fact. The shells of Nautilus and Triton are examples; especially fine are the long, cornucopia-like spiral shells of *Terebra oculata*. Further inquiry brought from Dr. H. E. Crampton the interesting observation that sea snails in the South Pacific show both right- and left-hand twists, the latter being infrequent.

Schaeffer[8] has carried his observations on spiral movement in organisms to man, whom he regards as a spirally twisted right organism. This is true not only of the movements of man but of body structure as well. The gall-duct is the most conspicuously spirally twisted unpaired organ in man, and it is a right spiral. There are numerous other examples of spirally-twisted organs in animals. As for movement, when man is blindfolded he walks in a right spiral. (In this connection there is the old saying that hunters when lost in the woods walk in circles to the right, the circle getting smaller and smaller, *i.e.*, man walks in a spiral. One wonders if the habit which dogs have of turning round and round before finally settling down for a nap, is another manifestation of the spiral tendency in organisms.) Spiral walking in man is also regarded as due simply to the fact that most people are right-legged, as they are right-handed, which results in walking in a curve. But the curve is most often to the right, while right-leggedness should, it would seem, produce a left spiral. However, right-leggedness is a possible cause of spiral walking in man, which, if true, eliminates but one of the many examples of the spiral habit in organisms.

The spiral structure of trees is duplicated in the most delicate of plant cellulose parts, namely, the cotton fiber. Titus and his coworkers[9] report such a structure for the cotton fiber. Denham[10] enumerates four distinct classes of spirals in cotton fibers. The structure does not always proceed in the same direction but suffers more or less regular reversals. Balls[11] has presented a number of papers dealing with the twisting of cotton fibers. He states that reversal from dexter (right) to sinister (left) spirals occur in the same fiber. Causation of the reversals is physiological (*i.e.*, protoplasmic). Ordinary environmental influences do not affect the statistical peculiarities of the reversals. The spiral habit in plants is further illustrated by the tight wrapping of tendrils and of vines. Two vines may twist around each other and give as perfect an example of spiral wrapping as exists in the artificial wound fibers of a rope. It appears, therefore, that the tendency toward spiral growth is as characteristic of the cellulose framework of plants as it is of the parts of animals. The spiral twisting of cotton fibers is convincing evidence that the twisting of tree trunks is an innate heritable property, and not an environmental effect.

The evidence presented here indicates that spiral development among organisms is the expression of a wide-spread tendency which is protoplasmic in origin.

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8 *Jour. Morph. and Physiol.*, p. 294, 1928.
9 *Jour. Chem.*, 9: 114, 1932.
10 *Jour. Textile Inst.*, 14: 86T, 1923.
11 *Proc. Roy. Soc.*, London, 99: 130, 1926.

THE EXTINCT LAKE SAN AUGUSTIN, NEW MEXICO

A SEMI-ARID basin in western New Mexico, known as the San Augustin Plains, has been described by Bryan as an old lake basin.[1] To this extinct body of water he has given the name Lake San Augustin. Field work by the writer during the summer of 1932 not only supports Bryan's view, but has yielded detailed information on the extent and characteristics of this ancient lake.

The San Augustin basin lies in western Socorro and eastern Catron Counties, and is bordered on the north by the Bear, Gallinas and Datil Mountains; on the west by the Tularosa Mountains; and the south by a mountainous belt, including the O Bar O, Pelona and Tuera Mountains; and on the east by the Magdalena Mountains The basin is 60 miles long from northeast to southwest, and has a maximum width of about 20 miles. During the rainy season (July and August) ephemeral streams make their way from the mountains across broad alluvial slopes to two playas, the larger and westernmost of which is called locally the San Augustin Plains, and contains the lake basin herein described.

Lake San Augustin at its highest stage was about 32 miles long by 11 miles wide, with a surface at about 6,940 feet A. T. The lowest point in the basin is 6,776 feet A. T., and thus the greatest depth of the lake was about 164 feet. The shore lines of this and all the lower stages are strikingly marked by shingle beaches, spits and bay head bars, and by cliffs developed both on rocky mountainsides and on alluvial fans. These shore features form a descending series that indicates many lake stages, the details of which are yet to be worked out from a study of the field notes. At its highest stage Lake San Augustin was connected by a small channel with a basin farther east, as yet unstudied, that probably drained into Lake San Augustin. At all the lower stages Lake San Augustin had no possible outlet, and its waters must have been depleted by evaporation and underground seepage.

The highest beach has a constant altitude on all sides of the playa, and thus gives positive evidence that no differential earth movements have occurred

1 Kirk Bryan, "Ground Water Reconnaissance in Socorro County, New Mexico," Seventh Biennial Report of the State Engineer, pp. 82–83, 1925–26.

here since the formation of this beach. The beaches can be traced across all the larger alluvial fans surrounding the playa, and thus show that these fans were formed before the lake existed. Subsequent fan development has been feeble. The lake is believed to have existed in the last (Wisconsin) glacial stage.

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SCIENTIFIC BOOKS

Faraday's Diary. Vols. I and II. Edited by THOMAS MARTIN, M.Sc., and published by order of the Managers of the Royal Institution of Great Britain, with a Foreword by Sir William H. Bragg, O.M., K.B.E., F.R.S. G. Bell and Sons, Ltd., London.

AFTER Faraday's death the Royal Institution received as a bequest from him a manuscript record containing an account of the experimental work which had been done by him in the years from 1820 to 1862. This record the managers of the Royal Institution decided to publish as a fitting memorial of their most distinguished director. When the publication is complete there will be seven volumes, of which two are now at hand, and the others may be expected within two years. Only 750 copies of the work will be issued, and these will be sold in sets. The price of a set is twelve guineas.

The task of editing this work was undertaken by Thomas Martin, M.Sc., general secretary of the Royal Institution. It has been admirably performed. So far as one can judge without comparison with the original manuscript, the transcription of the text has been carried out with accuracy. The peculiarities of spelling and the abbreviations used by Faraday have been retained, and obvious errors have been noted, with proper reference to the editor. The diagrams and sketches with which the manuscript abounds have been with great judgment and good taste removed from the body of the text and inserted either on the wide exterior margins of the pages or at the bottom below the letterpress. In the latter case the paragraphs to which the diagrams pertain are indicated. The result is that, while the diagrams are immediately available, the text can be read with continuous comfort. An extensive table of contents is prefixed to each volume, and references are made in it to Faraday's published papers in which the matter of the text has been incorporated. An index or synopsis of the whole work is promised for the last volume of the set. The books are beautifully printed, in excellent legible type, on wide pages, with large margins, and are well bound. The publishers, Messrs. G. Bell and Sons, Ltd., should be congratulated on their contribution to the value of the work.

Faraday's first scientific paper was published in 1816, at a time when, as he says of himself, his fear was greater than his confidence, and both far greater than his knowledge; at a time also when he had no thought of ever writing an original paper on science. The favorable reception given to it emboldened him to undertake other researches in the time that was left him after the many duties of his position as assistant in the laboratory had been performed. After a few years he evidently felt that he would be able to carry on research in a sufficiently consecutive way to make regular entries of his experiments advisable, and in September, 1820, he began the notes of his work which ended only with the close of his scientific activity, forty-two years later. They present a complete record of the experiments which he carried out in the laboratory of the Royal Institution. The only important things which he did which do not appear there are his studies of alloys of other metals with iron and steel, carried out by him in collaboration with Mr. Stodart; his researches on the manufacture of glass for optical purposes; and the work which he did for nearly thirty years as scientific adviser of the Trinity House, for the improvement of the lighthouse service.

As was to be expected of an assistant of Sir Humphry Davy, Faraday was first interested in chemistry. With the exception of the invention in 1821 of apparatus to exhibit electromagnetic rotations, most of the entries for the first ten years are concerned with chemical matters. They record the experiments which led to the discovery of two compounds of chlorine with carbon (1820), they describe the liquefaction of chlorine and other gases (1822); and they present the long series of observations which led to the isolation of benzene from coal oil (1825). Many other observations are recorded which led to nothing or to results of minor importance. In 1831 appears the first study —with the exception noted above—of a purely physical subject, the vibrations of plates and the formation of Chladni's figures.

From time to time in these years Faraday had evidently had in mind the possibility of an inductive effect produced by an electric current in a neighboring conductor. On December 28, 1824, he tried the experiment of bringing up a strong magnet to a wire carrying a current, with the expectation that the current would be thereby modified; but no effect was shown on a magnetic needle placed under a distant part of the circuit. On November 28, 1825, he looked for a current in a wire set parallel to another wire carrying a current, but could perceive no action. Again on April 22, 1828, he endeavored to find an effect produced by a magnet pushed through a ring of copper wire, with no result. Why some of these