object for which it was installed, which was to determine "the times at which various phases of motion are recorded" (see British Association Reports, 1897, p. 130. Copy of a circular sent to foreign Governments and colonies). This it does, and a little more. If an observer desires to have an open diagram, he must employ clockwork to drive the record receiving surface at a higher speed, whilst a longer period than the one usually employed can be obtained by adjustment. It must, however, be remembered that the period obtained at one station may, on account of the wandering of the pendulum and "tremors," be unpractical at another, and that difference in adjustment at different stations destroys uniformity. Although with the object of stimulating further research we have criticised certain portions of the work before us, the bulk of it commands the admiration and thanks of all seismologists.

THE GILBERT TERCENTENARY.

THE tenth of this month was the three hundredth anniversary of the death of Dr. William Gilbert, the celebrated Elizabethan philosopher who laid the foundations of the science of electricity. The occasion was celebrated on Thursday, December 10, at the meeting of the Institution of Electrical Engineers by the presentation of a picture by the Institution to the town of Colchester, in which place Gilbert was born and died. The picture was painted by Mr. Ackland Hood; it is a fine historical painting representing Dr. Gilbert showing his electrical experiments to Queen Elizabeth.

The proceedings were opened by the president of the Institution with a short speech. Prof. S. P. Thompson then gave a brief address, in which he outlined Gilbert's life and his contributions to science. Gilbert was born in Colchester in 1544, and was educated at the school there and subsequently at St. John's College, Cambridge, at which he became mathematical examiner and senior bursar. He took the degree of M.D. in 1569, and rapidly advanced in the profession, becoming in 1599 president of the Royal College of Physicians, and a year later physician to the Queen. He died at Colchester on December 10, 1603, and was buried there in the Church of Holy Trinity. Eminent as he was as a physician, his claim to immortality rests not on his work in medicine, but on his pioneering investigation in the then almost non-existing sciences of magnetism and electricity. To him we owe the science of terrestrial magnetism; by numerous and careful experiments upon the loadstone he discovered many of the most important principles of magnetism, such as the existence of a magnetic field—an "orbe of virtue"—around the magnet, the screening effect of iron, and the destroying effect of heat. From experiments on a globular loadstone he was able to evolve the theory that the earth is itself a great magnet. Thus many years before Bacon, who is usually regarded as the father of the inductive method, Gilbert was using this method with signal success.

Gilbert's contributions to electricity are contained in the second chapter of Book ii. of the celebrated "De Magnete." He showed that not amber alone, but many other bodies, which he put in a class called *electrics*, can attract solid bodies when rubbed; that they attract everything, not merely straws or chaff; that damp weather hinders the electrification; and that a flame destroys it, as well as many other important facts which are now the fundamental principles of the science. He invented the electroscope, and discovered that the force of attraction is in a straight line towards the electrified body. From these simple beginnings has been gradually evolved in 300 years the immense structure of pure and applied electricity.

The Mayor of Colchester thanked the Institution for its gift in a brief and humorous speech. Amongst many other distinguished men present at the meeting were Sir W. Huggins, president of the Royal Society; Sir Dyce Duckworth, treasurer of the Royal College of Physicians, an office twice held by Dr. Gilbert; Prof. J. Larmor, representing St. John's College, Cambridge; the Mayor of Westminster; and Mr. Ackland Hood, the painter of the picture.

AGRICULTURAL NOTES.

THE third report on the Woburn Experimental Fruit Farm, recently issued by the Duke of Bedford and Mr. Spencer Pickering, F.R.S., is devoted to a discussion of the effects of grass on apple trees. In previous reports it was shown that grasses prove most injurious to young apple trees, and the experiments described here were designed to throw light on the causes of injury. Up to the present time the cause, or causes, have not been discovered, but the experimenters have made considerable progress, for they have shown that their first suspicions were unfounded. Grasses might reasonably be expected to injure young fruit trees by interfering with their air, or water, or food supply, but the careful experiments recorded in the report indicate that interference with air, water, and food has little or nothing to do with the question, and that the injury "must, in all probability, be attributed to the action of some product, direct or indirect, of grass growth which exercises an actively poisonous effect on the roots of the tree." This conclusion is based partly on the negative evidence of the experiments, in which the supplies of food, air, and water were controlled, and partly on the appearance of the trees grown in grass. These trees were always very sharply marked off from the others by peculiar tints of leaf and fruit, quite unlike those due to starvation, and produced obviously by some unhealthy condition of soil. The effects of grass on apple trees have been studied only on the shallow clay soil of the Woburn Fruit Farm and on a clay soil at Harpenden, and it is possible, as the experimenters are careful to point out, that on a richer soil, and in a different climate, grass might not prove injurious, but the Woburn experiments clearly indicate that horticulturists should avoid planting apples in grass, unless there is local evidence that grass does not injure the young trees.

In their work on apple trees the Duke of Bedford and Mr. Pickering are dealing with a special and well-marked case of a general problem of great interest to agriculturists—the effects of crops and of crop residues on the quality of soil. Every observant cultivator knows that land may get "sick" or "over-cropped" when a plant is grown too often, and he also finds that certain plants "exhaust" the soil in a peculiar degree for certain other plants. He has been told that this is a "food" or a "special food" question, and that interference with the air, food, and water supply explains all the ills which plants may suffer from competition with their fellows. At the same time, he does not feel satisfied that such phenomena as the disappearance of clover from land, or the effects of rye-grass on wheat are due to straightforward competition, and the "poison" theory of the Woburn experimenters will arrest his attention. Seventy years ago agriculturists were discussing De Candolle's "excretory theory," and found in it the chief explanation of the benefits due to a rotation of crops; when the theory was abandoned the facts from which it originated were forgotten, and in connection with the effects of grass roots on apple trees the following sentence from De Candolle is worth recalling:—"Thus we know that the thistle is injurious to oats, the Euphorbia and Scabiosa to flax, the *Inula betulina* to the carrot, the *Erigeron acre* and tares to wheat, &c." Though the plant does not "excrete," it may readily influence the character and condition of the soil either directly by the decomposition of its roots, or indirectly through its effect on soil organisms, and the Woburn experiments, which deal with this subject, will be closely followed.

In a paper entitled "Recherches sur la Synthèse des Substances Albuminoides par les Végétaux," MM. Laurent and Marchal, of the State Agricultural Institute, Gembloux, give a useful *résumé* of the sources of nitrogen to plants. In doing so they point out that during the latter half of the nineteenth century there was a tendency to overlook the importance of ammoniacal compounds, and to regard nitrates as the only sources of nitrogen to the higher plants. While nitrates are of chief importance, there are many plants, even colonies of plants, such as forest trees and the vegetation of marshes, that must depend largely or entirely on compounds of ammonia for the supply of nitrogen. The authors describe experiments on cress, white mustard, chicory, asparagus, white melilot, Persian lilac, and tobacco, and among other conclusions state that sun-