considerations are, in his opinion, the key to the character of the manual.

Practice and theory are treated in separate chapters, beginning, for stated reasons, with a description of the most successful method of butter-making, and closing with an exposition of the philosophy of the various modes of operation. The discussion opens quite deservedly by dwelling on the importance of cleanliness as the first and indispensable requirement for success in the dairy industry. The first chapter treats of the best indorsed rules for milking, and for setting milk for cream. The setting of milk in open and closed vessels, as well as the proper conditions of the cream for churning, and the management of churning, are carefully discussed. The author very frequently cites well-known authorities in the dairy business — Professors Arnold and Lewis — in support of his statements. A detailed description of the best rules for collecting, washing, pressing, salting, packing, and marketing the butter, closes the first chapter on the scientific method or process.

The succeeding chapter explains the philosophy of the rules of treatment during the various stages of the process, which have been previously enumerated and critically discussed. The different points involved are here stated in an equally instructive manner. More prominence might have been given to a consideration of the chemical character of the various glycerides constituting the fat of milk, and consequently of the butter, as compared with those which constitute other animal fats. The serious influence of exceptionally large quantities of the glycerides of four volatile fatty acids on the successful manufacture and on the keeping of butter is quite manifest, and deserves more than a passing notice. The first part of the book closes with remarks on milk-production, on the natural functions of the cow, on breeding and feeding, on dairy utensils and supplies, on water and its uses in the dairy, and on salt and its proper application in butter-making. The discourse on these subjects occupies about forty pages of the manual.

It is unfortunate that by far the larger part of the pamphlet (the appendix) should be taken up with quotations from agricultural newspapers, and that in the closing paragraphs it should be stated that Mr. Lynch is the owner of the patents on the forms of butter-making appliances which he advocates. The work, with its numerous newspaper extracts and poor printing, has not the appetizing appearance so essential to a new book, and is calculated to repel one at the first glance.

MAN'S FUTURE.

The destiny of man, viewed in the light of his origin. By John Fiske. Boston, *Houghton, Mifflin, & Co*, 1884. 10+121 p 16°.

"The question of a future life is generally regarded as lying outside the range of scientific discussion," says the writer; but yet he thinks it is one upon which an opinion may be legitimately entertained, and he proceeds to say, that opinion "must necessarily be affected by the total mass of our opinions on the questions which [do] lie within the scope of scientific inquiry." His essay is to let us know what the teachings of the doctrine of evolution as to the origin of man seem to indicate as to his final destiny. His conclusion is, that "the more thoroughly we comprehend that process of evolution by which things have come to be what they are, the more we are likely to feel that to deny the everlasting persistence of the spiritual element in man is to rob the whole process of its meaning," and that it goes far toward putting us to 'permanent intellectual confusion;' which, as a well-known authority assures us, is a scientific *reductio ad absurdum*. So, finding "no sufficient reason for our accepting so dire an alternative," our author declares, "For my own part, therefore, I believe in the immortality of the soul, not in the sense in which I accept the demonstrable truths of science, but as a supreme act of faith in the reasonableness of God's work. . . . The belief can be most quickly defined by its negation, as the refusal to believe that this world is all." We must refer to the little book itself for the line of argument which leads up to this *credo*. And if the argument, however scientifically based, is philosophical and even theological in form, it needs only to be understood that this essay is, in fact, an address to the Concord school of philosophy last summer, at the time when the subject of immortality was under discussion.

NOTES AND NEWS.

The following is the full list of papers read at the Newport meeting of the National academy of sciences, Oct. 14–17: On the Columella auris of the Pelycosauria, E. D. Cope; The brain of Asellus, and the eyeless form of Cecidotaea, A. S. Packard; On the theory of atomic volumes, Wolcott Gibbs; On the complex inorganic acids, Wolcott Gibbs; Notice of Muybridge's experiments on the motions of animals by instantaneous photography, Fairman Rogers; Notice of Grant's difference-engine, Fairman Rogers; On the thinolite of Lake Lahontan, E. S. Dana; On the mesozoic coals of the north-west, R. Pumpelly;

On the work of the Northern transcontinental survey, R. Pumpelly; The grasses mechanically injurious to live-stock, William H. Brewer; On gravitation survey, C. S. Peirce; On minimum differences of sensibility, C. S. Peirce and (by invitation) J. Jastrow; Researches on Ptolemy's star-catalogue, C. H. F. Peters; On the operations of the U. S. geological survey, J. W. Powell; The motion of Hyperion, Asaph Hall; Remarks on the civilization of the native peoples of America (by invitation), E. B. Tylor; Some results of the exploration of the deep sea beneath the Gulf Stream, by the U. S. fish-commission steamer Albatross during the past summer, A. E. Verrill; Recent progress in explosives, H. L. Abbot; On an experimental composite photograph of the members of the academy, R. Pumpelly; Report on meridian-work at Carlsruhe (by invitation), W. Valentiner; On the algebra of logic, C. S. Peirce; On the temperature of the lunar surface, S. P. Langley; On methods of eastern archery, E. S. Morse.

— A letter to Lieut. Schwatka, from one of the officers of the Imperial geographical society of Russia, states that no polar expedition is to start from Russia this year or next, as has been widely circulated in the American press. There is in view, however, an expedition to the New-Siberian Islands, to start in the spring of 1886, to be carried on by money appropriated by the czar for that purpose. The expedition is to be undertaken by two gentlemen from the Imperial academy of sciences of St. Petersburg, and the preparations for it are going on under the supervision of a committee appointed by the academy. The year 1885 will be employed in scientific work on the Yana and the coast between it and Indigirka.

— Among recent deaths we note those of G. B. Delponte, formerly professor of botany in the university of Turin, well known for his researches upon the Desmidiae, on the 18th of May, at Mombaruzzo, Piedmont; Count Constantin Branicki, a zealous promoter of natural science, to whose generosity the museum at Warsaw is indebted for a large part of its valuable collections, July 14, at Paris; August Pasch, professor of mathematics at Stockholm, in that city, on the 16th of July; L. M. Larsson, author of 'Flora af Wermland,' on the 17th of July, at Carlstad, Sweden; Dr. M. Perty, a well-known zoölogist and anthropologist, from 1834 to 1875 professor of natural history in Berne, where he died Aug. 8, almost eighty years of age; in Moscow, the last of July, A. G. Fischer von Waldheim, president of the Moscow natural-history society; E. P. M. Fournier, botanist, in Paris; Lodovico Caldesi, botanist, July 2, in Faenza; Dr. E. Carstanjen, chemist, on the 13th of July, at Leipzig, in his forty-ninth year; Dr. Hans Hübner, the director of the chemical laboratory at Göttingen, on the 13th of July, in his forty-seventh year; and Dr. Ferd. Hochstetter, geologist and naturalist on the Novara expedition, on the 18th of July, in his fifty-sixth year.

— Prof. F. E. Nipher finds from data taken from Dr. Engelmann's observations at St. Louis, Mo., lasting over a period of forty-seven years, that the duration of maximum rains is inversely proportional to the violence, or that the product of violence into duration is constant. This constant is the amount of water which may fall in a continuous rain, and is, for Dr. Engelmann's series of about half a century, about five inches. A rain of five inches per hour may last one hour. A rain of four inches per hour may last an hour and a quarter; and such a rain Dr. Engelmann observed. A rain of two and a half inches per hour may last two hours, and several such rains were observed. A rain of an inch per hour may last five hours. Each of these cases would be a five-inch rain. For a longer period of time than fifty years it is likely that greater rains than five inches may be observed. The same is to be said if observations are to be taken over a wider area of country. In fact, a rain of six inches in three hours occurred near Cuba, Mo., some years since. This would increase the value of the constant from five to six, but otherwise the relation will probably remain unchanged.

The importance of this law is very great in engineering, where the capacity of sewers, culverts, and bridges, must be such as to carry the water. A more general investigation which Professor Nipher is now making will determine the relation between the violence, duration, and frequency not only of maximum, but of all rains. This work, when completed, will enable an engineer to construct the water-ways of bridges of such a capacity that they will probably stand a definite number of years before they are washed away. This number of years will be so determined that the interest on the invested capital during the probable life of the bridge will equal the possible damage when the destructive flood comes which the engineer determines shall destroy his work. The running expense of maintaining the bridge is then the least possible.

— A late number of the *Academy* states that the eleventh annual meeting of the German and Austrian alpenverein has just been held at Constanz, under the presidency of Herr Richter of Salzburg. The grand duke of Baden took part in the proceedings. The united clubs have a membership of 12,500, and the property of the verein amounts to 11,430 florins. Grants were voted for forest-planting, for support of certain mountain sections of the club, for payment of persons who have engaged to lecture during the winter months, for meteorological observations, and for explorations of caverns. Next January will be published the first collected volume of the *Mittheilungen* of the club, with illustrations. Collections of 3,130 marks and 9,925 florins were made for paths and huts. Villach was selected for next year's meeting.

— Signal-service note xvi., entitled 'The effect of wind-currents on rainfall,' by G. E. Curtis, is one of the most carefully prepared numbers of the series, both in the reference to previous work on the subject, in which English, French, and German authors are quoted, and in the discussion of the special series of records from five gauges on the summit of Mount Washington. The author concludes that the rainfall (without snow) in such exposed situations varies materially within distances of only one or two hundred

feet; that the windward gauges receive least and the leeward gauges most rain, as had been stated for buildings by Bache in 1837; and that, in high winds, small gauges do not collect enough rain, the discrepancy between eight-inch and three-inch gauges varying as the square of the wind's velocity; and, for velocities of sixty miles an hour, the three-inch receiving only two-thirds of the rain collected by the eight-inch gauge.

— The elasticity in the carbon filaments of the incandescent lamps, at least in some of the patterns, is rather remarkable. Take an Edison lamp of about a hundred ohms resistance, and a moderately sharp blow with the hand at right-angles to the plane of the loop will vibrate it so far that it strikes the side of the glass bulb; and it will continue for two minutes, swiftly vibrating through very slowly decreasing amplitudes, and with beautifully complicated nodal effects, according to the direction of the blow. So sensitively elastic are some of them, that it is difficult to hold them in the hand so steadily that the upper part of the loop is not blurred by rapid incessant vibrations of small amplitude.

— The Royal society of New South Wales offers its medal and a money-prize for the best communication (provided it be of sufficient merit) containing the results of original research or observation, upon each of the following subjects. To be sent in not later than May 1, 1885: anatomy and life-history of the Echidna and Platypus, the society's medal and £25; anatomy and life-history of Mollusca peculiar to Australia, the society's medal and £25; the chemical composition of the products from the so-called kerosene shale of New South Wales, the society's medal and £25. To be sent in not later than May 1, 1886: on the chemistry of the Australian gums and resins, the society's medal and £25.

— The committee of the Octagon chapel at Bath, England, where Sir William Herschel was organist from 1766 to 1782, invites subscriptions toward a memorial-window of one whom they truly call 'by far the most distinguished citizen who ever lived in Bath.'

— The *Illustrirte zeitung* reports that the new torpedo-boat tried at the recent manœuvres of the German fleet has proved eminently satisfactory. In addition to its great strength and speed, it has water compartments which can be suddenly filled, and thus sink its deck to the level of the sea, without seriously impairing the speed of the vessel.

— The London health exhibition has been so successful, that it is expected the council will have a handsome balance when they close their doors; and they have not yet decided what to do with it. The aggregate of admissions now exceeds two millions and a half, representing a gross taking of a hundred and ten thousand pounds, ten per cent of which may remain when the last liability has been wiped off.

— Mr. Farini of the Royal aquarium, London, has now on view some of the dwarf race of men reported by several travellers as dwellers in equatorial Africa; and he has invited all anthropologists there to study this strange development of the human race. The tallest of them is four feet six inches in height, and professes to be a giant among his own people. They are exceedingly intelligent.

— The Social science congress this year met at the place of its origin, Birmingham, and attracted a much larger attendance than last year, the programme of work being a fine one. The president of the year, Mr. Shaw Lefevre, in his opening address, reviewed the reaction from the non-intervention views of state policy of Ricardo, Stuart Mill, Bastiat, etc., and stated his opinion that the present "movement for extending the action of the state has not been due only to democracy. It has been demanded almost equally by all classes; but the greater force of the popular will in parliament has deprived the opposing interest of their power of resistance. . . . The more recent school of political-economists in this country, and still more on the continent, has largely departed from these (earlier) views, and has held, that while free exchange, free labor, and free contract are important principles to maintain, yet the state is bound to interfere when individual interests result in the degradation and oppression of the lower classes, and that it is justified in undertaking those works and functions which can be better attained by it than by individual effort. Almost alone, my friend Mr. Herbert Spencer has been left among philosophers, to preach the doctrine of *laissez faire*, to raise the banner of individualism against state action, and to denounce what has been done during the last few years as radically wrong in principle, and leading to socialism, or to the ultimate slavery of the masses."

During the last ten years, he stated, taking the increase of population of England and Wales into account, there had been a decrease of pauperism of thirty per cent, and of serious crime of twenty-two per cent.

— Prof. W. Braune claims to have discovered some constant principles of arrangement of the veins in the human body, the variability of which has been an anatomical puzzle of long standing. He proposes to publish an atlas in imperial folio under the title '*Das venensystem des menschlichen körpers.*' The first part with four colored plates, prepared with the collaboration of Mr. E. Harry Fenwick, is now announced by Veit & Co. of Leipzig; price 45 Rmk.

— The Prussian authorities are planning a hygienic institute, as a branch of the University of Berlin, similar to the existing institutes of physiology, etc., this branch of knowledge being recognized as necessary to the medical profession. It is said that Dr. Koch will be placed at the head of it.

— Dr. Th. Liebisch, formerly professor of mineralogy at Greifswald university, has been called to the Königsberg university. The professorship of physiology at Königsberg has been given to Prof. L. Hermann (Zurich). Dr. L. Königsberger, formerly in Vienna, has been called to the professorship of mathematics at the university of Heidelberg. Dr. P. Dubois-Reymond of Tübingen has accepted a call to the Technical school in Berlin.