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Contents.

(Illustrated articles are marked with an asterisk.)

IS THE EARTH THE ONLY INHABITED WORLD?

The idea that in other worlds life may exist in conditions widely different from those prevailing on this world in which we live, however plausible at first, becomes highly improbable when tested by the light shed on this subject by the accumulated knowledge of modern research in the fields of astronomy, geology, spectroscopy, and chemistry, especially that branch of the latter science pertaining to organic compounds. Thus it has been suggested that—granted even that when the temperature of the moon, and other satellites of planets has been cooled to such a degree as to freeze all water—living creatures may exist there, having a liquid in their arteries and veins as uncongelable as mercury, glycerin, alcohol, etc.; or, inversely—granted that the planet Jupiter is red hot, and the sun much hotter—living beings may exist, consisting of fireproof materials, and of such an organization as to feel happy and comfortable in an atmosphere of superheated steam, as in Jupiter, or even while swimming on a surface of melted lava, surrounded by an atmosphere of white hot iron vapor, as would be the case in the sun.

Astronomy, now so powerfully aided by the modern tools of the scientist, having proved that the terrestrial elements exist throughout the whole universe, only differently distributed, and chemistry having studied the behavior of these elements under extremes of temperature, we know now that the possibilities of the existence of organic life are comparatively within very narrow limits and confined to a range of not much beyond 100° among the 6000° or 8000° to which our investigations have extended. We have learned that the wonderful properties of that common but most marvelous substance, carbon, aided by liquid water, at a temperature below 110°, are the absolute and essential conditions which make the development and continuation of life a possibility. Without these, no life can exist.

It may be objected that in other worlds there may be another substance, as effective in its function as carbon in our regions, and that therefore we cannot make any conclusion as to the necessity of carbon for the existence of life. In order to meet this argument, let us consider the properties of carbon, which, by modern scientists, has rightly been called the great organizer.

A substance, in order to take the place of carbon in the economy of organized existence, must be able to combine in different proportions with itself, to form a complex molecule, in order to enter again into complex combinations. It must exist as a solid, but also easily pass into the atmospheric condition by combination with another substance, equivalent to oxygen, so that all vegetation may be surrounded by an atmosphere containing carbon in such a state that the plant may obtain it, and complete, with this substance as a solid basis, its organic tissues. We may go on and sum up other conditions which this supposed substitute of carbon would have to fulfill, in order to take its place; but then we should in the end be driven to the conclusion that a substance which possesses all the properties of carbon would be carbon itself. But now comes the spectroscope and teaches us that even the comets consist chiefly of carbon dust, and that their purpose may be to supply the planetary atmospheres from time to time with some of this necessary element, when sweeping close along them, as is often the case.

As the latest investigations prove the identity of the elementary matter in our whole planetary system (and this even extends to a great number of the fixed stars), we can come to no other conclusion than to accept a unity of chemical operations, of crystalization, cell building, organic growth, and organic life in general, of course greatly modified in accordance with the conditions of gravitation, atmospheric pressure, distribution of elementary matter on surface, and especially of temperature. If now we look carefully on all the conditions required to make life possible on the surface of a planet, we see that these conditions are very complex, that not only the elementary matter, possessing the different required qualities must be present, but also in the exact relative quantities, in order not to annul the results of this distribution. Let us, for an example, only consider the amount of hydrogen present on our earth's surface. We know that nearly all of this element is combined with oxygen, forming the extensive oceans, rivers, lakes, clouds and moisture in general; in fact, the only source from which we can obtain this element is by decomposing water. This compound is indeed burnt up hydrogen, and this burning up, of course, took place at an early geological period of our earth's history. Therefore all the hydrogen has thus been burned up, consuming an equivalent amount of oxygen; and the latter now forms eighty-eight per cent of all the terrestrial water. But suppose that there had been some more hydrogen, just enough to combine with the small portion of oxygen (21 per cent) contained in the atmosphere; the result of the combustion would then have been some more water in the ocean, raising its surface only a few feet, while no oxygen would have been left in the atmosphere. In this case, life would have been simply impossible, and the earth would now be desolate. It would be easy to adduce other instances proving how complex the conditions of life are, and how improbable it is that all these conditions are fulfilled everywhere at once.

We conclude, then, that our earth is a highly distinguished planet, at present favored above hundreds and perhaps above thousands with conditions which have not alone rendered the existence of vegetable and animal life possible, but developed it to the highest stage of organic existence: namely, civilized and enlightened human races, able to investigate and discuss the highest problems in the universe, which are the laws of its creation, progress and ultimate purposes.

A NEW RULE IN RESPECT TO CAVEATS.

Among the recent decisions of Commissioner Leggett is one restricting the descriptive matter contained in caveats. For instance, in machinery for making lightning rods of a peculiar pattern, the inventor describes the peculiarity of the rod, and the new machinery for its manufacture. Whereupon the Commissioner of Patents decides that the machine and the product of the machine shall be classed as separate inventions, and that, before the papers submitted for caveat can be filed, the party must elect which invention he wishes protected by the caveat, and the description of the other invention must be struck out.

It has been a common practice of the Patent Office to require a model of the machine used in the manufacture of the *article* on which a patent is sought, and it is not unusual for the office to grant under a single application a patent which covers both the machine and the article. The following are a few examples of patents thus granted, and many others might be cited.

J. S. and T. B. Atterbury, September 15, 1868: glassware. Process, mold and article. J. Treat, April 7, 1868: volute spring. Method and article. J. Hobart, August 4, 1868: volute spring. Method and article. G. Hopson, January 7, 1873: spring heads. Method and article. Theo. E. Harris, November 14, 1871: shingle straps. Machine and article. S. N. Smith, September 13, 1870: shoe stays. Machine and article. W. Acheson and W. H. Ridley, May 28, 1872: manufacture of hoes. Machine and article. Thomas C. Croven, May 21, 1872: gin teeth. Method and article. J. C. Richardson, June 15, 1869: fork blanks. Method and article. C. T. Beebe, December 19, 1871: barn forks. Method and article. Jacob Reese, July 10, 1869: bands for shingle machines. Machine and article. Wm. A. Lewis, October 10, 1871: wagon axles. Dies and article. Wm. H. Knowles, June 27, 1871: carriage clip. Dies and article. Wm. B. Smith, August 9, 1870: shackle blanks. Dies and article. Jas. P. Thorp, September 18, 1866: shaft shackles. Dies and article. H. M. Beecher, September 12, 1871: carriage clip. Machine and article. T. Diebold, December 10, 1872: jeweller's stock. Machine and article. E. Waters, July 9, 1861: manufacture of paper boxes. Machine and article.

Now if both machine and article may be patented under one patent fee, they may legitimately be caveated under one caveat fee. The Commissioner's new decision is evidently erroneous, and from it, we trust, he will gracefully recede. The patent laws were not formed for the purpose of exacting double fees or drawing revenue from inventors, but to encourage them in making original discoveries by granting to them every reasonable facility in securing, for a limited period, the fruits of their inventions. The present decision is contrary to the spirit of the laws. It imposes additional burdens, and needlessly multiplies official ceremonies in the simple business of filing a caveat.

OPENING OF THE VIENNA EXPOSITION.

The formal opening of the Vienna Exposition took place on the 1st of May. In spite of the overcast and threatening weather, at an early hour a vast crowd thronged the avenues leading to the great edifice, and, when the twenty doors were thrown open, surged into the immense hall, filling every available space. The scene is described as one of wonderful impressiveness and grandeur; the motley costumes of the multitude, representative of almost every nation, the brilliant decorations of the throne and the gigantic proportions of the building together forming a spectacle of imposing magnificence.

At noon the Emperor of Austria, with the Empress, the Crown Prince of Germany, the Prince of Wales and other royal guests, with the high officials of the empire, arrived and were received with a tremendous popular ovation. The Arch-Duke Charles Louis, Patron of the Exposition, opened the proceedings by delivering an address, which was responded to by the Emperor, who, in a few words from the throne, welcomed the visiting nations and declared the Exposition open. Other speeches, by the President of the Imperial Council and the Burgomaster of Vienna, concluded the ceremonies, when the Imperial party made a tour of the building and departed.

As is usually the case in great fairs, the preparations for the opening day were far from complete. The bare frescoed walls were covered with an oozing dampness and but very few of the exhibits had been finally arranged in their places. Many were still covered with their cases and wrappings, and in nearly all the departments confusion and misplacement seemed to be the general rule. The American section was closed and is described by a correspondent as "looking battered and dingy, like an abandoned railway town on the plains." Even our flag was ominously hoisted with the union down. Judging from the mismanagement which has characterized the doings of the suspended commission and the obstacles in shape of inexperience and the absence of records with which the body which has superseded it in its labors has had to contend, a not much better condition of affairs could have been anticipated. As matters now stand, the new officials, aided by the exhibitors, are doing all possible to organize and complete the United States arrangements. The displaced commissioners protest vehemently against the summary action of the government and assert their innocence of the charges. A recent cable dispatch exonerates all the members but two, but no definite details of the offences alleged, or the evidence sustaining the same, have as yet been received.

As regards the probability of the United States, through the various causes which have occurred to discourage exhibitors and produce other unfortunate results, falling below other nationalities in the variety and magnitude of its representation, we do not acquiesce in the desponding view taken by many of our contemporaries. Already some seven hundred exhibitors have entered goods; and even if more do not take advantage of the month's extension of time granted by the Director of the Exposition, enough to fill up our allotted space, the country will be fully represented by large numbers of the articles contributed by other nations. It is a well known fact that nearly all of the most important American inventions are manufactured extensively abroad, and the quantity and variety of these, which are sure to be displayed, even if made by foreign workmen, will be ample to demonstrate to the world the industrial genius and advanced progress of our people.

A NEW SPECIFIC FOR RHEUMATISM.

Rheumatism, notwithstanding that it is one of the most obstinate diseases, some forms of which baffle the skill of the most eminent physicians, is, from a medical point of view, highly interesting; the late Dr. Valentine Mott used even to say that "it is one of the beauties of rheumatism that it shows itself in such a great variety of forms." It is a fact well known among the medical profession that many rheumatic patients, in the impatience produced by their affliction, change from one physician to another; at length the disease has run its course, the patient gets well, and the last doctor whom they then happen to have, earns the credit of the cure.

Without intending to trespass on the domain of the physician, it may be well to give, for the benefit of all, some information concerning the nature and treatment of this malady.

As it is a constitutional disease, proper diet and close attention to the general health are of more benefit than local applications, which may be useful in exceptional cases, but generally they give only temporary relief, and often drive the pain from one part of the body to another. In all cases of this disease, the blood is in an abnormal condition, and may be considered to be poisoned; persons who live high (which means, live on rich and highly nitrogenized food) are apt to have this disease in a peculiar form, which is commonly called gout, of which the chief seat is in the joints. A lower mode of diet is then advisable. Persons who live low and get this disease by exposure, combined with over fatigue, are apt to suffer from the so called chronic form chiefly seated in the muscles, and in these cases, the system may suffer from one of two opposite causes, an excess of either alkali or acid, which, when neutralized, ends the disease. Hence the curious and formerly unexplained fact that sometimes acid treatment, as with lemon juice, and at other times alkaline treatment, as with Rochelle salt, etc., has produced a cure.

There is one very severe form of rheumatism called acute or inflammatory, which is a most formidable disease, and which in olden times was treated by blood letting. This disease has the remarkable feature of suddenly leaving one part of the body to appear in another. If, by blood letting, the heart receives a sudden shock by the withdrawal of a quantity of blood, the malady is very apt to settle there and produce disease of the heart, which is a very common cause of death among persons who once have been treated for rheumatism by blood letting. The latter operation relieves the patient; but, considering the often fatal results, it is now abandoned by all enlightened physicians, and the treatment by colchicum wine and opiates is used instead. Besides the derivatives of opium, morphine and codeine (see page 273 of our current volume), sal ammoniac has been often praised as an effective remedy when others failed; but perhaps these derive their efficiency from their similarity to a new substance, a derivative of opium and ammonia, which has recently been found as effective a specific against rheumatism as quinine is against fever and ague. This substance