Madagascar and New Zealand are of older separation, the latter approaching the *restinseln*.

The term 'oceanic' is discarded for the second group, because islands may be formed *de novo* close to continental shores; but the term proposed ('original') is not altogether satisfactory, as it does not express precisely what is meant. The first subdivision (volcanic islands) contains the most important examples, which have sometimes, from their considerable age and altitude, acquired peculiar and local organic forms. The second subdivision (heaped-up islands) includes those of coral and of sand, on which the dry surface is due to wave and wind action. These are all low and monotonous. The third subdivision includes portions of the sea-bottom laid bare by non-volcanic action, either by local elevation "or by withdrawal of the sea formerly held at a higher level by the local attraction of mountains or ice masses that have now disappeared." A single example of recent formation is given, — the so-called 'Gulf-stream island,' northwest of Novaya Zemlya, where the Dutch navigators of 1594 found a sand-bank in seventeen fathoms of water. Peschel's error of placing the Japanese and Philippine islands among the volcanic is corrected: they are included among the continental, as both contain a series of old non-volcanic rocks.

W. M. DAVIS.

LETTERS TO THE EDITOR.

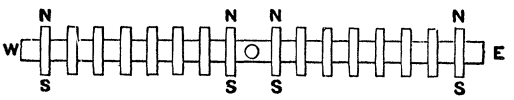
A new form of battery-cell.

IN the ordinary voltaic element, two solid plates are acted upon unequally by one or more liquids. About three years ago, it occurred to me to construct a battery-cell with three non-miscible liquid strata, and no solid plates; which I did, as follows: in a small beaker-glass I placed successively layers of mercury, dilute sulphuric acid, and a solution of iodine in ether. Upon connecting the uppermost and lowest layers with insulated wires, and introducing a coarse galvanometer into the circuit, I obtained evidence of a fairly strong current of electricity. Having neither time nor opportunity to pursue the matter further, I put it on record now in order that any student who happens to be interested in the subject may carry out the investigation. Theoretically, a three-liquid cell is interesting, because its internal resistance ought to diminish with rise of temperature. In this respect it might be very different from the usual voltaic elements. Possibly a combination of solid plates with the upper and lower liquids might give a cell having an internal resistance constant for varying temperatures. F. W. CLARKE.

Correcting compass deviation.

Some years ago, frequently recurrent shipwrecks from magnetic disturbance in the Gulf of St. Lawrence directed my attention to the subject of improving the mariner's compass, or supplementing it in some way which would make its indications trustworthy. The causes of the shipwrecks which I have mentioned seemed to be deposits of iron ore near the shore, so extensive in their area as to render the compass-reading false and misleading. The problem of improving the compass is an important one; for, apart from such risks as those which beset navigation in the Gulf of St. Lawrence, the deviation on board ship due to the presence of iron in the structure or cargo of the vessel is an element of some uncertainty, and danger even, when all the devices known to the mariner's art are used to correct the readings.

My first attempt was to so dispose a series of small flat magnets, fastened across a strip of aluminum, that the strip as such, when poised at its centre, pointed east and west.



Poised concentrically with the strip at such a distance as to avoid mutual influence, I placed a light magnetic needle of a length equal to that of the strip. When strip and needle were near enough to a piece of iron to be attracted by it, one of the two acute angles formed by them indicated the position of the disturbing iron; and this inclination at an acute angle promised to be of value in solving the problem of correcting compass-readings. But magnetic influence on the large scale which prevails on shipboard proceeds from distant centres along large curves, in which terrestrial and local forces merge, which are not attractive, but simply directive; so that when I tried my device on a steamer under very favorable experimental circumstances, as the magnets, large and small, were directed into curves so great as to be practically straight lines, the needle and strip were always at right angles with each other. Were it feasible to use a very long magnetic strip at sea, my device might be available; but, so long as ships roll and pitch on the ocean's unruly surface, the dimensions of the ordinary compass must remain as they are. Since abandoning the fragile little model which I launched with some expectations long ago, I have frequently reverted to the problem it was intended to solve; and it has occurred to me, that were an electro-magnet poised so as to be in constant and free communication with a battery, and were it possible to make it, when desired, so intense in its power that its induction affecting the iron of ship or cargo should increase the deviation which, when less intensely excited, would affect it, then the direction of the deviation would be, of course, known by the direction of the increase of that deviation, and the problem of correcting the compass-reading would be advanced a step. The intensity of the electro-magnet would yield such results as a long (impracticably long) magnetic strip. The electro-magnet would require to be so constructed as to be capable of developing the utmost intensity possible; and the current sent through it should be controllable at will, so that the indications at moderate and highest intensity might be compared. I have neither the skill nor opportunity to carry out the suggestion here given, and publish it in the hope that some competent man of science may be able to embody it in a practical and useful form. GEORGE ILES.

Montreal, May 25, 1883.

MAINE'S EARLY LAW AND CUSTOM.

Dissertations on early law and custom. By Sir HENRY SUMNER MAINE, K.C.S.I., LL.D., F.R.S. New York, *Henry Holt & Co.*, 1882. 402 p. 8°.

WHEN a new book by Sir Henry Maine is announced, we expect to have something to read worth reading. Nor have we ever been disappointed. The author of 'Ancient law' has always something interesting, suggestive,

instructive, to say. He gathers up the gist of contemporary thought, and presents it in a simple, lucid way, and always contributes something new from his own mind. The specialist finds, sometimes, a lack of definition, of exhaustive analysis, and here and there more or less serious errors. In spite of this, however, he must admit that we have no more interesting, no more instructive writings than these; that the reasoning is generally clear and sound; that the errors are, as a rule, incidental.

The present volume is divided into eleven chapters, to one or two of which notes of some length are appended. The first four chapters are devoted to early law in its relations with religion. Ancestor worship is discussed at length. We are told how the worship of father, grandfather, great-grandfather, and other ancestors, remembered or capable of being remembered, has among the Hindus a most elaborate liturgy and ritual. Our author thinks that wherever ancestor worship arose paternity must have been recognized. The father's power must, he tells us, have been antecedent to the practice of worshipping him. This seems a sound conclusion. When, however, we are told that ancestor worship preceded the existence of laws of inheritance, we demur. It is quite possible that ancestor worship originated as an expedient for preserving the knowledge of genealogical relationships, inheritances being determined according to these relationships. It has been very well said by Mr. Skene, that the genealogical table was to early society what the title-deed has been to society of medieval and modern times.

In chapters v. and vi. our author takes up the subject of royal succession and kingship in its connection with early civil justice. These chapters are very instructive. But on p. 131 we find the following statement: 'The past of the west lives in the present of the east.' This seems to us open to some criticism. Does our author mean to say that the gaps in the early history of the west may be filled up by importations of eastern custom? If so, we must make a protest. This is a very dangerous method, and not a scientific one. Without doubt, existing institutions in the east suggest to the student of institutions in the west hypotheses which he may profitably use *as hypotheses;* but they must not be used in any other way. The late Mr. Morgan was led into many errors by filling gaps in the history of one nation by extracts from the history of others. We remember our astonishment when we read his account of the Roman *gens*, in which he fills up the blank spaces of Gaius with importations from America. We are not a little pleased to see that Sir Henry Maine does not follow him in this. He says (p. 283), "The Agnati were a group of actual or adoptive descendants, through males, from a known and remembered ancestor: the Gentiles were a similar group of descendants from an ancestor long since forgotten." His note upon the *gens* is extremely interesting and valuable.

Chapter vii., upon the theories of primitive society, will, perhaps, be read with more interest than any other in the book. It is an argument to support the theory of patriarchal families against the theory of promiscuous hordes, against the theory of McLellan and Morgan. Have we any right to assume that the intercourse of men and women was in early times promiscuous? Sir Henry Maine thinks not. The first fact in sociological development is, according to his view, the family. Promiscuous intercourse, in so far as it has existed, he regards as due to the cultivation of unnatural, abnormal instincts, or else to a deficiency of women at certain times and in certain places. The origin of the family he traces to sexual jealousy, which he describes, rightly enough, as one of the strongest of animal instincts. In short, he takes very much the position which Mr. Darwin takes in his account of the descent of man. Sir Henry Maine defines the patriarchal family as the result of sexual jealousy indulged through power. This is a very good phrase. The whole argument, indeed, is vigorous and strong.

The house community (chapter viii.) is the next stage in sociological development. Then comes the village community, and lastly the manor. "Nor is it possible for me to doubt that the typical manor arose out of the village community." Our author makes this statement on p. 331. The inquiry suggests itself: Why should not the patriarchal family take the form of the manor, and why should not the village community grow up within the manor? Had we space, we should like to discuss this matter at length. Sir Henry Maine does not sufficiently consider the fact that the patriarchal family includes, usually, an assemblage of dependents and slaves. Why not derive the manor, with its tenures and its customs, out of this group, and the village community out of the manor?

The last three chapters of the book (ix., x., xi.) are devoted to the decay of feudal property in France and England, to classifications of property, and to classifications of legal rules. We regret that we have not space to speak more particularly of their contents. On the

whole, the book is singularly interesting, and well worth reading. We may be able hereafter to notice more in detail, and discuss more fully, some of the themes which Sir Henry Maine has made so attractive.

REPORT OF THE UNITED STATES ENTOMOLOGIST.

Report of the entomologist (of the department of agriculture) for the fiscal year ending June 30, 1882. By C. V. Riley. Washington, *Government printing-office*, 1882. 167 p., 20 pl. 8°.

THE report before us, which is extracted from the annual report of the department of agriculture, is not only the most voluminous contribution to economic entomology of the year just closed, but it presents the results of the most extensive investigations in this field during that period. The author, an entomologist of unusual ability and experience, was aided by a corps of very efficient assistants, and had at his disposal a large appropriation. This combination could not fail to produce important results.

It is to be regretted that the report reflects the character of too many other public documents, in that much is printed which has not the slightest permanent value; letters, for instance, from correspondents, often in full, which could have been advantageously reduced to half their extent; or accounts like that of the invasion of the army-worm in New Jersey, which is pleasant reading enough, and well suited to a popular journal, but out of place here in the form in which it is cast. Very different from these are the portions written by the entomologist and the members of his staff: these are direct, and to the point.

As the volume containing this report may be had for the asking, it will be in the possession of all who are especially interested in economic entomology. On this account, it is not worth while to refer, in this place, to each of the many topics discussed. A few of them are of general interest.

The circular which accompanied the seeds of Pyrethrum, that were distributed by the commissioner of agriculture, is reprinted, and is illustrated by two excellent colored plates representing the flowers and leaves of P. roseum and P. cinerariaefolium. The circular gives a *résumé* of what is known respecting the history of Pyrethrum, the method of preparing the powder, and the modes of using it. Dr. Riley adds reports from persons to whom seeds were distributed. Only a few persons succeeded in raising good plants. These were chiefly in the north. The failures were probably largely due to drought and bad seed. A report of experiments with the powder, by Miss Murtfeldt, is also given.

Acting under the direction of Dr. Riley, Mr. Hubbard experimented upon scale-insects with various insecticides, and especially with emulsions of kerosene and milk. These emulsions were the most efficient of the substances used.

Several insects infesting the rice-plant are described. The rice-grub is the larva of a beetle (Chalepus trachypygus). This insect feeds upon the roots of rice, and has done considerable damage to rice-plantations. Howard states that the larvae and adults are both destroyed by the 'harvest-water;' and consequently the breeding-places must be those fields which are not flooded, and the patches of volunteer rice. Therefore the insect can be easily kept in check, except where upland rice is grown. The rice-stalk borer (Chilo oryzaeellus) is a new lepidopterous insect described by Riley. The habits of the larva, which are indicated by the popular name, are reported by Howard.

Economic entomologists will note with especial interest the discovery of the larva of the 'corn bill-bug' (Sphenophorus robustus). This larva infests the stalks of corn at or near the surface of the ground. If, as is now supposed, the adult beetle hibernates in the stalk, ploughing up the stubble, and burning it, will be a simple remedy.

'The smaller corn-stalk borer' (Pempelia lignosella) is a new corn-pest which is very destructive in the Carolinas and Georgia.

In an article on the cotton-worm, a machine for spraying the cotton-plant from below is described, and illustrated by a full-page figure.

Embodied in this report is a part of a report on miscellaneous insects, made by Prof. J. H. Comstock to the commissioner of agriculture; the most interesting portion relates to lac insects, of which two species are described from Mexico and the adjoining portion of the United States.

MACGREGOR'S BALUTCHISTAN.

Wanderings in Balochistan. By Sir C. M. MACGREGOR. London, *Allen & Co.*, 1882. 315 p., illustr. 8°.

THIS is a rather loosely written narrative — with a tendency to slang expressions, such as 'green funk,' 'make tracks' — of a reconnaissance expedition undertaken in 1876–77, in company with Capt. R. B. Lockwood, who,