are rapid, rhythmic fluctuations in the electric potential of the brain. Waking persons, with their eyes closed and under no mental stress, produce them in such a way that they register on the recording apparatus in pat-

terns called "trains." Sleeping persons produce a much more rapidly fluctuating type of pattern, referred to as "spindles," and also irregular random waves.

Other physicists have measured the cosmic ray super-energies by using the earth's magnetic field. From the decrease in the number of rays which take place when one approaches the equator the energy can be calculated; also the fact that more rays come from the east means that the majority of them carry positive electric charges.

Dr. Le prince-Ringuet's experiments confirm these results. He finds that nearly all of the very high energy rays are positive, and that the lower energy ones are half positive, half negative.

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Waking persons in a totally dark room produce brain waves in "trains," but if the tiniest spot of light is turned on, the "trains" stop at once.

Moderate mental activity does not seem to upset the regularity of arrival of the brain wave "trains." A person sitting quietly with his eyes shut keeps on producing them if some one else reads to him, or if he does simple mental problems in arithmetic. But in a difficult or embarrassing mental or emotional situation, the "trains" usually stop.

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