THE FIELD OF CHEMISTRY.

Although vast strides have been made in the number of chemical combinations, some of them so remarkable as to border upon the creative act, the field is still limitless. Every new combination, or readjustment of atoms, so to speak, furnishes a foundation for others of still greater perfection. The number of compounds of acids, gases and alcohols reaches into the thousands of millions, so that the student need never fear that there will be nothing left worth investigating. Not every experiment in chemistry is attended with success. Nor does every successful experiment lead to any practical value. It is impossible, however, for any experiment to be fruitless, even if confined to the laboratory, for it adds to the knowledge of properties and to at least a technical value. It is now well known that the majority of fruit essences and flavors are simple chemical combinations, without any element of the natural fruit in them. When petroleum was first discovered in America, or rather when it first came into use, it excited very little attention, except as a liniment for physical ailments, until by a little chemical manipulation it was adopted as an illuminator. The failure of the turpentine product during the war brought into use the lighter product of petroleum, or benzine, in its stead. Further experiments developed lubricating oil, then paraffine, tar, and most wonderful of all, the brilliant aniline colors. In regard to paraffine from petroleum, it may be said that experiments have been in progress to extract the hydrogen atom in its composition and obtain carbon or graphite.

The components of many substances are so well known that they may be compounded as easily as they can be converted into their constituents. Cane sugar may be easily converted into grape sugar (glucose) by the abstraction of the element of water, and why should not grape sugar or glucose be converted into cane sugar? It has probably never yet been accomplished, although synthetical chemistry has many devotees. Kolbe, aware that salicylic acid could be readily converted into carbolic acid, by liberating carbonic acid, reasoned that if he could make carbonic acid act upon and combine with carbolic acid, salicylic acid would be the result. He found a cheap means of accomplishing the synthesis in caustic soda, raising the temperature to give it sufficient energy. Carbon is an element too little understood. It enters into combination with many useful and valuable substances, yet it refuses to be segregated. A diamond can be converted into charcoal, but charcoal has never been converted into a diamond. The paraffine of petroleum consists largely of carbon and an atom of hydrogen, yet nobody has succeeded in liberating that atom of hydrogen. Oxygen, hydrogen, etc., are supposed to be elementary bodies, yet a French chemist demonstrated hydrogen to be a compound, and one of its components so light and of such force as to carry up into the air metallic balls filled with it.

Phenylacetic acid is made from coal tar. This acid furnishes isatine, and isatine may be converted into indigo blue. Bayer reasoned this out from the fact that when indigo is oxidized with nitric acid isatine is formed, and by means of phosphorus and chloride of phosphorus he succeeded in obtaining indigo. Now this conversion of coal tar, etc., into true imitations of nature's own products is a wide and open field, and we may say that we are scarcely beyond the first step towards crossing it.

But it is not the only field unexplored. The changing or converting of one natural product into another is an equally mysterious region scarcely penetrated. The juice of the common carrot may be converted into pectin, the base of all fruit jellies, and flavored with any vegetable jelly prepared by the combination of acids and alcohols, and put upon the mrrket as true fruit jelly of every kind, although perfectly innocent of being evolved from any fruit. Yet it is just the same. Chemical analysis could not demonstrate it to be anything else, so well known already are the elements of natural things. Starch is converted into sugar, and the sugar into alcohol by nature herself. Sawdust is converted into oxalic acid, and old rags into sweet syrups. Oil of turpentine is isomeric with oil of bergamot, lemon and lavender, but they have never been transposed. There is no reason, however, to suppose that they cannot be. We may say in fact that those things which now seem to be impossible of solution will, by the aid of continual experiment, not only be solved, but will give place to other chemical problems of equal value, which are not now even dreamed of.—*Mining and Scientific Press.*

ISINGLASS FROM SEA WEEDS.—A very interesting product, called "kanten," or vegetable isinglass—a species of gelose derived from either of the sea weeds *Gelidium corneum* or *Plocaria lichenoides*—is made in China and Japan, and exported to Europe in flat and molded tablets and in bundles of strips. It is known in Cochin China as "hai thao." It is soluble in boiling water only, of which it takes up about 500 times its weight. It is manufactured as follows: The sea weed, called by the native name of "tengusa," is carefully washed and afterward boiled, so as to form a gluish decoction, which is strained off and put into square boxes. When cool it forms a stiff jelly, which can easily be divided into squares a foot in length. The manner in which the surplus water is removed is very ingenious. The jelly prisms are exposed in the open air during a cold night, and allowed to freeze. During the day the sun melts the water which runs off, leaving behind what one might term the skeleton of white, horny substance, which is extremely light and easily dissolved in hot water; when cooled it again forms a stiff jelly. This article can be applied to many purposes—for culinary uses, for making boubons and jellies, for clarifying liquids, as a substitute for animal isinglass, for making molds used by the plaster-of-paris workers, for hardening the same material; in short, as a substitute for all kinds of gelatines, over which it has the advantage of producing a firmer jelly.—*Confect. Journal.*

DOMESTICATION AND BRAIN GROWTH.—At the recent meeting of the British Association, Dr. Crichton Browne gave an address on the influence of domestication on brain growth. He had found by experiments that domestication had greatly reduced the brains of the duck, and he argued that men, like ducks, might be fed and housed, fenced about, and exempted from participation in the life struggle, until, like the ducks, they would depreciate in mental capacity. Their bodies might increase in size and succulence, but their brains would become straitened and withered. Disease and luxury crippled the brains. It was as true as ever that men were perfected through suffering, toil, and conflict, and it was not through affluence and comfort that genuine civilization was attained. It was the civilization, not merely the domestication, of mankind that must be aimed at.

BEST ANTISEPTIC.—Prof. Klebs, of Prague announces that the benzoate of soda is the best antiseptic in all infectious diseases. It acts, as the experiments of the author show, very powerfully. It is claimed that a daily dose of from 30 to 50 grammes to a full-grown man will render the poison of diphtheria inoperative. The benzoate is prepared by dissolving crystallized benzoic acid in water, neutralizing at a slight heat with a solution of caustic soda, drying and then allowing the solution to crystallize over sulphuric acid under a bell-glass. Large doses do not appear to be absolutely necessary. Good results may be obtained by the daily administration of about 12 grammes.

THE END OF THE WORLD.—A lecture was lately delivered at the Berlin University bearing the above ominous title. The learned professor argued that every movement upon our planet, with the exception of ebb and flood tide, which are caused by the attraction of the moon, is occasioned by solar heat. As, however, the sun loses a portion of his caloric every year, science has lately come to the conclusion that as an emitter of warmth, the sun will only last 17,000 years longer. During that space of time our earth will get colder and colder, in proportion as the solar heat shall diminish. The ice will advance from the poles to the equator; the earth's population will gradually recede before the advancing glaciers; the sun will become less and less luminous, until he will present the appearance of a dark red ball; and finally ice will annihilate all vitality on our planet. It is very easy to establish an admitted hypothesis. If solar heat is the source of motion, of course its withdrawal will produce lamentable consequences. Anybody can understand that. But science has not established any such fact. Another scientific writer whose name has escaped our memory, demonstrated with mathematical precision, that the earth's orbit is gradually contracting and the earth approaching nearer the sun in consequence, until finally our planet will become food for solar heat, so far as it goes. Perhaps both theories are partially true. If the sun is losing annually a portion of its heat, so also is the earth annually approaching the sun and in about the same ratio, so that terrestrial conditions must remain unchanged. Climate may have something to do with these theories. A native of the tropics would probably be convinced that we are approaching nearer the sun, while the Laplander might argue that it was losing its heat. The natives of the temperate zones would be divided in opinion, depending upon an unusually cold winter or hot summer, or *vice versa*.

THE RUSSIAN THIRTY-TWO-INCH OBJECTIVE. A contract, it is said, has been made by Alvan Clark & Sons, of Cambridgeport, Mass., with the Russian government, relative to the great objective for the Imperial Observatory at Pulkowa, for a great telescopic objective. The proposed glass is to be the largest in the world. The contract provides that the definition of the glass shall not be inferior to that of the telescope in the Naval Observatory in Washington, and that the amount of light shall be greater in proportion to the increased area of the objective, allowance being made for the absorption of light by the glass. The objective at Washington is 26 inches in diameter; the proposed glass is to be from 31½ to 32 inches in diameter, with a clear aperture of 30 inches. Three years and a half are allowed for its completion—two years to procure the rough disks, and 18 months for grinding, polishing, correcting, etc., with an extension of time, provided good and sufficient reasons are given for the failure to finish within the specified period. When finished the glass will be mounted in Hamburg. The cost of the glass alone will be $32,000. The material for the glasses will probably be furnished by French manufacturers, the Clarks finding them the most trustworthy.

ADULTERATION OF TIN.—The adulteration of tin with lead, antimony, or other metals, is exceedingly prejudicial to health. Tin which contains lead should be proscribed entirely by the pharmaceutical world. The lead in the block-tin worm of stills finds its way into distilled waters of every description. Cisterns lined with tin that has been adulterated with lead, or contain that matter accidentally, are a source of danger to every one. Solutions, distilled waters, and other liquors preserved in such cisterns soon become charged with lead, which thus finds its way into the various pharmaceutical preparations made from them.