sign, but no true magnetic ones. This statement has been made quite clearly by James Clerk Maxwell in his "Treatise on Electricity and Magnetism." Maxwell tried to prove that there was no such thing as true magnetism. May I remind you here that *in principio* it is impossible to prove from experiments that something is non-existent. Furthermore, the two experiments which Maxwell quotes are not conclusive. The first one states that a broken magnet gives two entire magnets with equal poles. If a non-magnetic piece of iron is broken, it can be observed that the fragments become magnetized in various ways on the broken ends. The effect is the same when a non-electrically charged glass or sulphur rod is broken, and shows at the ends various kinds of electric charges. This phenomenon is easily explained, since each breaking creates constriction. Each constriction, however, creates electricity and magnetism. The breaking experiment therefore, does not prove that true magnetism does not exist, as Maxwell stated.

The second experiment, which probably originated with the ancient Chinese and is quoted by P. Peregrinus (*anno* 1269), indicates that a magnet floating upon water directs itself but does not move. From this has been concluded that the amount of north and south magnetism is equal in each magnet. It is easy to perceive that the mobility of such a big floating magnet is much too small to show slight differences of charge. The particles on which my observations were made have a mobility a million times greater than that of the floating magnet of Peregrinus. Such particles irradiated with light move in a homogeneous magnetic field in the lines of force. Thus my sensitive experiment gives evidence of the existence of true magnetism. In other words, the Peregrini-Maxwell experiment turns out to be positive in my small condenser, when light is used.

My interpretation not only explains all observations in a rather simple manner, but also makes a number of new conclusions possible. One of these is that light magnetizes matter. Leo Banet and I succeeded in magnetizing small pieces of iron by means of irradiation with ultraviolet rays. Lilly Rona has expressed the idea that, concluding from these experiments, it should be possible to extract electricity from the beam of light originating from these stationary components. I believe that she is right, and that it could be done without the use of the photoelectric effect, that means without deteriorating and decomposing matter itself.

Under the influence of the light matter coagulates more readily because of the induced poles (charges). Sometimes the light separates amorphous and crystalline particles, and sometimes it makes crystals grow toward it (heliotropism of crystals).

Light causes irregularities in Brownian movement and therefore also in diffusion because of photophoresis.

Light causes ponderomotive forces to act upon matter apart from the effects of the light pressure. These ponderomotive forces are produced by the stationary components and induced charges. The latter have attracting or repelling effects.

I determined the magnitude of the charge of the magnetic ion and found it to be of the same order of magnitude as the electric one.

A new phenomenon which I called the trembling effect found a simple explanation, the frequent change of the magnetic charge occurring predominantly in weak magnetic fields in the beam of light.

Leo Banet has drawn important conclusions in regard to the effects on the sun and the earth that will be described in another paper.

Now I shall say a few words about the *magnetic current.* We have shown the existence of unipolar magnetic charges, which flow in a homogeneous magnetic field in or against the direction of the lines of force. This can be observed directly by means of a microscope. Therefore we have to deal with magnetic currents in a physical and technical sense. Around a magnetic current there exists an electric field. Furthermore a magnetic current produces heat in a medium conducting magnetism.

I have attempted to show that a beam of light causes or induces not only heat and electricity but magnetism at the same time.

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EFFECT OF THYMUS EXTRACT INJECTIONS ON RATS

FOLLOWING the report of Rowntree and coworkers[1] on the marked precocity of development and growth resulting from daily peritoneal injections of thymus extract to successive generations of rats, an attempt was made to repeat these findings. Correspondence with Drs. Rowntree and Hanson regarding the preparation of the extract greatly facilitated our work. No positive findings were obtained by us, even after carrying the rats to the F_4 generation. This was not reported at the time because we felt that perhaps the calves from which the thymus glands were obtained were not of the age specified.

With the publication of a modified method for the preparation of the extract by Steinberg,[2] the work was repeated, using this method of preparing the extract. This time we had a source of supply from which we could definitely obtain thymus glands from calves of the type stressed: local stock, milk-fed, two

[1] L. G. Rowntree, J. H. Clark and A. M. Hanson, *Am. Jour. Physiol.*, 109: 90, 1934.

[2] A. Steinberg, *Endocrinology*, 23: 581, 1938.

to six weeks old. As before, the rats were carried to the F_4 generation, with no positive findings resulting.

In both series of experiments, chemical findings for glutathione-like substances were always within the limits specified by the Philadelphia workers.

In connection with the above, it is well to note that negative findings in mice[3] and in rats[4] have been reported. Positive findings in rats have been reported from the Wistar Institute,[5] and positive findings regarding sexual maturity only in mice by Lafon.[6]

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A NUCLEUS-LIKE STRUCTURE IN A STAPHYLOCOCCUS

IN the course of studies on the variability of bacteria, we encountered a greenish-black staphylococcus which spontaneously dissociates into a yellow form.

The resting cell of this staphylococcus contains a single granule, spherical or slightly ellipsoidal in form and located near the center of the cell.

The growing cell contains either a single rod-like granule parallel to the long axis of the cell, or two granules spherical or ellipsoidal in shape and lying in the polar regions across the long axis of the cell. Instead of being rod-like, the granule may often be kidney-like.

These granules have the following properties: (1) They are pseudo-chromotropic with old solutions of methylene blue. (2) They are strongly acidic, staining deeply with methylene blue at pH 1.8–2.0. (3) They are not dissolved in 10 minutes by boiling water. (4) They are not dissolved by 0.02–0.5 per cent. sodium bicarbonate after a contact of over two hours. (5) They do not disappear when the cells are subjected to starvation for as long as 24 hours at 37° C. (6) They do not disappear upon frequent transferring. (7) They give a clear-cut Feulgen reaction under all the conditions listed above.

The constancy of these granules, their position, numbers and morphology in resting and growing cells, added to the properties enumerated above, speak strongly for their nuclear nature. Indeed they appear to fulfil all the requirements of nuclei.

The size of these granules, compared to that of the cell, is strikingly large, and yet we have been so far unsuccessful in our attempts at observation in the living cell, indicating that, in the living state, their refractive index is close to that of the cytoplasm.

We were unable to detect any type of reserve material in the cell of the staphylococcus.

The details and records of the present work will be published elsewhere.

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HOW MANY SPECIES OF PLANTS ARE THERE?

RECENTLY, during the course of investigations of general systematics of plants, it has been noted that current text-books of botany for university students contain discrepant and often contradictory statements of the number of existing species of Angiosperms. For example, according to a dozen books examined, the number of species of all Angiosperms varies from 133,000 to 175,000; of Dicotyledons 100,000 to 140,000; and of Monocotyledons 24,000 to 35,000. The number of Gymnosperms usually is said to be 500, and the total of all living species of plants is frequently estimated to be about 250,000. The methods used by the authors of these books in obtaining these figures is not revealed, but it is clear that the relatively simple expedient of consulting reasonably accurate recent sources of taxonomic data was not employed.

It occurred to me, therefore, that, in view of the fact that these estimates appear to have been based upon antiquated data, it may be worthwhile to present a more accurate summary. According to a compilation made partly from the eleventh edition (1936) of "Die Syllabus der Pflanzenfamilien" (Engler and Diels), and partly from recent monographs and other sources, the Angiosperms contain a total of 195,000 known species; of these, 155,000 are Dicotyledons, and 40,000 are Monocotyledons. There are approximately 640 species of Gymnosperms. On the basis of figures supplied by G. M. Smith,[1] there are (with the addition of Bacteria) 107,570 species of Thallophyta and 23,000 species of Bryophyta. The Pteridophyta contain about 10,000 species, of which 9,000 belong to the Filicales.[2]

Thus, the conclusion may be drawn, that on a conservative basis, the approximate total number of different species of known living plants is slightly in excess of 335,000. The rate of discovery and description of new species of flowering plants during the twenty-five year period from 1910 to 1935 has been reported by E. D. Merrill as averaging at least 4,800 per year.[3]

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[3] G. van S. Smith and E. E. Jones, *Proc. Soc. Exp. Biol. and Med.*, 43: 157, 1940.

[4] H. B. Vickery, Carnegie Inst. Wash. Year Book No. 37, 335, 1937–8; H. Chiodi, *Rev. de la Soc. Argent. de Biol.*, 14: 326, 1938; W. O. Nelson and D. A. McGinty, quoted by Nelson in "Sex and Internal Secretions," 2nd Edition, 1939, Chapter XXI.

[5] *Wistar Institute News Letter*, April 15, 1936.

[6] M. Lafon, *Jour. Exp. Biol.*, 13: 140, 1936.

[1] "Cryptogamic Botany," Vol. 1, 1938, McGraw-Hill Book Co.

[2] C. Christensen in Verdoorn's "Manual of Pteridology," The Hague, 1938.

[3] *Memoirs Brooklyn Botanic Garden*, 4: 57–70, 1936.