it, except to refer to it in a general way.* I am glad that the discussion arising from Mr. Larkin's letter has furnished such opportunity, and avail myself of it to give it to "SCIENCE" for publication. GEO. W. RACHEL.

NEW YORK, *April* 11, 1881.

MICROSCOPICAL NOTES.

Recent investigations respecting the pathological relations of diphtheria, and the discovery of a micrococcal organism in the false membrane, have made it almost certain that the morbid poison which gives rise to the disease is a parasitic organism. M. Talamon now states that he has succeeded in finding this organism in eight cases. In the condition of complete development they presented a characteristic mycelium and spores. The former are tubes with partitions from two to five thousandths of a millimetre in length. These under favorable circumstances, elongate and bifurcate, the bifurcations being characteristic in consequence of their incurved branches, like the sides of a lyre. In other conditions the mycelia do not become elongated, although they multiply so rapidly as to cover the surface of the cultivated liquid; they remain short and assume irregular forms, and give rise to numerous straight rods. The spores are of two kinds, round or oval, which may be termed the spores of germination, and rectangular spores or conidia. The latter characterize the species. They form small rectangles of various sizes, their length being sometimes fifteen thousandths of a millimetre. They may be isolated or united in festoons or zigzag chains. At first homogeneous they soon become filled with small round granules, highly refracting, and of the size of ordinary micrococci. The round or oval spores are those which by their elongation constitute the mycelium. They appear as clear points, from three to five thousandths of a millimetre in diameter, in the middle of a mass of granular material.

Animals and birds inoculated with these organisms all died developing the characteristic false membrane.

These facts are very important, and open up an entirely new field of investigation, and M. Talamon already hints that he has a clue as to the source from which the organism is derived in the case of human infection. We trust that those of our subscribers who possess microscopes will follow up the researches of M. Talamon, which promise results of the highest value to science and to humanity.

NOTES.

THE bicarbonate of soda prepared by the Solvay process contains from two to three per cent. ammonia, and is therefore not suitable for pharmaceutical use, and for certain technological purposes.

A NOVEL FERRIC HYDRATE.—C. Graebe has received from the Baden Aniline and Soda works a reddish crystalline substance deposited in cast-iron vessels in which potash has been melted. It has the same composition as hematite and gœthite, but its specific gravity is only 2.93.

CHLORINATED DERIVATIVES OF CARBAZOL.—On treating carbazol suspended in acetic acid with chlorine, the liquid turns blue, yellowish, greenish, and, lastly, red. If the reaction is then interrupted the product is trichlorocarbazol in white needles, melting at 185°. If the process is continued for ten or twelve hours, hexachloro-carbazol is produced, fusible at 225°.—W. KNECHT.

PRESENCE OF ALCOHOL IN THE SOIL, THE WATER AND THE ATMOSPHERE.—A. Muntz has previously shown that it is possible to detect exceedingly slight traces of alcohol by converting it into iodoform. On concentrating the alcohol in a small volume of water by means of fractionated distillation, and using the microscope to verify the presence of iodoform, he was able to recognize with ease 1-300,000th of alcohol mixed with water. He has since improved the process so as to detect quantities even smaller than 1-1,000,000. During the last four years he has applied this method to river, spring, and sea-water, as well as to rain and snow. The results obtained leave no doubt of the presence of a neutral body, more volatile than water, and yielding iodoform. He thinks alcohol is the hydro-carburetted body present in the atmosphere, indicated by the researches of Boussingault and De Saussure. Soils rich in organic matter yield alcohol in such proportions that its essential properties may easily be verified.

NEW SYNTHESIS OF DESOXY-BENZOIN AND CRYSENE.—MM. Graebe and Bungener have obtained desoxy-benzoin by causing the chloride of phenyl-acetic acid to react upon benzol in presence of aluminium chloride. By the same reaction, naphthalin being substituted for benzol, they produce benzyl-naphthyl-keton. They then reduce with hydriodic acid and phosphorus at 150° to 160°, and pass the vapors of the carbide thus obtained through a red-hot tube, when 4 atoms H are removed and chrysene remains.

CERTAIN PHENOMENA OF OPTICS AND OF VISION.—M. Trève mentions the fact that the flame of a lamp appears brighter, and that a vertical shaft, a post, or mast is seen more distinctly through a vertical than through a horizontal slit, whilst a house, a landscape, or the disk of the sun or moon is perceived more clearly through a horizontal slit. He finds similar differences in photographs according as the light passes from the object to the plate through a vertical or a horizontal slit, and ascribes the results to the action of diffused light.

COPAL varnish for mounting objects for the microscope has been suggested by Mr. Julien Derby of the Quekett Club, who states that Mr. Van Heurck, of Antwerp, who first used it, has met with much success in mounting diatoms with that medium. This varnish is used about the consistency of oil and should be of that brand known as "pale copal." It has about the same refractive index as balsam, and is free from bubbles. Drop the copal over the object and slightly heat over a spirit lamp. In some cases a cover can be dispensed with, as it soon takes the consistency of amber, and is hard enough to sustain wiping and brushing with a soft brush with impunity.

WIDENING OF THE RAYS OF HYDROGEN.—The nebulous expansion of the spectral rays of hydrogen, noticed on increasing the pressure of this gas in a Geissler tube, is still ascribed to the influence of the pressure, though Dr. Shuster, Secchi, and others have shown that it is not possible to alter the pressure of a gas without at the same time affecting the resistance of the medium, and in consequence the temperature of the spark which traverses it. C. Fievez has undertaken to examine separately the influence of the different agents, temperature, pressure, direction of the current, etc., which have been suggested as contributing to produce this phenomenon. He finds that the widening of the hydrogen rays is correlative to the rise of temperature. We may affirm that the temperature of a celestial body is higher than that of another if its hydrogen rays are broader.

RECIPROCAL DISPLACEMENTS OF THE HYDRACIDS.—The action of the hydracids upon the salts formed by the halogens is in general the inverse of that of the elements themselves. Thus hydriodic acid expels hydrochloric acid from the metalic chlorides and hydrobromic acid from the bromides, whilst hydrobromic acid also liberates hydrochloric acid from the chlorides. The chlorides in general are decomposed by hydrobromic acid, and this decomposition preponderates according to the thermic value of the principal action. But the bromides may also be decomposed, though less readily, by hydrochloric acid. This inverse action previously pointed out by M. Hautefeuille in the salts of silver at a red heat, and by the author in the moist way, has lately been observed anew by M. Potilizine, but it is in no way contrary to thermo-chemical principles. It results from the existence of secondary compounds, partially dissociated, which intervene with their peculiar heat of formation. The theory of these reciprocal actions and equilibria is always the same. In every case we have to do with a principal re-action, foreseen by the thermic theory, and a perturbation equally foreseen by the same theory, of which it is a necessary confirmation.—M. BERTHELOT.

*"SCIENCE," Vol. I, p. 246, foot-note to the paper on Friedrich Mohr's Life and Works; *Scientific American Supplement* No. 266, p. 4,241, in a paper on "The Actual Figure of the Earth."