

cation of those managers, determine whether the terms so proposed are reasonable.

3.—(1) Any local authority empowered to carry into execution the provisions of the Public Libraries Acts with respect to the establishment and maintenance of public libraries, public museums, schools for science, art galleries, and schools for art, may from time to time supply or aid the supply of technical instruction by providing or aiding in the provision of teachers, apparatus, or buildings to such extent and on such terms as the authority think expedient, and may exercise its powers under this section either with or without exercising any of its powers under the Public Libraries Acts.

(2) Provided as follows :—

(a) In a district for which there is a School Board, the local authority shall not out of their own funds supply or aid the supply of technical instruction suitable for scholars receiving at a public elementary school instruction in the obligatory or standard subjects prescribed by the minutes of the Education Department for the time being, except to the extent, if any, to which the authority was so supplying or aiding before the establishment of a School Board.

(b) In a district for which there is not a School Board, the managers of a public elementary school shall not receive aid under this section except for scholars for whom technical instruction may be supplied or aided by a School Board in a district for which there is a School Board.

(3) The amount of the rate to be levied in any one year under the Public Libraries Acts as amended by this Act for the additional purposes authorized by this section shall not exceed the sum of *one penny in the pound*, and where the powers given by the Public Libraries Acts are exercised concurrently with the powers given by this section shall not exceed *two pence in the pound*.

4.—(1) The managers of any technical school in the district of a School Board or local authority may make an arrangement with the Board or authority for transferring their school to that Board or authority, and the Board or authority may assent to any such arrangement.

(2) The provisions of section twenty-three of the Elementary Education Act, 1870, with respect to arrangements for the transfers of schools, shall apply in the case of arrangements for the transfers of schools in pursuance of this section.

5.—Every minute of the Department of Science and Art with respect to the condition on which grants may be made for technical instruction shall be laid on the table of both Houses of Parliament within three weeks after it is made, if Parliament is then sitting, and if Parliament is not then sitting, within three weeks after the then next session of Parliament, and shall not come into operation until one month after being so laid.

6.—In this Act—

The expression “technical instruction” means instruction in the principles of science and art applicable to industries and in the application of special branches of science and art to specific industries or employments. It does not include teaching the practice of any trade or industry or employment, but, subject as aforesaid, includes instruction in the branches of science and art with respect to which grants are for the time being made by the Department of Science and Art, and any other form of instruction which may for the time being be sanctioned by that Department by a minute laid before Parliament and made on the representation of a School Board or local authority that such a form of instruction is required by the circumstances of its district.

The expression “technical school” means a school or department of a school which is giving technical instruction to the satisfaction of the Department of Science and Art.

The expression “manual instruction” means instruction in the use of tools and modelling in clay, wood, or other material.

The expression “the Education Department” means the Lords of the Committee of Her Majesty’s Privy Council on Education.

The expression “local authority” means the Council, Commissioners, Board, or other persons or authority carrying into execution, or empowered to carry into execution, the Public Libraries Acts.

The expression “Public Libraries Acts” means the Public Libraries (England) Acts, 1855 to 1887, and the Public Libraries (Ireland) Acts, 1855 to 1884.

7.—This Act may be cited as the Technical Instruction Act, 1888.

## SCHEDULE.

### STANDARD.

*Reading.*—To read a passage from some standard author.

*Writing.*—A short theme or letter on an easy subject, spelling, handwriting, and composition to be considered. An exercise in dictation may, at the discretion of the inspector, be submitted for composition.

*Arithmetic.*—Fractions, vulgar and decimal, simple proportion, and simple interest.

## AGRICULTURAL EDUCATION IN NORTHERN ITALY AND IN PRUSSIA.

MR. COLNAGHI, Consul-General at Florence, in the course of an elaborate Report on his district, refers at some length to agricultural education in the province of Florence. He describes especially the well-known “*Accademia dei Georgofili*,” the Tuscan Society of Agriculture, the *Comizi Agrari*, or Agricultural Boards, the *Stazioni Agrarie*, and also refers to the various institutes and schools which have been established of late years in the province. The “*Accademia dei Georgofili*” of Florence was founded in 1753, and was the first Association of the kind formed in Italy to promote the science of agriculture. On the roll of the Academy are to be found the names of the most distinguished Italian agronomists, and the long series of its Transactions contains important papers on all points of interest connected with the agriculture of Tuscany.

The Royal Tuscan Society of Horticulture, which was established in 1854, now numbers about 700 members. Much useful work has been done by this body in encouraging the improved cultivation of fruit, vegetables, flowers, and ornamental places and by the holding of annual shows in Florence.

Each district of the province has its *Comizio Agrario*, the objects of which are to extend agricultural skill and knowledge, or encourage improvements, and to form a centre for the diffusion of information. The *Comizi* offer prizes for improvements in cultivation, hold Conferences on various subjects, and publish Bulletins containing much useful information on practical subjects. These bodies are supported by members’ subscriptions, and by grants from the Minister of Agriculture and from the province. Besides the annual shows held at Florence, there are regional agricultural shows (*Concorsi Agrarii Regionali*), instituted by the Ministry of Agriculture and the *Comizi Agrari*, which are held at stated periods, and in which some five or six provinces are included. These larger shows have been useful in bringing agriculturists from various parts of the country together, showing the latest improvements in machinery, and in displaying the various products of the different districts.

At the “*Stazione Agraria*” of Florence, which is a branch of the Technical Institute, and is under the direction of Prof. Bechi, experiments are made on the culture and diseases of the vine, the olive, and other plants, and analyses are made of soil, minerals, water, wines, &c. Attached to the *Stazione* is an experimental farm six hectares in size, and also a Government depot of agricultural machinery.

There is also in Florence a Bureau of Agricultural Entomology, under Prof. Tragioni-Tozzetti, where great attention is paid to the *Phylloxera*. This Bureau is in fact the centre of information for the whole of Italy on entomological subjects.

For practical instruction the province contains the *Regio Istituto Forestale* (Vallombrosa), the *Regia Scuola di Pomologia e d’Orticoltura* (Florence), and the *Scuole Agrarie* of Castaletti, near Signa, and of Scandicci, in the immediate neighbourhood of Florence. The Forest Institute of Vallombrosa, now under the Presidency of Prof. Piccioli, who is assisted by eight professors, was founded in 1869, on the model of the forestry schools of France, Germany, and Austria, to supply a sufficient number of trained officers for the Department of Woods and Forests. From 1869 till the present time, 159 students have entered the school, and of these 136 have received diplomas. All of these have entered into the service of their native country, except one who was a Swiss. The course of study lasts three years, during which time instruction is given in forestry and kindred subjects, and in French and German. The limits of age at entrance are sixteen and twenty-two, and the annual charge for board, residence, and instruction is fixed at 700 lire. The State pays a portion of the cost of some of the students, and sometimes their respective provinces do so.

Attached to the Institute is a library of works on forestry, and also the requisite collections and instruments, both chemical and scientific. A nursery which contains nearly 450,000 plants, and which can supply annually nearly 100,000 plants of from three to five years old, is also annexed. There is also a small fish-breeding establishment, in which about 10,000 trout-fry are annually hatched, and placed in the neighbouring streams.

The Royal School of Pomology and of Horticulture was established in 1882, and is now under the direction of Prof. Valvassori. Its object is to train vegetable and fruit gardeners. The course lasts three years, and is both theoretical and practical. The age for the admission of pupils is from fourteen to seventeen, preference being given to the sons of the smaller farmers, and the charges are 25 lire per month, besides 20 lire for the purchase of gardening-tools, &c., and an entrance fee of 10 lire. There are five professors, with a censor and two gardeners, and at present the number of pupils is thirty-two. For practical instruction the school possesses an orchard, and kitchen and flower gardens.

The Agricultural Institute of Castaletti has been in existence since 1859, when it was founded by Commendatore Leopoldo Cattani-Cavalcanti. It is now under the direction of Signor Riccardi-Manelli. One section of the school was placed on the footing of a Government technical institute during the life-time of the founder; but this has now been changed by the present Director, because the school has for its object, not the production of engineers and surveyors, but of factors or agents and head gardeners. The course of instruction in this institution lasts for four years, and the age of admission is from eleven to fifteen. Of late the charges have been increased, and in consequence the number of students has fallen from seventy to fifty. The entrance fee is now 50 lire; board, lodging, &c., 165 lire for the first and second years, and 180 lire for the third and fourth years; and 8 lire in addition per month for washing. The institution is not self-supporting.

The Agricultural School of Scandicci was founded as recently as 1884 by Count Napoleone Passerini for charitable purposes, his own villa being given up to the work. It was first only a day-school, but this year boarders have been admitted, and there are now ten boarders and eight externs. The object of the institution is to make good managers of rural estates. The course of study lasts for three years; the ages of admission are from fifteen to eighteen; the entrance fee is 10 lire, boarders paying in addition 36 lire per month, and 2 extra for washing. There are in all seven professors and masters. There is an experimental farm of 100 hectares in extent attached to the school, and a good library, and zoological, mineral, and agricultural collections, a chemical laboratory, an apiary, and a pigeon-house. A meteorological observatory of the second class, affiliated to the Central Observatory at Rome, is also annexed. The diplomas awarded to the pupils at the close of their course of study are countersigned by a special delegate of the Government.

According to the Report recently presented to the Foreign Office by Sir E. Malet on agricultural education in Prussia, the State annually gives £49,625 for agricultural instruction in that country, and £38,401 to the veterinary Colleges. Out of the former grant are supported the two Agricultural Colleges of Berlin and Poppelsdorf, the Pomological Institutes of Proskau and Geisenheim, and a station near Wiesbaden for experiments in agricultural chemistry; and subsidies are given to various provincial schools which are supported by local Boards but inspected by the central executive of the province. At the two Colleges the education is mainly scientific and theoretical, the ordinary course consisting of two terms of six months each. At the end of each term the subjects of examination are the science of farming and planting, farm management, physics and chemistry, botany, zoology, animal physiology, mineralogy, and geology. On passing these examinations the students are entitled to diplomas of proficiency in agricultural science. Those who wish to become land-surveyors can proceed to a further course of two terms of six months each, in which the instruction given is of a most advanced kind, embracing mathematics, trigonometrical surveying, levelling, engineering, forestry, and plantation, the science of breeding and rearing cattle, dairy farming, mechanics and agricultural machinery, besides a course of law bearing on questions with which land surveyors have to do. According to the most recent report, the Berlin Agricultural College was attended by 98 students in the summer term, 12 of whom pro-

ceeded to the more advanced course, and in the winter term by 155 students, 27 of whom went in for the higher course. Poppelsdorf College was attended by 76 in the summer term, of whom 45 went on to the higher course, and in the winter term by 87, of whom 57 attended the larger course. With regard to the lower-grade schools receiving help from the grant in aid of agricultural education, 16 are intermediate schools which get £13,365 every year from the State. The school money varies from £3 5s. to £1 10s. per term of six months, and the subjects taught in these institutions comprise chemistry, mineralogy, physics, zoology, veterinary science, and farming. There are also numerous local winter elementary schools which supplement by theoretical training the practical teaching which the pupils have had in the fields in spring and autumn. £6648 is annually given to them.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—An examination will be held at Cavendish College on Tuesday, July 24, and following days, according to the results of which it is intended to award eight Scholarships of £30 a year, provided that candidates of sufficient merit present themselves. Candidates must be under eighteen years of age on October 1, 1888, and may offer for examination one or more of the following subjects: Classics, Mathematics, Natural Science, Modern Languages. The Scholars elected will be required to come into residence at Cavendish College in October 1888, and commence study for a Tripos or the Engineering course. Medical students may conveniently combine their medical work with the course for the Natural Science Tripos. It is also intended to offer in June 1889 three Scholarships of £30 to be competed for by students of the College who will then have resided not longer than one year. The College fee for board, lodging, and tuition, is £25 for each of the three University terms, and £15 for residence (optional) in the Long Vacation. For further information apply to the Bursar, Cavendish College, Cambridge.

In the paragraph last week about Prof. Darwin's lectures (p. 117), for "tin" read "sun."

### SCIENTIFIC SERIALS.

*Bulletin de la Société des Naturalistes de Moscou*, 1887, No. 4.—On organic compounds in their relations to haloid salts of aluminium, by G. Gustafson (in German). In this second part the following conclusions are arrived at. The organic compounds undergo deep modifications in presence of the above salts. The reactions of addition are the chief ones, but the most interesting are those undergone by the aromatic hydrocarbons under the influence of chloride and bromide of aluminium; although most unstable, and therefore sometimes viewed as mere molecular compounds, they show a deep modification of the hydrocarbons from which they issue. They explain also the rôle of salts in organisms.—On the regeneration of lost organs in spiders, by V. Wagner (in French). This is the result of a double simultaneous process; the atrophy of the tissues belonging to the lost member, and the growth of the new one in the atrophied remnants of the old member. Both processes are described and illustrated.—Short notes on some (eighteen) Russian species of the genus *Blaps*, by E. Ballion (in German).—On two new Branchiopods from the Transcaspian region (*Apus haackelii*, n. sp., and *Artemia asiatica*, n. sp.), by Dr. A. Walter.—Enumeration of the vascular plants of the Caucasus, by M. Smirnow (continued). The Ranunculaceæ are described; they contain ninety-eight species, belonging to seventeen genera, and out of them thirty-seven belong to the genus *Ranunculus*, and thirteen to that of *Delphinium*. The *Myosurus*, *Gariadella*, *Calltha*, and *Actæa* number only one species each. The total number of Caucasian Phanerogams, according to Ledebour's "Flora Rossica," is 2965; now it must be estimated at about 4000 species. Out of the ninety-eight species of Ranunculaceæ described, forty belong exclusively to the flora of the East, while fifty-two are met with in South Russia, thirty in the Crimea, thirty-three in the Altai, twenty-four around Lake Baikal, and only twenty-one in the Urals, and eighteen in North Russia. Very interesting remarks follow as to the distribution of the Ranunculaceæ in separate parts of the Caucasus.