

ducted showed that ordinarily the pressure is not affected at all by alcohol. But arterial pressure, like all pressure, is a reaction between two opposing forces, the strength of the heart's action on the one hand, and the friction in the arteries on the other. Alcohol might increase one of these while correspondingly diminishing the other. In fact, this was found to be the case; for if the constrictive reaction of the arteries was paralyzed by severing their connection with the vasomotor centres, it was found that the heart dilated so much more fully under the influence of alcohol that the increase in the flow through the carotid would amount to from 50 to 75 per cent., although the frequency of the heart-beat was unaffected. The apparatus was so arranged that every five minutes there was an alternation between supplying the heart with blood mixed with alcohol and with pure blood, while the blood that passed through the carotid in each five-minute half-period was collected. The result was invariably as stated. It follows, therefore, that alcohol has a double effect on the circulation, at once stimulating the heart and paralyzing the vasomotor centres. But if this be the case, the flow of blood must be greatly increased, and consequently there should be a dilatation of the smaller vessels which would be shown by that instrument which detects changes in the volume of a limb. Dr. Wood's communication was set forth in so interesting a way, and his delivery was so admirable, that the audience was vivaciously responsive.

Professor Brooks, of the Johns Hopkins University, explained how he had discovered that the principal axis of symmetry of the mature oyster is already marked in the ovarian egg—in the egg before it is yet an egg, and while it is still attached. In that stage of development it has a kind of stem, in reference to which the nucleus of segmentation is symmetrically situated. It also has a shell at that time, but as soon as it is expelled the sea water enters the shell, and the egg slips out; whereupon, in ninety-nine cases out of a hundred, the egg assumes a spherical form, so that the axis which its stem had marked now appears to be obliterated. However, in one egg out of every hundred a sort of neck remains, which is identifiable, by its peculiar shape and by the situation of the nucleus, with what was at first the stem. The segmentary spindle, and all the segmentations are placed symmetrically to the axis of this neck, and the identity of the axis can be traced throughout the animal's life. It is perhaps the only case in which a principal feature of a mature individual, and unattached animal is so indubitably determinate from the very first.

Mr. Agassiz, the President of the Academy, gave a fascinatingly interesting account of his last *Albatross* expedition. It was intended to explore a part of the Pacific Ocean that had been quite unknown. We will not undertake to state all the lines run over, but the following will show some of the principal passages, though not always in chronological order: From Panama to the Gallapagos (on the equator due south of New Orleans); thence to Callao (13 degrees south); thence to Easter Island, and to Mangrove Islands (on the tropic of Cancer); westward of Pitcairn, due south of Suva; back to Acapulco (south by west of the city of Mexico). In this quadrilateral

particularly in its southern part, was found a large district of the ocean characterized by a bottom of manganese nodules, with scarcely anything else. Each haul would fetch up two or three bushels of what looked like potatoes, running up to the size of cannon balls. Such a bottom is found nowhere else, although manganese nodules have been brought up sporadically. Elsewhere the bottom is covered with an ooze largely of decaying animal matter, affording plenty of food, but in this district there is very little food. It is a sea-bottom desert. It lies upon a plateau some 2,000 fathoms deep, between which and the coast is a series of deeps where the soundings were most irregular, some of them reaching 4,000 fathoms. It is curious that the explorers took with them a chart from Kiel, where they found laid down, on the evidence of a few soundings, the "Albatross Plateau," a sort of clairvoyance of what was to be. Mr. Agassiz called it a guess. Over this plateau there are no currents. No food is drifted there, and consequently there is no animal life at the surface. There being no life at the surface, no food can drop to the bottom; and that explains its being a desert. In the Humboldt Current, animal life reaches a depth of 300 fathoms. Where there were currents, plenty of food and animal life was everywhere found. The amount of animal life on the surface of the Humboldt Current is immense, but it diminishes very rapidly as the depth increases, because the temperature falls very rapidly. It would be 72 degrees Fahrenheit at the surface, 52 degrees at 30 fathoms, and at 100 fathoms not much above 40 degrees. Many of the so-called deep-sea animals really do not live below 150 fathoms; but they are brought up in the hauls, and, being much damaged, are supposed to have come from great depths. Mr. Agassiz remarked that this relation between the distribution of animals and the currents throws a certain light upon former geological conditions. It was the eastward currents that stocked and peopled the islands of the Pacific; and there were greater currents in geological ages.

Easter Island was visited, and it was most satisfactory to have an account of that enigmatical place from such an observer. The whole periphery of the island is land-walled 12 to 15 feet high, with numerous platforms for the gigantic images. In the entire absence of wood, these were roughly cut from stone with obsidian tools. The stone must have been soft when first taken from the quarry. They are idols with enormous heads and small bodies, not apparently intended to imitate humanity, and infinitely below the work found in Central America. Hieroglyphics abound which the natives can still read. Originally there must have been a population of four or five thousand inhabitants; at present the natives number fifty or sixty. Every indication is that the work ceased most suddenly, as if in consequence of some unexpected physical or psychical catastrophe. The audience was charmed with the lecture. It recalled Louis Agassiz to those who had heard that famous naturalist and lecturer.

On Wednesday the Academy visited the new Bureau of Standards with the Washington Academy of Sciences. It is as yet impossible to form any critical opinion of this institution; but it has certainly been planned upon a generous scale, with the

intention of covering every kind of standardization that there is any important wish in the country to have the Government undertake. The appearance of everything—buildings, instruments, and men—is highly creditable; and there are enough accomplished physicists in the country to make its work an object of national pride.

On Wednesday evening the Academy dined with Mr. Agassiz at the New Willard.

DR. EVANS'S SIXTH YEAR'S CRETAN CAMPAIGN.

Knossos, March 29, 1905.

Had I not already made similar prophecies, I should say, after this week spent in the Museum at Heracleion and on the site of the House of the Double Axe at Knossos, that discoveries are likely to end with the present year's work. But an incident of two days ago gives me pause. While our party was paying its last visit to the excavations, the foreman brought the curved segment of a vase-handle, instantly identified by Dr. Evans as belonging to one of the familiar Knossian funnel-shaped vases made of micaceous schist. The Italians have found the like at and near Phaistos. This handle was decorated with alternating nautilus and sprays wrought in an extremely clear-cut fashion, suggesting the best palace-style of vase painting. But the newly found fragment came fresh from a trial pit just experimentally sunk at a considerable distance west of the palace. Indeed, it lay on the upward slope of the long hill running parallel to that on which the Knossian palace stands. If followed by others, this small find must indicate the presence of important remains upon that hill. The trial pit was sunk in the line of the deep-level Mycenaean causeway discovered last year below a Roman road built along the same line about 2,000 years afterwards. These two roads run, one under the other, from the theatre building 100 yards northwest of the palace due westward. The problem in hand is to remove the upper Roman road and lay bare the lower Mycenaean one. This will probably have been done by April 14, when a visit is expected from members of the forthcoming Archaeological Congress at Athens.

Incidentally there is also in progress the excavation of certain magazines lying deep down and by the side of this Mycenaean causeway. Whether there are older magazines beneath the ones now in hand remains to be seen. Fewer magazines belonging to the oldest Knossian palace have come to light so far than might have been hoped. The Italians at Phaistos have found several such, and it is equally clear on both sides that at least two distinct epochs are distinguishable in buildings and in pottery and the like. Of course, the older and the later palace both antedate 1500 B. C.; and remains both earlier and later than either have been forthcoming, not only from Knossos, Phaistos, and Hagia Triada, but also notably from Gournia, where our countrywoman, Miss Harriet Boyd, has found so much of vital importance for the history of earlier Cretan handicraftsmanship and for the understanding of the mysterious worship of the Cretan snake goddess.

As the years pass by since Dr. Evans's first campaign at Knossos, it becomes more

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Few railways are operated to their full capacity. They could move more trains, they could move more cars to the train, they could put more freight in the cars which they do move. Suppose a freight train returns empty from its destination; the cost of moving it is nearly as great as if the cars were loaded. If by allowing a rebate of one-half, or of nine-tenths, of the regular rate, a return train-load of freight can be procured, it will pay to allow the rebate. And it will pay not only the owners of the railroad, but also their other customers, who are very likely complaining of the rebate; for the increased earnings of the road tend to bring about reduced charges. In fact, it might almost be said that no

road can reduce its charges except by increasing its earnings; and earnings are increased by accepting all the traffic which can be handled—at any rate which produces any profit whatever. Mr. Acworth's demonstration of these truths is beautifully simple, and it would be a fortunate thing for our country were it brought to the public attention. When we consider that our Government is now largely engaged in transporting mail matter; that it charges thirty-two times as much for some kinds of this matter as for others; that it charges as much for carrying a bundle a mile as for three thousand miles; that in many cases the rate of charge is two or three hundred times, sometimes a thousand times, as great as in others—when we consider all this, it is certainly remarkable that any one should propose to make the equalization of railroad rates a Governmental function. Yet this proposal may be carried into effect unless our citizens are willing to listen to men like Mr. Acworth, who are at the pains to present in a few words the lessons derived from a long experience.

Neolithic Dew-ponds and Cattle-ways. By A. J. and G. Hubbard. Longmans. 1905.

"We have no waters to delight
Our broad and brookless vales—
Only the dew-pond on the height
That never fails,
Whereby no tattered herbage tells
Which way the season flies—
Only the close-bit thyme that smells
Like Dawn in Paradise."

We wonder how many persons who read this stanza in Mr. Kipling's fine poem "Sussex" understand what he meant by the third and fourth lines. The word "dew-pond" has so far escaped the net of the compilers of the Oxford Dictionary, but it still has a chance to appear under "pond." In the work cited above, the authors endeavor to solve the question of the water-supply of the Neolithic dwellers in hill-encampments on the Downs in the South of England. There were apparently no wells, and they had to depend on the "unfed" artificial dew-pond. The art of making these has never quite died out in England. There are still wandering gangs of men whose trade it is to construct for farmers a pond which, in however dry a situation, will contain more water in the summer heat than in the wet winter season. The supply is independent of springs or rainfall. The dew-pond makers

"hollow out the earth for a space far in excess of the apparent requirements of the proposed pond. They then thickly cover the whole of the hollow with a coating of dry straw. The straw is then covered by a

layer of finely puddled clay, and the upper surface of the clay is closely strewn with stones. The pond will gradually become filled with water, the more rapidly the larger it is, even though no rain may fall.

During the warmth of a summer day the earth will have stored a considerable amount of heat, while the pond, protected from this heat by the non-conductivity of the straw, is at the same time chilled by the process of evaporation from the puddled clay. The consequence is that, during the night, the moisture of the comparatively warm air is condensed on the surface of the cold clay. As the condensation during the night is in excess of the evaporation during the day, the pond becomes, night by night, gradually filled. In practice it is found that the pond will constantly yield a supply of the purest water."

From all which we may justly conclude that labor was more available than boring tools for Neolithic man, and that even now there is a good deal of leisurely and cheap labor in the South of England.

Closely connected with the dew-ponds are the cattle-ways down which primitive man drove his herds from the entrenched settlement to water. These ponds were always outside the earthworks, and were themselves sometimes fortified. As for the encampments themselves, the readers of Mr. Hardy's 'Mayor of Casterbridge' will remember his description of the huge, mysterious earthworks outside Casterbridge (which is, of course, Dorchester). Maumbury Ring, as it is called, is an oval structure measuring 218 by 163 feet. Its embankment is about thirty feet high. At the northeast there is an opening some thirty feet wide. Mr. Hardy always refers to this Ring as a Roman amphitheatre, but the present writers maintain that it is a solar temple, one of the earliest of its kind, having the orientation of Stonehenge and originally holding a sun-stone in its eastern cleft; the stone itself was still to be seen in the eighteenth century. Where Mr. Hardy and the majority of antiquaries see "the slopes lined with a gazing legion of Hadrian's soldiery," our authors, carrying their imaginations further back, behold hordes of Neolithic men. Just so were their settlements constructed. All through the Downs can be traced vast hill-encampments, in some cases as old as the Egyptian pyramids, and built, it must be remembered, without metal tools. Specimens of their flint tools have been found in the neighborhood. The remains of dew-ponds are always to be found near them, with the cattle-ways as has been described.

The whole study is well worth reading even by those who have no immediate interest in antiquarian topography. There are numerous and very clear photographs of dew-ponds both dried up and still in commission, and of those imposing embankments wherein primitive man toiled to entrench himself and his cattle against wild beasts and hostile neighbors.

Philosophy as Scientia Scientiarum, and A History of Classifications of the Sciences. By Robert Flint. Imported by Charles Scribner's Sons. 1904.

A Syllabus of Certain Topics of Logic. By C. S. Peirce. Boston: Alfred Mudge & Son. 1903.

Judicious and thorough, the historical part of Dr. Flint's volume satisfies well the conditions that are most essential to a satisfactory history of any department of

philosophy. Devoted students of the subject, the few there are, will not need to be told this. It is not merely that Dr. Flint's skill in the clear presentation of the history of philosophy is known to them by his 'Vico,' his 'Historical Philosophy in France,' and his 'Philosophy of History in Europe,' but that for now nearly twenty years they have had the larger and major part of this very work at their elbows, undeterred by its obliging them to harbor volumes of the old-fashioned review in which it first appeared, ponderous volumes—in their avoirdupois we mean, and not merely in their tone. A certain tell-tale redolence of the quarterly-reviewer clings to Dr. Flint still, in a habit of pronouncing judgment concerning questions of philosophy and criticism without having submitted much evidence, if any, to the judgment of the reader, to whom alone it really appertains to pass judgment. This harmless addition is certainly not a mark of great philosophical strength, nor can that quality be claimed for Dr. Flint; but it has been one of the foibles characteristic of Scottish philosophers, and we all know how the stock of one or two of these has been rising of late in the world's market of criticism. That man has not learned to read philosophy to serious purpose who, other things being equal, does not more enjoy, in a discussion of a purely theoretical question, to read that from which he deeply dissents than that with which his own opinions mainly concur. Besides, Dr. Flint's habit brings along with it that sturdy Scottish freedom of private opinion which does not quail before the face of any host of authorities—a trait, for all its amusing us at times, which in a historian of philosophy is as valuable to his student, after those of thoroughness, level-headedness, and fairness, as any that occur to us, simply because the writer who possesses it suggests ideas, while he who follows the great authorities suggests nothing to the student who reads their works for himself.

If Dr. Flint asserts many things which, so far as appears, he is unable to prove, they are for the most part propositions which recommend themselves to natural good sense, and thus at any rate suggest interesting questions. He has attempted no classification of his own, and, as long as he has not been moved to do so, we need not lament it. In this and other historical works he has employed his philosophical capacities with such wisdom as to render them more conducive to philosophical progress than those of many a more vigorous thinker, though it be only indirectly, by the pabulum his works afford to the more vital thought of others. We must say, however, of this book that its utility would have been appreciably enhanced if an appendix had exhibited the schemes of those classifications which are described merely in general terms in the text. Moreover, we should have preferred an alphabetical index to the analytical table of contents that is furnished; but why might we not have had both?

As for fairness, perfection in this virtue is as unattainable as in any other. Dr. Flint is a professor of theology, and it is to be presumed that some cause renders it more difficult for divines to be fair than for other men. We quote the passage which seems to be the most suspect in this respect of any in the book:

"We now reach Auguste Comte, than whom,

perhaps, no one has done more for philosophy as positive. He owes the high place he holds among philosophers to the power and skill and general truthfulness of his elaboration of the doctrine of the so-called positive sciences as a whole, not to the merits of his treatment of the particular problem of the classification of the sciences. He claimed, but had no right whatever to claim, that he originated the classification which he adopted. If that classification possess any merits, they must be ascribed to Dr. Burdin, who conceived it, and to Saint-Simon, who first received and published it; not to Comte, although he showed how much could be made of it. . . . The classification cannot be disavowed from the celebrated 'law of the three states.'"

As to this law, M. Lévy-Bruhl remarks that it

"had been anticipated and even already formulated in the eighteenth century by Turpin, then by Condorcet, and by Dr. Burdin. Comte, nevertheless, takes to himself the merit of the discovery. As he is generally most precise in doing full justice to his precursors, we must admit that, according to him, none of them had seen the scientific importance of this law. It certainly is one thing to gather the notion of a law out of a number of facts, and another to understand its capital importance, and to discern in it the fundamental law which governs the whole evolution of humanity."

It will be seen, from this admission of a writer who, though not a Comtist, is extremely favorable to Comte, that no charge of unfairness on the part of Dr. Flint can be sufficiently supported upon his rather harsh phrases. It is by no means beyond a doubt that the general truth of the Comtian classification depends upon that of the law of the three stages.

It may very likely strike the general reader that the classification of the sciences must probably be a very small matter to have a history that can be expanded into a book. How many such classifications have ever been proposed in all, he may ask? Dr. Flint does not tell, nor can the reviewer; but the latter has examined upwards of a hundred that may fairly be said to be independent of one another. Of titles of publications approximately covering the question, Dr. Ernest Cushing Richardson, in his book called 'Classification,' enumerated about half as many again; but these are not all independent. Their multitude will not appear surprising if one considers that, in the first place, the different writers aim to make their several classifications subservient several widely distinct purposes, and that their theories of the nature of classification in general are very diverse; that, in the second place, the general word "science" means, for some, what *scientia* and *intelligere* meant for the ancients, while for others it means, with Coleridge, systematized knowledge, and, with a third party yet, the whole business of research as an existing activity; that, in the third place, those who entertain substantially the same notion of science in general, may nevertheless differ as to the nature of "a science"; and that, in the fourth place, while the majority of those who attempt to classify the sciences have in view all possible sciences, there are not a few who intend only to enumerate those which have hitherto developed somewhat extensive doctrines. Thus there is no lack of substance for the history.

The second title at the head of this notice is that of a brochure distributed last winter, which gives an outline sketch in four pages of a somewhat elaborate inquiry

into the relations of the actual living and advancing studies as they are conceived by the researchers themselves. The outline embraces only theoretical sciences of research; but the study on which it is based allots considerably more space to the practical sciences.

Dr. Flint's essay on philosophy as *scientia scientiarum* sketches his own notion of what philosophy should be. There is little argument in it, and that little rather inconclusive.

Manual of the Trees of North America (Exclusive of Mexico). By Charles Sprague Sargent, Director of the Arnold Arboretum of Harvard University. With six hundred and forty-four illustrations from drawings by Charles Edward Faxon. Boston: Houghton, Mifflin & Co. 1905.

The times are ripe for this book. In this country there is an increasing interest in forestry and in trees as trees. The large and expensive volumes of Professor Sargent's 'Silva of North America' are now accessible in public and private libraries throughout the United States and Canada, to those who wish to identify the native species of ligneous plants; but, from the nature of the case, such consultation must needs be in the house. Every lover of trees desires to take into the field some convenient guide which can answer a good share of his questions offhand. This task of providing a handy book of reference in field-work fell naturally to the author and illustrator of the 'Silva.' Both have done their work well. While disagreeing wholly with certain features of the nomenclature both in the 'Silva' and in this Manual, and not favoring the splitting up of certain species, we are far from withholding hearty praise to the industry which has brought this mass of materials together, and to the marvelous skill of the artist, who has given to all the sketches, more than six hundred in number, a delicacy and strength which belong to the very first order of illustration.

According to the classification now generally adopted by naturalists as exhibiting best the evolutionary relationships of vegetation, this volume begins with the Pines and their allies, close cousins to the Ferns and their kindred. Then come the Palms and the Yuccas. From these we pass to the Walnuts, Willows, Birches, Beeches, Oaks, and Elms, concerning all of which the amateur desires to know much both in summer and in winter. In the new classification of plants, known as Engler's, and here used as the basis, one comes next to the Magnolias, Sassafras, Witch-hazel, and Plane-trees. And now we are brought face to face with the groups which will cause much perplexity among the students of this treatise, namely, the Thorns. The genus *Crataegus*, the common Hawthorn, everywhere known for its fine foliage, handsome flowers, and richly colored fruits, is here made to pay the penalty of its caprice. Many of the species are extremely variable, diverse characters appearing sometimes on the same plant. Doubtless writers have hitherto been too conservative, making fewer species than this polymorphic genus is entitled to; but one shudders at the thought that the genus as represented in North America (exclusive of Mexico) is here divided into 131 species, to all of which names have been given, for which de-

scriptions have been made, and illustrations drawn. A fate worse than that which has befallen the genus *Rubus* (the Bramble), at the hands of certain botanists in the Old World, has befallen our hawthorns. It is to be feared that our amateur botanists will now treat the hawthorns as Old-World botanists treat the brambles, namely, they will let them alone, since the identification of species based on very minute characters is hardly more attractive as a branch of study than the matching of patterns anywhere. One thing, however, is brought out clearly by such a presentation of slight characters in a genus—the point of view is everything. Otherwise it would not be possible that the genus *Crataegus*, when reviewed in Engler's 'Pflanzenfamilien,' should be credited with only forty species for the whole world, and should, besides, have its identity lost by being merged with another genus, *Mespilus*. In the Manual, the genus not only preserves its individuality as a genus, but is stated to contain within the limits mentioned more than one hundred and thirty species.

It is highly probable that in the genus *Crataegus* and the near of kind, the Brambles, we have some species in the making. Such mutations are attracting great attention in certain quarters, and deservedly; a minute trustworthy pictorial record of such changes and changings must have its value. To Mr. Faxon's unerring eye and pencil we owe such a record. It will be very interesting to see how many of these species will stand the test of the short period which will elapse before a second edition of the Manual is called for. It is noticeable that a few of the new species of *Crataegus* even recently described have fallen by the way, or perhaps have been assigned to other positions in the list. It is worthy of mention that a recent treatise on the Plants of the Southern States contains more than 180 species of *Crataegus* within those limits alone. This must be interpreted, we think, that, in the recognition of species, the personal equation as well as the point of view is an important factor.

The Italian in America. By Elliot Lord and others. New York: B. F. Buck & Co. 1905.

The authors of the above work have done a service to students of Italian immigration in bringing together in book form data, statistics and information relating to Italians in the United States which have from time to time appeared in American magazines and reports. In this compilation, some parts are taken bodily from other works without citation of the sources or even the use of quotations marks. But the labors of others are here presented in logical sequence and in a sympathetic spirit, resulting in an interesting and readable book.

The design of it is stated in the preface to be to "present clearly the contribution of Italy to American development and citizenship." In fact, however, the compilers do not and cannot carry out such purpose. It is too early to examine the effects of Italian immigration on our country; all that can be done is, as is here actually done, to present the ethnic and historical antecedents of the Italian, which are certainly in his favor, and to study what the Italian immigrant has been doing