of 291 guineas for seven; Scottish Chief, whose thirteen yearlings were sold for 3,215 guineas, or 247 guineas each; and Blue Gown, whose eleven yearlings fetched 2,635 guineas, or nearly 240 guineas each. See-Saw, Pero Gomez, and Speculum were the only other sires whose yearlings made more than 2,000 guineas; their respective averages being 219½, 225½, and 180 guineas: and this shows a falling-off as compared with last year, when nineteen sires, as against twelve this, reached that total. With the exception of the colt by Albert Victor—Letty Long, all the high-priced yearlings of the season were by sires included in the above list; and Albert Victor himself was very near being in it, as his six yearlings made 1,865 guineas, or nearly 311 guineas each. Four of the sires which stand at the top of the tree were winners of the Derby—namely, Hermit, Doncaster, Blair Athol, and Blue Gown; but there are six other Derby winners—namely, Macaroni, Lord Lyon, Kingcraft, Cremorne, George Frederick, and Galopin, who have done very badly, for the twenty-eight yearlings by these sires fetched only 4,199 guineas, or rather less than 150 guineas each, taking them all round. The first important yearling sale of the season was held at Marden Deer Park, where Mr. Hume Webster obtained a total of 7,715 guineas for twenty-six lots, and this average of 296 guineas compared very favourably with that made by the Cobham yearlings, which were sold for 4,240 guineas, or 178 guineas each. Mr. Waring's sale at the same place was still more unsatisfactory, as his ten yearlings made but 3,650 guineas, or 365 guineas each, and her Majesty's yearlings—sold, as usual, at Hampton Court—twenty-five animals being sold for 3,585 guineas, or little more than 143 guineas each. Matters mended a little at Newmarket a fortnight afterwards, when 109 yearlings, the bulk of which belonged to Mr. Chaplin, Lady Emily Peel, the Yardley Stud, Mr. Blenkiron, and Mr. Alexander, made 23,515 guineas, or 215 guineas each, and Mr. Carew Gibson had a fairly good sale at Sandgate, where thirty yearlings were sold for 7,950 guineas, or about 265 guineas each. The last of the yearling sales were held at Doncaster, and they were in some respects the best of the season; for, though the average was four guineas less than at Newmarket, 230 lots were sold as against 109, and of the fourteen yearlings which have run into four figures, eight, including the three highest priced, came into the ring at Doncaster.

THE IRISH LAND LAWS.*

THIS book cannot fail to do good if it be carefully read and honestly considered by those who are about to undertake (some of them not for the first time) to dispose of the Irish land question finally. Mr. Richey contrives to present to us, in a remarkably small space and with most commendable clearness, the history of the Irish land laws and the changes they have undergone. He starts by explaining the difference between the tenancy of land regarded as an estate in the land, as by English law, and a letting of land for hire, or "*bail à ferme*," as it is called in the Code Napoléon. For so doing Mr Richey gives this justification:—"The fairest mode of drawing our attention to the peculiar characteristics of the system of land tenure in Ireland is to compare the provisions of that law with the contract to be implied in the ordinary cases of the hiring of land, as framed by jurists who were perfectly free from that prejudice in favour of landlords which has been transmitted, like an hereditary taint, through the successive generations of English lawyers." We are now so often told that the Irish tenant is oppressed, in comparison with a French "preneur," that it is not uninstructive to have set before us this passage from the "Code Napoléon:"

> Le preneur peut encore être expulsé s'il abandonne la culture, s'il ne cultive pas en bon père de famille, s'il emploie la chose louée à un autre usage que celui auquel elle est destinée, ou, en général, s'il n'exécute pas les clauses du bail, et qu'il résulte de là un dommage grave pour le bailleur. En cas de résiliation provenant d'un fait quelconque de preneur, celui-ci est tenu de dommages et intérêts.

Now, independently of covenants in his lease, if he have one, no English or Irish tenant is bound to cultivate "en bon père de famille;" nor is he liable to many of those burdensome incidents which the French law—looking on the hiring of land like the hiring of anything else—imposes on the tenant. But, whereas a French tenant is compensated for agricultural improvements, an Irish one was not until 1860, and an English tenant not until the Act of 1875. Those who talk so glibly about feudalism will do well to say no more about it until they have studied Mr. Richey's chapter in which he gives an account of the Landlord and Tenant Act (1860). Here he shows clearly how the theory that land is a commodity in which there should be free trade was insisted upon in its fullest intendment. It was by this statute, which forced land into the market, enabling those to sell who could not have sold before, which held out inducements to tenants in the shape of security for the value of their improvements—it was by this that those new proprietors were created, those capitalists who bought the land and now look in vain for the rent of it. It is pointed out by Mr. Richey what results ten years of free trade in land had brought about in Ireland. The fact is that the tenants, falling into the humour of the free-trade doctrine, competed recklessly and bought too dearly, and were afterwards evicted when unable to pay their rents. The reformers of 1870 therefore determined to give them "security of tenure," to help them to make improvements, and to promote the growth of peasant proprietors. No further estate in the land was given to the tenants by the Act of 1870; and no portion of the absolute ownership was in terms transferred to them. It was merely made most expensive for a landlord to terminate the tenancy he had created, or, as it was said, to "disturb" the tenant. As Mr. Richey well puts it: "The rights given to the tenants as against their landlords are not stated affirmatively in the statute; the rights of the tenant are, so to say, latent, and cannot be exercised until the landlord has previously attempted to exercise his legal right of resuming possession. Until the landlord 'disturbed' the tenant, the rights of the latter were precisely the same as they were before the Act; from the date of the disturbance, the tenant acquired a negative right of refusing to give up possession without compensation." The examples given by Mr. Richey—and they are many—of the injustice and absurdity worked by the Act of 1870 constitute a warning to those who are about again to remedy the evils of "disturbance" by disturbing what a short time ago they enacted.

Mr. Richey concludes with a series of questions which, as he truly says, it is necessary they should be able to answer distinctly who undertake to draw a new and better Irish Land Act. These questions are most apposite; and, though Mr. Richey does not profess to answer them himself, his explanation of the law on the subject, as it was and is, cannot but assist those who would fairly face the many difficulties of this troublesome matter. We give a few of these questions, and invite consideration of them. "What do we mean by the terms 'security of tenure,' and 'fixity of tenure'? Under such a system what would be the rights and duties of the landlord, and what those of the tenant?" "Whether the grant to a tenant of 'fixity of tenure' at a 'fair rent' is not merely a circumlocution for the conveyance of the fee simple to the tenant charged with a rent-charge for the landlord?—and, if so, whether the landlord should, under these circumstances, pay all the county cess, and one-half of the poor rate, otherwise than other annuitants or remembrancers (incumbrancers?)" "If a landlord for the public benefit be required to accept, and not permitted to demand more than, the 'fair rent,' whether he should or should not be guaranteed by the State the punctual payment of such 'fair rent?'"

Mr. Richey writes throughout fairly, and in no partisan or controversial spirit; and his book is a contribution of great value to the discussion in which we now find ourselves involved. That there is little enough of accuracy, and more than sufficient of ignorance, among those who would enlighten us on the Irish question, his appendix on "Popular Errors as to Irish Law" very plainly proves. It is not unusual to find people complaining of the law for what is often their own fault in not understanding their rights under it. This Dr. Hancock did; and Mr. Cliffe Leslie seems to have been no better instructed. Archdeacon O'Connell also is shown to stand in need of a copy of this book; and it is not improbable that there are others, even more eminent, whose knowledge would be increased by consulting Mr. Richey.

* "The Irish Land Laws." By Alexander Richey, Q.C., LL.D., Deputy Regius Professor of Feudal and English Law in the University of Dublin. (London: Macmillan and Co. 1880.)

MR. DARWIN ON THE MOVEMENTS OF PLANTS.*

No part of vegetable physiology is more interesting than that which treats of the quasi-animal movements performed by so many plants. For some years past Mr. Darwin has devoted himself to studying these curious phenomena, and he has already published the results of his investigations on insectivorous and climbing plants; but his new volume introduces us to a different class of facts, which are far less familiar, though more universal, than the very marked and rapid motions of the mimosa and the Venus's fly-trap. There is a kind of slow revolving movement, common to the growing parts of all plants, which causes their tips to describe gentle circles or ellipses, and to which Mr. Darwin has given the name of circumnutation. Upon these motions Mr. Darwin and his son have made a number of minute observations and experiments, carried on with that wonderful patience and power of detail which distinguishes all his work; and they have now made public their results at great length, and with copious diagrams and illustrations. The authors themselves begin by observing that no one who is not independently investigating the subject need read all the details; and they have accordingly printed their more important conclusions in larger type. The book, in fact, is intended rather for specialists than for the general reader. Nevertheless, many of its chief results are of great interest even for those who would not care to follow out all the experiments and observations by which they have been established to their full extent.

From the moment when a seedling plant first bursts the coverings which enclose it, it constantly performs a series of slow revolutions with both its growing tips, upward and downward. The tiny root which penetrates the ground has a gentle corkscrew movement, enabling it to find out and insinuate itself in the hollows between grains of the soil, and to follow the burrows of worms or other subterranean animals. It thus winds its way along the line of least resistance; and, growing laterally as it sinks downward, it acts like a wedge with a wonderful power of breaking up the earth, analogous to that exerted by wooden wedges expanded by the absorption of water. At the same time, the arched stem pushes its way upward, thus avoiding injury to the delicate head, and similarly traces itself a zigzag course through the surface-soil, by which means it throws off the earth on either side and shuffles out, to use the authors' simile, like a man covered by a load of hay. The seed-leaves and all subsequent leaves, as soon as they appear, also revolve in irregular ovals, which of course are changed into spirals by their upward growth: and these movements persist as long as they continue growing, and even afterward in many cases, where the organs are provided with a special cushion of cells for that express purpose. The slowness with which they describe these circular figures causes us to overlook them in ordinary life; but Mr. Darwin affixed fine thread of glass, tipped with a minute bead of sealing-wax, to the growing parts, and then marked the positions from time to time on a piece of glass fixed above, or sometimes permitted the movements to

* "The Power of Movement in Plants." By Charles Darwin, LL.D., F.R.S., assisted by Francis Darwin. (London: Murray. 1880.)

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draw their own line on a surface of smoked glass. An immense number of the figures thus obtained are reproduced as diagrams in the volume, and the amplitude of the movements is certainly very surprising. They are caused by a swelling of the cells first on one side and then on the other, which accelerates growth on the opposite sides alternately; and the authors, though cautious of hypotheses, suggest that the changes in the cells may require periods of rest. At any rate, the root and all the leaves of almost all plants are constantly moving round and round in irregular spirals; and, strange as the fact seems at first sight, the immense number and variety of Mr. Darwin's experiments, as well as the minute care with which they have been performed, place the universality of this circumnutation beyond a doubt.

In order to test how the growing radicles pass over stones, roots, and similar obstacles, the authors tried several other experiments, which resulted in the establishment of the fact that the tip of the root in many plants is highly sensitive to contact, and causes the part behind it to bend away from any object which touches it. They fastened tiny scraps of card to the growing points, and found that the root turned out of its way in the opposite direction as long as the card remained in contact; and as the root was of course unable to avoid the card, however much it turned, it formed in some cases a complete circle or loop. One germinating grain of Indian corn, in fact, suspended on a pin, in its futile endeavours to escape from the card actually tied itself into a knot; in doing which it knocked off the foreign body which was annoying it, and proceeded at once to grow straight downward. When no obstacle gets in its way, however, the tip of the root seems conscious, so to speak, of the attraction of gravitation, and under the influence of this geotropism, as Mr. Darwin calls it, grows directly towards the centre of the earth.

In all these cases we have merely instances of unmodified circumnutation, which may sometimes be useful indeed to the plant, but which seems to depend upon original organic causes, without any specialization for a distinct purpose. There are, however, other cases in which circumnutation appears to have been modified by natural selection, so as to produce larger results in certain special parts for certain special reasons. The simplest instance is that of climbing plants, in which the modification consists of an increase in the amplitude of the movements only. When young, such plants perform revolutions of about the ordinary diameter; but as they grow older and begin to seek for a support, they make much wider excursions to all points of the compass, until they find a suitable object round which to cling. Similarly, most leaves circumnutate very slightly; but many tendrils, which are metamorphosed leaves, move in comparatively large orbits, and so have a much better chance of finding a support. Twining stems have also adapted themselves to special circumstances: for while some can only wind round a thread-like host, others, even in Britain, can grasp a stalk of a few inches thick, while tropical creepers can embrace the trunks of huge forest trees. Another modified form of circumnutation is that which enables the cyclamen to bury its pods, after flowering, in the moist moss, and the pea-nut to worm its way spirally below the soil itself. Still more interesting are the observations on the so-called sleep of plants. Ever since the days of Linnæus it has been well known that certain trees and shrubs change the position of their leaves at night, so as to bring their upper surfaces into contact with one another, or to cover one another with their blades. Such plants occur sporadically in the most widely different families, and therefore it would seem probable *a priori* that the cause of the phenomenon was a modification of some common habit; but nothing was really known before of its nature and object. Mr. Darwin and his son, however, have now clearly shown that the end attained is the protection of the upper surface of the leaves from chilling by radiation; and in several plants which they exposed to the cold air at night, the leaves which were allowed to sleep naturally were little or not at all injured, while some which were pinned down so as to prevent them from sleeping suffered greatly. They also suggest excellent reasons for believing that the movements which produce the so-called sleep are modified forms of the ordinary circumnutation. The illustrations include some woodcuts of various plants in their diurnal and nocturnal conditions, after photographs; and even those who have themselves been accustomed to watch similar phenomena in their own conservatories will probably be astonished to find how great is the difference between the two states of the same plant when we are thus enabled to compare them side by side simultaneously.

Perhaps, however, the most interesting suggestion in the whole work is that cautiously hazarded in the concluding chapter: that there exists an analogy between these movements of plants and those unconsciously performed by the lowest animals. The tip of the root, in particular, which determines the course of the whole subterranean portion of the plant through the earth, has acquired a sort of sensitiveness which enables it to guide and direct its movements almost like the brain of one among the lower animals. If pressed, burned, or cut, it transmits an influence to the adjoining parts, causing them to bend aside in the opposite direction: it can distinguish between slightly harder and softer substances on either side; and it is sensitive to differences of dampness, so that it directs the adjoining parts towards the source of moisture.

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TRADE AND FINANCE.

The Brighton traffic returns, which have so long been disappointing, suddenly show a great increase just at the moment when the speculation on the Stock Exchange has turned, and the price of the A stock is recovering as unaccountably as it previously lost ground. The increased receipts last week were £2,319. The increase on the South-Eastern was £2,640. According to the usual fortnightly Sheffield statement, the receipts on railways and canals (exclusive of joint lines) from July 1 to November 28 show an increase of £20,545, and the expenses an increase of £7,980, being a net augmentation of £12,565, to which ought to be added for the two days short this year about £5,000. Respecting the railway prospect in general, we cannot agree with the *Daily News* that there is need for hoisting "storm signals." Whether the renewed speculation in the heavy lines is justified or not, we fancy the keen and shrewd persons engaged in it are quite as competent to form an opinion as the City editor of the *Daily News*, and may safely be left to take care of themselves. But respecting the broad question, Is railway property so improving that the next three or four dividends are likely to be good? we think no competent observer would hesitate to reply in the affirmative.

The condition of the New York Associated Banks has grown materially worse during the past week, in spite of most vigorous efforts to replenish their reserves. The whole stock of gold and legal tender held by them has fallen to £13,300,000; while 25 per cent. of the net deposits amounts to £13,805,000. Consequently, the reserve is now £505,000 below the legal minimum. This has been brought about by a loss of £1,140,000 in the gold, and of £20,000 in the legal tender—together £1,160,000; while the net deposits have decreased only £2,680,000. That the banks have greatly restricted the accommodation they usually give to their customers, letting discounts run off and calling in advances, is shown by the fact that the loans and discounts have decreased £1,560,000. How great the absorption must be—whether for bearing the Stock-Exchange, as alleged, or because of the currency requirements of the interior, appears from a telegram from the Philadelphia correspondent of the *Times*, which says that the imports of gold during the week amounted to £722,600; and since August to £10,182,120. Furthermore, it appears from the report of the Director of the Mint presented to Congress that there were coined during the fiscal year ending with June last—£7,200,000 in gold and £7,600,000 in silver. The greatness of the currency demand, for the South and West particularly, is shown by these figures.

Mr. Sherman, it turns out, recommends Congress to adopt both modes of dealing with the portion of the United States Debt falling due next year which we have mentioned in these columns as alternatives offering each very considerable advantages. According to Mr. Sherman's report, the amount falling due is £137,400,000, and he recommends that the Secretary of the Treasury should be empowered to issue for its redemption 80 millions sterling in bonds, bearing interest not exceeding 3 dols. 65 c. per cent, and redeemable at the end of fifteen years; also 80 millions in bills falling due in annual series for ten years, and bearing interest not exceeding 4 per cent. It will be seen that the Secretary asks for authority to issue 160 millions sterling to pay off only 137½ millions, and that he also asks for discretion respecting the rate of interest, the maximum only being fixed, not the minimum. The reason is that his plan being tentative, he wishes to have power to modify his measures according to experience. But he expects to be able to place the fifteen-years bonds at 3½ per cent., and the Treasury bills at 3 per cent. He is to be bound, of course, not to issue more of both classes of obligations than will cover the debt to be carried forward—that is, 127½ millions sterling; for he will pay off absolutely ten millions next year. That the plan is practicable admits of little doubt. During the last fiscal year, ending with June, the actual surplus was £13,176,731, and a further sum was taken from the Treasury balances, which raised the total redemption of debt in the twelvemonth to £14,793,613. In the current financial year the surplus is expected to reach 18 millions sterling; and for the financial year beginning next July an equal surplus is estimated. In that year the debt charge will be brought down to less than £17,800,000, about £6,400,000 having been saved by refunding at a lower rate of interest. The proposals now submitted are estimated to effect a further saving of £2,400,000, if we understand the telegram rightly. Mr. Sherman proceeds to recommend a sweeping reduction of taxation on articles of home produce and manufacture, which will of course temporarily reduce receipts; but in the course of a year or two the reduction will stimulate consumption, and the Treasury will be recouped, while every year's redemption of debt will swell the surplus. There seems no reason to doubt, therefore, that the 80 millions of debt annually falling due can be redeemed in less than ten years; and, furthermore, that considerable purchases for the Sinking Fund of the Four-and-a-Half per Cents. and Fours are certain to be made. In short, the total extinction of the United States Debt within twenty years is quite practicable, if the people make up their minds to bear the necessary taxation.

We have once already commented upon the way in which the City editor of the *Daily Telegraph* is writing up Philadelphia and Reading shares, and advocating Mr. Gowen's plan for paying off the floating debt. We may add that the City editor of the *Standard* is only a little less guilty. Every one, of course, has a right to form his own opinion of the plan, and express that opinion temperately; but it is clearly the duty of a City editor not to make himself a partisan. The City editor of the *Daily Telegraph* violates this elementary rule in the following passage:—If there were the slightest reason to suppose that Mr. Gowen would be ejected from office, and that the financial scheme he favours would fall to the ground, the shares would doubtless descend to very nearly the modest level to which the dispiriting report of the Cairns Committee sent them some months since. So well is this understood in America that the journals there comment upon the movements of Mr. Gowen's notorious enemies to or from either country as affording an explain an otherwise unaccountable fluctuation in the shares. The

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