the influence of the scientific method upon the agricultural art.

Anlaysis of soils has not answered the questions put by its means exactly as we expected. But it has frequently shown us why, through excess or defect of some ingredient, certain lands were barren, and it has taught us how cheaply and thoroughly to remedy their sterility. Excess of decaying organic matter, of soluble salts, or the presence of ferrous salts, or of iron pyrites, these have been recognised amongst the curable ills of our soils. What is known as the *coagulation* of clay is now understood, so that we can often bring it about and thus render heavy lands workable at our will. The relations between the fungi inimical to our cultivated plants and the constituents of our soils being known we can now fight more hopefully against blight and mildew. What kind of exhaustion of soil is to be feared and how it can be remedied is now within our knowledge.

The development of the industry of artificial manures has been a very marked feature of the whole period of forty years during which our great Agricultural Society has been in existence. Farmyard manure has been relegated to its true place—no mean one, but one which has no longer the importance once attached to it. As 100 tons of ordinary dung and litter do not contain more than 1 ton (often less) of real manurial substance—potash, nitrogen, phosphorus pentoxide—one hundredweight of guano may frequently replace with advantage the usual dressing of farmyard manure applied to an acre. But while chemistry has searched out the constituents of manures, and recognised and determined the elements of fertility scattered in minerals and guano and waste products throughout the world, and shown how to bring all plant food into available forms, it has had also to carry on a perpetual warfare with the bands of adulterators, perfecting its methods of detecting the falsification of the materials which it has itself introduced; for manures are difficult to test by mere inspection, often being merely "dirts with a strong smell."

The improvement of existing varieties of plants by artificial selection has been carried to great perfection in many instances—the sugar-beet and wheat being notable examples. The introduction and improvement of new plants, both for cattle food and for the sustenance of man, is a work in which much remains to be done. Especially should attention be directed to those crops upon which lesser, but in many cases more, remunerative industries than mere corn-growing may be founded. Plants yielding products useful in medicine, dyeing, and perfumery, should not be neglected. Some districts on the Continent, such as the neighbourhood of Florence, have been immensely benefited in every way by the introduction of minor crops with their attendant industries; similar successes may be repeated where skill and capital are available, climate and soil being of course taken into account.

Of improvement in the breeds of horses, cattle, sheep, and pigs, nowhere can be found better illustrations than in England: we shall soon see how much our neighbours and friends abroad have gained from our work in this direction. In agricultural machinery and implements the same statement may be made with still greater emphasis: it is indeed curious to note how in every text-book of agriculture, in every farmer's journal, and rural advertisement published in France, Germany, Italy, and in most other countries both of the Old World and the New, the familiar names of Howard, and Fowler, and Cambridge, and Aveling, meet us on plough, and roller, and harrow, and engine. Perhaps in the after-treatment of some kinds of ordinary farm produce, we have been behind our Continental neighbours and American cousins, but we are beginning to appreciate better the aids that science can render to cheese and butter-making, and to the preparation of mill-products from wheat. The critical study of milk and dairy processes is securing the attention of dairy-farmers in England; while such an invention as Wegmann's porcelain cylinder for milling wheat has revolutionised the old grinding process already.

Of progress in the agricultural education either of farmers or farm-labourers, we have little to boast. Our solitary Agricultural College at Cirencester has been ever and anon paralysed by mismanagement; while its charges are too high, owing to the absence of any endowment, for its instruction to be accessible to the sons of ordinary farmers. Agricultural newspapers are neither as cheap nor always as instructive as they should be; the education in our elementary schools has hardly yet acquired that agricultural bias which in rural districts might be so advantageously given to it. Still the Science and Art Department has begun a good work by instituting its examination in the principles of agriculture, although its syllabus presupposes that the examinees will have been been fed on far richer and more varied stores of learning than are yet at their disposal.

This Kilburn Show will then direct our attention to a multiform subject of the greatest national importance at the present crisis. We shall hope to learn much from the exhibits in the eight miles of shedding arranged in due order over more than 100 acres of ground, and to be rewarded with over 13,000*l.* in prizes.

THE ELECTRIC LIGHT

THE Committee of the House of Commons appointed to inquire into the value of the electric light has completed its labours and has issued its report. There is no doubt that the evidence given before it, when published, will be very useful, and that the report itself is a careful digest of the facts elicited, but it is questionable whether the results of the inquiry, or the conclusions of the Committee, will satisfy any one. Our readers will find in it nothing new. Gas engineers will find in it their extermination calmly contemplated. The gas manufacturer is told that he has nothing whatever to do with electricity. Gas, and nothing but gas, is his ware. Though he was incorporated to illuminate a city with the then best known illuminant, he is not to touch a newer illuminant because he will check the development of the fresh source of light, and his present mode of production is quite different to that required for the new commodity. It is as though a wine merchant who had a large sale of sherry were not allowed to sell beer, or a dairyman were not allowed to sell asses' milk because he only kept cows. The enunciation of such a proposition in a Parliamentary Report is sad. Worse than all, municipal authorities are advised that they can ruin all the gas interests without the distribution of any compensation whatever. Surely the enormous capital sunk by the public in gas enterprise deserves some consideration from its representatives in Parliament assembled. Are our vestries and corporations so immaculate that they are to have entire control of our supplies of water and of light? Why not give them the supply of food and of heat? The line must be drawn somewhere, and it is well that Parliament should hesitate in the complacency with which it now thrusts on irresponsible communities the distribution of vital necessaries.

The only sphere in which electricity has made itself useful and practical as an illuminant is in our lighthouses, and though it is eminently adapted for nautical purposes, as ordinary ships' lights, or to illuminate the sails of a ship, the Report is silent on the point and on the absurd restrictions which have been placed by the Board of Trade on its use at sea.

The statement that the energy of one-horse power when converted into gas-light only gives 12-candle power, and into electric light 1,600 candle power is startling if true. Without the evidence before us on which this statement is made we cannot well contravene it, but it seems based on some fallacy. We remember seeing somewhere, but cannot recall where, a somewhat similar estimate, but it was based on the assumption that the whole of the coal was consumed in producing gas, and no allowance whatever was made for the coke, tar, and other products of distillation. Is it so in this instance? Though 3 lbs. of coal consumed in one way may give one horse-power, and in another way 12-candle light, it by no means follows that one-horse power is equivalent to 12-candle gas-light—for in the case of gas we do not know the remanent energy.

The report fully confirms the opinion we have frequently expressed that the electric light sensation was due to a scare and not to any real progress or new discovery made. The transmission of power for mechanical purposes is foreign to the inquiry, and the suggestion that currents used by day for mechanical purposes can be used at night for illuminating purposes assumes what we only wish were true, that there is no mechanical work done in England in hours of darkness.

The general conclusion arrived at is that we can do no more with the electric light at present, but that we must do nothing to restrict its development. We did not require a Parliamentary Committee to tell us that.

INDIAN GEOLOGY

A Manual of the Geology of India. By H. B. Medlicott, M.A., and W. T. Blanford, F.R.S. Published by Order of the Government of India. (Calcutta, 1879.)

THE appearance of this long-promised work marks an epoch in the history of Indian science. In two moderate octavo volumes (paged as one) and the map which accompanies them, we have placed before us, in an attractive and convenient form, the matured conclusions of upwards of thirty years' systematic survey of the geology of our Indian possessions; and now, for the first time, the geological structure of India, or, at least, its leading facts, may be mastered by the student at no greater cost of labour than is involved in a few days' study of a well-arranged and thoroughly trustworthy manual.

We are reminded almost in the opening words of the preface, how many of those who have contributed to the researches on which this work is based, have now passed from among us. Stoliczka, J. G. Medlicott, the two Oldhams, Williams, and Loftus are only a few of the better known names among the many that for a longer or shorter time have been borne on the rolls of the Indian "Geological Survey," whose bearers lie in Indian graveyards, or beneath some modest tomb on the out-skirts of an Indian village, or who finally have returned with shattered health to the land of their birth, only to bring to a close among their friends the last few enfeebled months of their career. Of the earlier labourers in the field, of those who witnessed the birth of the "Geological Survey of India," and who three-and-twenty years ago wielded their hammers in breaking open the secrets of Indian rocks, but three still remain members of the Survey Staff, and to two of these surviving members whose names stand at the head of our article, we are indebted for the present masterly summary of the common labours of all.

The contributions of the two authors to the joint work are distinct, and in point of magnitude unequal. To Mr. W. T. Blanford has fallen the lion's share of the labour. Of the thirty chapters which (including the introduction) make up the work, Mr. Medlicott contributes ten, viz., those on the metamorphic and azoic rocks of the peninsula, and those on the geology of the Himálaya east of the Jhelum, and on Assam. The remaining twenty chapters, including the introduction, which deal with all the fossiliferous and neozoic rocks of the peninsula, the geology of Sind, the Punjab and Burma, and the Sivalik fauna generally, are the work of Mr. W. T. Blanford. The map,[1] which is printed in colours and is on the scale of sixty-four miles to the inch, has been compiled in the office of the Geological Survey, from materials in part unpublished. It professes to be only a preliminary sketch map, and three small tracts in the peninsula, the greater part of the Bikanir Desert and Guzerat, the Nepalese Himálaya, and Arakan and the adjoining hill tracts are left uncoloured. But with these exceptions it exhibits in as detailed a form as the scale admits of, and with unquestionable accuracy, the extent and boundaries of the several formations, classed as Alluvium, Upper and Lower Tertiary, Cretaceous, Jurassic, Triassic, Carboniferous, Silurian, Submetamorphic, Metamorphic, Granitic, Volcanic; and in the peninsular area, Upper and Lower Gondwâna, and Vindhyan, the meaning of which unfamiliar and special classification we shall presently have occasion to notice.

The subdivision of the whole region into a peninsular and an extra-peninsular area is one of fundamental importance, and, as such, is treated in the arrangement of the manual. Geographically, the two areas are separated by the broad unbroken alluvial plain which stretches along the foot of the mountain zone from the mouths of the Indus to those of the Ganges; and geologically both in

[1] A copy of this map was sent for exhibition to the Great Paris Exhibition last year, but was probably seen by few. In fact, it was suspended in the office room of the Indian department, avowedly for want of room. Meanwhile a conspicuous case in the centre of the transept was devoted to the exhibition of Indian pickles.