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LIFE WITHOUT LIGHT.

An interesting discussion has recently taken place in the French Academy of Sciences, on the question of the influence of solar radiation, and of the green matter in the formation of the immediate principles of plant organisms.

M. Boussingault considers this influence to be indispensable, and that, if the solar radiation should disappear, life would be impossible. M. Pasteur on the other hand thinks that life might still continue in certain inferior plants and occasion the most complete organic growths. He cites as an example the life of the *mycoderma aceti*, which may take place in darkness on a liquid composed of alcohol, acetic acid, and mineral phosphates, the latter including phosphate of ammonia.

The *mycoderma aceti* to which M. Pasteur alludes is a remarkably curious organism, which serves as a medium between the oxygen of the air and a combustible body or fermentable matter, to produce combustion or oxidation. Fermentation of this kind has thus a special character, and differs from that set up by yeast or in other ways. The *mycoderma aceti* appears as continuous membrane, either wrinkled or smooth, upon the surface of liquids while the same are undergoing acetic fermentation, and is generally formed of very minute elongated cells whose diameter varies from 0·000059 to 0·000118 inch. These cells are united in chains or in the form of curved rods. Multiplication seems to be effected by the transverse division of the fully developed cells, which division is preceded by a median constriction. If we allow this cryptogam to develop itself on the surface of any organic liquid containing phosphates and nitrogenous organic matter, until the whole surface of the liquid is covered: then if we remove the liquid without disturbing the membrane, and substitute an equal volume of water containing 10 per cent alcohol, the plant immediately sets up a reaction between the alcohol and the oxygen of the air. After a certain time the action, impeded by the great acidity of the liquid, becomes slower; but we can restore it to activity by substituting alcoholized water again. So that, as long as the *mycoderma* is supplied with suitable nutrition, it will go on and burn the alcohol; but if on the contrary we deprive it of nourishment, or in any wise diminish its vital activity, then its oxidizing action will not go so far, and the alcohol may change into acetic acid. This is the substance of one of M. Pasteur's most brilliant investigations, among the practical results of which is a new commercial method for the acetification of fermented liquids. The process consists in sowing the *mycoderma aceti* on the surface of liquor containing 2 per cent of alcohol, 1 per cent of vinegar, and traces of alkaline and earthy phosphates. When the surface is covered with membrane, the alcohol begins to acidify. This action being fully set up, some alcohol, wine, or beer mixed with alcohol is added every day to the liquid in small quantities; the acetification is then allowed to terminate, and the vinegar is drawn off. The membrane is collected, washed, and employed for a new operation.

M. Boussingault's reply to the suggestion of the *mycoderma* by M. Pasteur is that it is true that some parasites attain a complete development in an artificial medium containing nothing but definite and crystallized chemical compounds. Still there is a great difference between this development and that of chlorophyll in plants. The latter take all their elements from the exterior world, carbon from the atmosphere, hydrogen and oxygen from water. The parasites, even those mentioned by M. Pasteur, take carbon in substances which, although of definite chemical construction, are derived from vegetable organisms. Alcohol and acetic acid have their origin in sugar, which cannot be formed save under the influence of solar radiation. The existence therefore of parasites in an obscure place, where their cellules form immediate principles, similar to those produced in bright daylight by plants of green protoplasm, is far from being an exception, as has been affirmed, but is rather a confirmation of the necessary relation of light and vegetation. Hence M. Boussingault adheres to his opinion that, if the sun's light were quenched, not only chlorophyll plants, but also those deprived of chlorophyll, would disappear from the earth.

M Pasteur's position appears, however, to be unassailable, as might well be expected from his immense experience and wide investigations touching the subject under discussion. He simply points to the fact that, by known methods of synthesis, chemists starting with carbon and watery vapor can produce alcohol, acetic acid, and many other substances capable of serving as carbonated aliment of inferior plants deprived of light. Moreover it may be conceived that, under the influence of the same, all the carbon existing at the surface of the earth or in the interior might pass into complex organic matters, and that ulteriorly it would return to the atmosphere in the form of carbonic acid through the actions of oxidation and fermentation. It would be only when this termination was reached that all manifestation of life would be impossible without the aid of solar light.

M. Pasteur's experimental determination that oxygen and light are not essentials of life, and his having caused organisms to exist in an atmosphere of carbonic acid and in absolute darkness, are among the greatest triumphs of modern chemistry.

THE ORACLES OF ANCIENT GREECE.

As the classical authors inform us, there were in ancient Greece, in different localities, so called sibyls, a kind of fortune tellers, clairvoyants, or spiritual mediums, but of a social standing much higher than that of their successors at the present day, as they were not only recognized but maintained by a wealthy and influential priesthood, to whom the presents received from the faithful believers were a source of enormous revenue. In our present state of society, we can scarcely form an idea of the power and influence of the priests as a separate class of society, monopolizing as they did all the profits derived from the superstitious, who wished to atone for their sins, to obtain knowledge not only of secret events, but also of the future, and to get advice as to their action in cases of difficulty, even to be cured of various diseases; and thus the priests monopolized, for many centuries, the functions of many professions, even that of the physicians, which Hippocrates at last succeeded in rescuing from the power of the priesthood.

These sibyls, of which the two prominent ones were the Cumæan and the Delphian, resided in gorgeous temples erected over caves, from which vapors arose which had an exhilarating and anæsthetic influence, similar to that of nitrous oxide or laughing gas, on those inhaling them. The author of a well known book, entitled "Art Magic," who for some time lived at the locality where the Cumæan sibyl once resided, states that it is one of the wildest, grandest, and most awe-inspiring gorges of the mountains around Lake Avernus, which itself is the inundated crater of an extinct but once mighty volcano; while the whole region around, now fertilized by the waters of the lake, bears the marks of the ravages of fire, presenting a most gloomy appearance. The clefts in the savage rocks abound with caverns, exhaling mephitic vapors and bituminous odors. The scattered inhabitants of the surrounding district once believed that the largest grotto was the entrance to the lower world, and that the hammers of the Titans, working in the mighty laboratories of the Plutonic realms, might be heard reverberating through the sullen air. The dark waters of Lake Avernus were supposed to communicate directly with the silent flow of the river of death, the Lethean stream, made dreadful by the apparitions of condemned spirits, who floated from the shores of the lake to the realms of eternal night. In this grotto resided the famous Cumæan sibyl; and from the exhalations, which were more or less poisonous to birds and other small animals which came near, the weird woman appears to have derived that fierce ecstacy in which she wrote and raved about the destiny of nations, the fate of armies, the downfall of kingdoms, and the decay of dynasties. Even monarchs and statesmen often acted according to her pretended revelations, as it was supposed that the purposes of the pagan gods were made known to her as to a counsellor and a mouthpiece.

She sometimes wrote her soothsayings upon palm leaves, which she laid at the entrance of the cave, suffering the winds to scatter them and bear them whither the gods directed. To the Cumæan sibyls is attributed the authorship of the famous sibylline books, of which many strange stories are told, but of which very little is left that can be regarded as genuine. It is said that she foretold the eruption of Vesuvius, in which Pliny perished and the cities of Herculaneum and Pompeii were destroyed. She declared of herself: "Why must I publish my song to every one? And when my spirit rests after the divine hymn, the gods command me to prophecy again, so that I am entirely on the stretch, and my body is so distressed that I do not know what I say; but the gods command me to speak." If we substitute in the latter expression the word spirits for gods, we have a declaration identical with those of the spirit mediums of the present day.

The abode of the Delphian sibyl or Pythia was in strong contrast with that of the Cumæan oracle. It was situated in the delightful region of Mount Parnassus, sparkling in sunlight and fragrant with bloom. The superb temple of Apollo was built over a similar chasm as that where the Cumæan sibyl held her *séances*, so that it was secured from the approach of the vulgar. On its former site certain clefts in the rock are still visible, one of which forms a deep cavern, into which travelers, by clinging to its rugged sides, may descend as far as they dare. They then experience effects similar to those produced by nitrous oxide or laughing gas; and one writer, who has explored these caverns, asserts that it is this gas that produces the effects spoken of. This, however, is, according to geological principles, highly improbable; and we rather suppose it to be some bituminous vapor, which (according to our present knowledge concerning petroleum and its derivatives, such as naphtha, ether, rhigolene, chymogene, etc.) has an effect, exhilarating, hypnotic, and anæsthetic, similar to that of nitrous oxide. All the descriptions agree that bituminous odors are exhaled from these volcanic chasms. Plutarch informs us that the most celebrated Pythia who served the Delphian oracle in the temple of Apollo was a beautiful young country girl from Libya, named Sibylla. From this was the name sibyl derived, and it was afterwards given to all clairvoyants of her day. Plutarch further says, concerning the first sibyl: "Brought up by her parents in the country, she brought with her neither art nor experience, nor any talent whatever, when she arrived at Delphi to be the oracle of the gods;" and further, he says: "The verification of her answers has filled the temple with gifts from all parts of Greece and foreign countries." How very much like the innocent young mediums of today, who are often claimed to give the most astonishing revelations from the other world without ever having had the advantages of a scientific education! The sibyls of the ancients had, however, the advantage of the support, assistance, and promptings of a class of men highly interested in their reputation, the priesthood of the period; and this class not only consisted of the most educated individuals, but of men who had the greatest opportunity of obtaining information withheld from the vulgar.

When we compare with this state of things the position of our mediums now, who obtain little support from the in