murids, but, with Mr. Forsyth, we think that it ought to constitute a family apart, akin to but distinct from that of the present Lemuridae. In every respect, it is a very specialized type, which, after it has become better known, will doubtless form a new link connecting the Lemurids with the Ungulates. We know that Mr. Milne-Edwards has shown that the makis, by their internal organization, are closely related to the Suidæ, and we may recall the fact that Cuvier described the *Adapis* as a small ungulate akin to the daman. It is not impossible that the *Megaladapis* was a Lemurid on the way to a transformation toward the type of the Ungulates, the same as the aye-aye or *Cheiromys* is a Lemurid that is becoming transformed under our eyes into a rodent.

The skull of the *Megaladapis* came from the same marsh of Ambolisatra in which not long ago were found the remains of the *Pygornis* and hippopotamus of which we have already spoken. The geological strata are of recent origin, for we find therein the bones of the domestic ox introduced into Madagascar by man. All the bones have that modern aspect which paleontologists characterize by saying that they are subfossil, and several exhibit traces of the hand of man.

The *Megaladapis* has however a well-marked tertiary aspect, and this is the first time that a fossil mammal so different from all the mammals now living has been found in Madagascar. We can scarcely doubt, however, that this large Lemurid lived at a relatively recent epoch, and was hunted and eaten by the first men who introduced the domestic ox into Madagascar.

What gives much weight to this opinion is the following passage from Flacourt, the first historian of the great African island, and which seems to refer to the *Megaladapis* or to some large Lemurid closely related to it:

"The tretretre, or tratratratra, is an animal as large as a two-year-old calf, and which has a round head and a man's face; the fore-feet like those of a monkey, and the hind ones also. It has curled hair, a short tail and ears like those of a man. It resembles the tanache described by Ambroise Paré. It has been seen near Lake Lipomani, in the vicinity of which is its lair. It is a very solitary animal that the people of the country hold in great fear and run away from, as it also does from them."*

With the exception of the round head and the size, which is doubtless exaggerated, this description by Flacourt applies to the *Megaladapis* very well. If we reflect, moreover, that the head of the living animal must have been covered with one of those shocks of curled hair which, in the present Lemurids, greatly increase the volume of it behind the ears, it will be agreed that there exists at least a singular coincidence between this description and the discovery recently made in Madagascar. The data given by Flacourt as to the fauna of the island are, as a general thing, very accurate, and most of the animals that he describes have been found by the naturalists who have succeeded him. It is therefore permissible to believe that rare survivors of this large species of Lemurid were still living, "very solitary," as he says, at the epoch of his sojourn in Madagascar—that is to say, in the middle of the seventeenth century.

However this may be, an examination of the skull of the *Megaladapis* permits of representing the latter as a Lemurid of a size comparable to that of a mandrill, and, like the latter and the indris, destitute of a tail. Like the cynocephalous monkeys, it must have inhabited mountainous and rocky districts and have often remained upon the ground than in trees. It ascended the latter only to obtain its food, which must have consisted of small birds, leaves, and fruit. Its strength must have been very great, and when it was attacked, its teeth and its robust arms must have rendered it formidable to man himself. But its intelligence was of a low order, so that it was easily exterminated by the population (probably of Malaisian origin) that colonized Madagascar, and that seized every opportunity of killing it with spears and *sagaies* in order to feed upon its flesh. We can wait to soon possess new data in regard to this large Lemurid and to the other mammals, now extinct, that constituted the tertiary fauna of Madagascar. Among the bones recently sent from this island to the Museum of Paris, and a description of which will be given by Mr. Milne-Edwards, there is a humerus that might well have belonged to the *Megaladapis*.—E. Trouessart, in *La Nature*.

ACTION OF LIGHT ON BACTERIA.†

By Prof. H. M. WARD, F.R.S.

A THIN film of gelatine or agar, in which spores or bacteria are evenly distributed, is spread over the flat bottom of a shallow glass dish. The lid of the dish is a plate of ground glass, in which one or more slots, about $\frac{1}{2}$ inch wide and $2\frac{1}{2}$ inches long, are pierced. The spectrum is so arranged that the light rays fall perpendicularly on the film carrying the spores, etc., and can only reach the latter through the slots, all other parts of the plate being covered by tin foil and black paper.

When the film has been thus locally exposed for a certain number of hours to the spectral rays, the culture is put into the incubator. All those parts protected from the light entirely behave as in any ordinary culture—the spores germinate out and develop colonies, and the previously transparent film (transparent because the spores are too minute to affect it) becomes opaque.

Under the slot, however, the spores were exposed to the various rays of the successive regions of the spectrum. On one part of the exposed area the infra-red rays fall; on another the red, on another the orange, and so on with the yellow, green, blue, violet, and ultra-violet rays.

If any of these rays kill or injure the spores they fall on, obviously the latter will show the effect, not ger-

minating at all in the incubator, after exposure, or by germinating more or less slowly and feebly in comparison with the uninjured spores.

Wherever the spores do not germinate at all, the gelatine remains transparent; where they only germinate and develop into slowly growing, feeble colonies, the transparency of the gelatine film is merely clouded more or less; whereas where they germinate and develop as vigorously as on the unexposed parts of the film, the latter is rendered quite opaque.

Obviously these differences, or contrast effects, can be photographed, and the following is a photograph of a plate treated as described.

ACTION OF LIGHT ON BACTERIA.

In all cases so far examined, both the solar and electric spectra show that no action whatever is perceptible in the infra-red, red, orange, or yellow region, while all are injured or destroyed in the blue and violet regions.

The exact point when the action begins and ends is not the same in all the experiments, though very nearly so, but it must be reserved for the detailed memoir to discuss the various cases.

Broadly speaking, the action begins at the blue end of the green, rises to a maximum as we pass to the violet end of the blue, and diminishes as we proceed in the violet to the ultra-violet regions.

Some especially interesting results were obtained with the electric spectrum. In the first place, the results with glass prisms, lenses, etc., were so feeble that it was necessary to employ quartz throughout.

Secondly, the bactericidal effect is found to extend far into the ultra-violet. The intervention of a thin piece of glass results in the cutting off of a large proportion of effective rays.

These results suggest evidently that the naked eye light may prove to be a very efficient disinfecting agent in hospital wards, railway carriages, or anywhere where the rays can be projected directly on to the organism.

THE ACARI.

At the recent annual meeting of the Royal Microscopical Society, Mr. A. D. Michael, president, delivered the annual address. He took for his subject the growth and present state of our knowledge of the Acari. The name "Acarus" was probably first used by Aristotle; it means uncuttable. But Aristotle did not anticipate Cambridge rocking microtomes, and the president exhibited a set of over 120 serial sections cut from a far smaller Acarus than Aristotle could ever have seen. The president then described what an Acarus really is and in what respects it differs from other Arachnida, a distinction which is erroneously stated in almost all text books of zoology. The classification of the group practically began with Linnæus; it was shown how difficult it is to identify a Linnean species, and the progress of classification was shortly traced from the single Linnean genus to the two hundred and twelve genera admitted by Trouessart, one of the latest writers on the subject. The president then referred to the fact that many of the predatory Acari had not any special organs of vision, and yet that they were most active creatures, and would catch such agile insects as Thysanuridæ without constructing any web or trap, and did not seem to suffer in the least from their eyeless condition; he had seen small and weak Acari quietly waiting until large ones had finished feeding before they ventured to attack the leavings, although both were blind. The various forms of acarine parasitism and commensalism were then described, including one where a parasite lives in the fur of the rabbit, not feeding on the host, but on other parasites which really do so, and the number of these which it will destroy is amazing. The president then illustrated the principal families of Acari by selecting one or two instances of each, which were specially interesting either from their habits, their anatomy or otherwise. The Sarcopitidæ, or bird parasites, were represented by a parasite of the cormorant, discovered by the president, in which the male has one leg much larger than the other; and the skeleton of the body is greatly modified to support it; but the enlarged leg and modified skeleton are on the right side of the body in some specimens and on the left in others. The so-called cheese mites were referred to in order to describe the hypopus stage in the life history of many of them; when the creature, which is originally soft and easily killed by heat or exposure, suddenly becomes hard and able to endure almost all vicissitudes, and also to live for a long period without eating; it is then provided

with special organs for adhering to insects, and thus the species are widely distributed under circumstances where they would otherwise perish. The president then spoke of his recent researches into the association between many Acari (Gamasids) and certain ants in whose nests they live, and of a still stranger and hitherto unrecorded case, even more lately observed by him, in which a species of *Acarus* (*Bdella*) lives habitually in a spider's web in harmony with the otherwise most ferocious occupant. The speaker then shortly described his recent discovery of the extraordinary way in which female Gamasids are fertilized, a spermatheca capsule being conveyed to its destination by the mandibles of the male. Finally, the descent of the Acari was discussed.

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* De Flacourt, *Histoire de la grande Ile de Madagascar* (1658), p. 154. As to the "tanache," or rather "thanaeth," of Ambroise Paré, the description of which is found in the book on *Des Monstres tant terrestres que marins, avec leurs Portraits*, the passage that refers to this animal is marred by fabulous traits that we are surprised to find coming from the pen of the great surgeon, so full of learning and good sense in the rest of his writings. We see, nevertheless, that it is a question of a large anthropoid monkey, probably of a chimpanzee, carried on board of a ship commanded by Andre Thenet in his voyage through the Red Sea. (Cf. A. Paré, *Œuvres Complètes*, Malgaigne edition, 1840, t. III, p. 786.)

† Lately read before the Royal Society. *Nature*.