

Chemistry teaches how to meet this requirement by means of growing clover and applying the needed fertilizers.

Sometimes we see a man not educated in some respects succeeding in agriculture beside a so-called "scientific farmer" who is failing. We are then led to question, is science a failure? No, the failure is in its application. We are forced to recognize that good judgment must accompany successful agriculture, but in any case scientific principles must be applied. The intellectual and moral advantages of a knowledge of science are very great. It has elevated the calling, making wiser and better men by developing their reason. The conclusions arrived at by it can be verified. Agriculture as it now exists in America was referred to as being far below its possible standard. Science will aid this advance.

Dr. Jordan, of N. Y. Ex. Station, expressed a belief that the experiment stations can best improve the present condition of agriculture by more thorough and rigid investigations. The stations have been dealing too much with superstructures and too little with primary causes. A deeper investigation is needed, and less disposition to be continually saying something new.

The Influence of Animal Experimentation upon Agriculture was the subject of a paper given by V. A. Moore, V. S. The great losses that have resulted from the many diseases of farm animals were referred to. Pleuro-pneumonia was brought from Europe to the United States in 1843, but its effects did not become alarming until 1880, when strenuous efforts were made to exterminate it, which took six years. Hog cholera and swine plague (fever) in ten years—from 1879 to 1889—caused in the U. S. an annual loss of about \$25,000,000. Experimentation has proved that the diseases are not identical. Tuberculosis was in 1883 discovered to be the result of a specific organism, and causes the death of 14 per cent. of the human family. From 3 to 20 per cent. of cattle and some other animals are affected; the food from which is much to be dreaded. The enormous losses by glanders in horses was referred to, as well as its transmission, like tuberculosis, to man. The great need of sanitary regulations was here referred to. Hydrophobia can now be successfully treated, as the result of the late Prof. Pasteur's experiments. Prof. Moore considers there is a great need of the extermination of many useless dogs in cities and towns, which would prevent a great deal of the danger of rabies. Texas and Southern fever, Trichina, tapeworm, and liver fluke, as well as many fowl diseases, can now be diagnosed and treated fairly successfully as a result of scientific investigation, but there is still room and much need for further study.

The paper was concluded by a reference to the action of societies for the prevention of cruelty to animals in endeavoring to obtain legislation to prevent vivisection and other means of experimenting with live animals for scientific purposes. The result of this reference was the drafting of a resolution expressing the sense of the Society assembled, protesting against the proposed legislation of humane societies, upon the grounds that such experiments prevent great loss and much more suffering than they cause.

The Flowering Habits of Red Clover and Timothy was enlarged upon by Dr. A. D. Hopkins, who has observed that insects such as bees and the like have much to do with the fertilization of these plants. Both self- and cross-fertilization are known to exist, although the latter is much more the rule, especially with clover, which accounts to some extent for the lack of development of seed in the first crop, due to the scarcity of pollenizing insects at the first blooming season. Climatic conditions, too, have their effect upon fertilization.

Dr. C. V. Riley's Biography was related by Prof. L. O. Howard, who referred to his valuable life's work and the great vacancy in this Society caused by his death.

Forcing Cauliflowers, with Lettuce and Cucumbers, was discussed by Prof. H. C. Irish, of St. Louis. It has been found that three crops can be grown successfully under glass, by the aid of artificial heat, on the same ground during the winter season. Lettuce and cucumbers can be grown between the cauliflowers, and return a good profit, as the cauliflowers should be grown eighteen inches apart. The largest heads obtained weighed about two pounds and twelve ounces each. No moisture should be allowed to come in contact, externally, with the heads, else rot occurs. It was found that one-twentieth of an acre could be looked after by one man, and when adjacent to such a market as St. Louis, it could be made to return in one winter over \$600 for the wages of the man and interest on the capital invested. With regard to fungoid and insect enemies, it was found that evaporating sulphur was the best treatment for powdery mildew. For aphides and red spider, liquid extract of tobacco was found good as a spray. Cucumber fungus was best subdued by the use of potassium sulphide—one ounce to two gallons of water.

Electro-Horticulture.—"Range of Incandescent Lamp" was the title of a paper prepared by Prof. F. Wm. Lane, of West Virginia Station. It was found that with continued light—of sun during the day and electric during the night—spinach gained twelve inches growth in thirty nights over plants having no night light. Lettuce and cauliflower are influenced much in the same degree. While tomatoes grow very fast under continued light,

the fruit borne was uncertain to set, and never amounted to much, as it ripened small and insipid.

Prof. Roberts, of Cornell University, asked whether or not electro-horticulture promised to be practical, to which a reply was given to the effect that many gardeners are now using it commercially with success where the all-night system of large cities could be taken advantage of. Without this can be obtained at reasonable cost the practice is out of the question.

Pres. Lazenby advised that experimenters go slow in recommending the use of electric light in practical horticulture. It was claimed, however, to have been found especially beneficial in market floriculture.

Protective Inoculation Against Anthrax was dealt with by Prof. F. D. Chester, of Delaware Experiment Station. Experiments with guinea pigs have proved that immunity from the disease can be obtained from continued introductions of properly prepared anti-toxic substances. Hog cholera and swine plague were proved to be entirely different diseases by the indifferent effect of the serum of each upon the other. As mentioned, protective inoculation against anthrax is only effective when repeated every few months. The vaccine must be obtained through a series of generations of the disease in order to be weakened beyond the dangerous point. The preparation of the vaccine is a very delicate operation; it was therefore considered wise to have it prepared at one central laboratory conducted under government supervision.

The practical results from protective inoculation against anthrax have been enormous. In France, in 1893, 319,487 animals were treated, so important was the practice considered. The results have been about one-tenth of one per cent. loss when treated. In Delaware, U. S., deaths from anthrax have occurred to many animals in herds while those inoculated in the same herds escaped free of the disease.

Fungicides with Smut in Oats.—Prof. W. H. Kellerman, of Ohio Station, has been giving careful attention to this subject, and was able to speak, as he did, upon the merits of the various treatments that have been recommended. With regard to the value of copper sulphate, which has heretofore been recognized as perfectly effective, the speaker referred to it as having the desired effect in destroying the smut spores, but condemned its use because of the injury done the seed. Iron chloride and potassium sulphide are just as cheap, as easily used, and equally as effective for the purpose intended, while no evil effects occur to the seed by their use. Potassium sulphate used in a three-per cent. solution gave the desired effect from one hour's treatment. The seed may be dipped into the solution or a pile may be sprinkled while it is being turned on the barn floor with a shovel. The grain should be dried and sown in from three to five days after treatment. With the hot water treatment six months may elapse between treatment and seeding and it will be equally as effective in every way as though it were sown shortly after treatment.

White Muscardine of the Chinch Bug was considered by Prof. D. M. Duggar, of Illinois Experiment Station. This is a fungus which has, perhaps, done more to keep the chinch bug in check than any other known agency. The Professor has endeavored to ascertain whether or not it is profitable to scatter the fungus in infested neighborhoods, and has concluded that such is not the case. The most effective method is to cease to grow wheat for a term of years. The muscardine fungus seems to follow of its own accord the chinch bug as well as the squash bug wherever these insects are in large numbers.

Time of Seeding as it Effects Rust in Wheat and Oats was discussed by Prof. H. L. Bolley, of R. I. Station, who concluded that the varieties of grain had more to do with the rustiness upon it than had the time of sowing. The weather, however, has a marked influence.

Potato Scab has been found by Prof. Bolley to be preventable by treating the washed clean seed with corrosive sublimate solution, and also by mixing a quart of air-slaked lime with the soil of each hill.

Varieties of Timothy and Red Clover.—Dr. Hopkins has given a deal of time and attention to the selection and perpetuation of decidedly early varieties of both timothy and clover as found growing in the field crop. It has been determined that there are a great number of most desirable varieties and many that are worthless growing together in confusion in the ordinary field practice. From these, Dr. Hopkins has selected and perpetuated enough of sorts having individual characteristics sufficient to convince him that red clover can be obtained as early as crimson clover, and that timothy-growing can be revolutionized in the same manner.

Steer Feeding Experiments at Kansas Station was dealt with by Prof. C. C. Georgeson. The question at issue was whether or not could oil meal and other nitrogenous substances be profitably fed to cattle in corn-growing States. Three lots of steers of five each were selected for the experiment, fed respectively upon a balanced ration, corn meal, and ear corn. One hundred and sixty-six days was the time occupied with the test. The first lot consumed 1,155 pounds of balanced ration, and made a profit per head of \$3.21. The second lot ate 1,401 pounds of corn meal, and returned \$1.51 profit per head. Lot No. 3 took 1,757 pounds of ear corn, and

made three cents per head profit. The steers fed the balanced ration were in best condition when put upon the market; they therefore brought the highest price per pound. It was considered that if hogs had followed the cattle eating the ear corn the profit would have reached that made by lot 2. Reference was made to an experiment to ascertain the value of soaking corn as compared to feeding whole dry corn, when it was found to pay well to soak corn.

Election.—Prof. W. R. Lazenby was re-elected President, and Prof. C. S. Plumb, Secretary.

Mr. Gladstone on Country Life.

Though now out of active political life, Hon. Mr. Gladstone is yet foremost in the world's eye among the Nineteenth Century's greatest men. His speeches and writings are regarded everywhere with the intensest interest. A fortnight since, at the Hawarden floral *fete*, he alluded to the unfortunately excessive tendency in modern life to forsake the country for the town. This exodus, whether in the Old Land, Canada, or the United States, shows no sign of abatement, and to correct it is a problem not easy of solution. The veteran statesman commended the flower show for its educative influence in the right direction, and for the spirit of enterprise which it develops. The number of such institutions commanding a large and general measure of support may be accepted as indicative of the interest which is taken in the most attractive of rural pursuits. Those who live "in the eye of Nature," and breathe the pure country air, have, in many cases, themselves to blame if a large measure of ordinary human happiness does not fall to their lot. Yet more might be done by leading the people to take a genuine interest in the land and what it produces. The pleasures of country life [Mr. Gladstone spoke eloquently and feelingly on this point] are beyond cavil or dispute. They are not intoxicating pleasures, to which must be ascribed the craving for the stir and excitement of life in town or city which the younger generation find so difficult to resist; but in a seemingly humdrum existence, when it is passed among the brightest and best that Nature has to offer, there is often pleasure that is more than superficial and happiness that is more than transitory and fleeting.

The Progress of Agricultural Schools.

Having in view the marked progress of such Canadian institutions as the Agricultural College at Guelph, Ont., we can quite concur with the following observations by the *Farming World* (of Scotland) in relation to this subject in Great Britain: "The success of agricultural schools is quite a feature of the times, and there can be no doubt that they are gaining in popularity with the agricultural community. If the old days of prosperity in the farming industry had continued, it is doubtful whether the success of these schools and colleges would have been quite so pronounced and assured as it is at the present day. There might have been more apathy and less incentive to radical change. The long spell of low prices, with the consequent difficulty experienced in making both ends meet in the conduct of his business, has led the farmer everywhere to accept the aid of scientific teaching to enable him to work his land to the best advantage without doing injury to the soil. At the different agricultural schools throughout the country, farmers' sons are now being afforded practical, as well as theoretical, education in agriculture, and the firm hold which these institutions have obtained in our midst augurs well for the future of British farming."

Co-operative Selling.

According to an English exchange, the farmers of South Lincolnshire are to have the credit of being the first in England to apply co-operative principles to the distribution of their produce. Under the direction of Lord Winchelsea's British Produce Supply Association, a local society of farmers has been formed at Sleaford to collect and distribute the farm produce of the district, and will begin operations in the autumn. The society proposes to arrange for the systematic daily collection of eggs and other small produce, which will all be taken to Sleaford, and thence forwarded to central stores in London. It will be able to take advantage of the reduction in the railway charges on large consignments, and will thus effect a saving on the present cost of carriage to small farmers. Further, the society intends to erect a butter factory in Sleaford, and to establish separators in the neighboring villages for the farmers who are willing to sell their cream.

Milking-machines are not giving satisfaction in hot weather in the Old Country, owing to the difficulty of keeping them clean. One gentleman says he had a fortnight's make of cheese spoiled in that way.