The whole system of higher education in Norway is based upon the intermediate school. It is the preparatory school of the Gymnasium, — the Latin as well as the Real Gymnasium, — and has a six-years' course. The requirements for entrance are essentially the same as in the Prussian *höhere Bürgerschule*. The normal age at entrance is nine years. For the first three years the course is in common: with the fourth year it is divided. The pupil preparing for the Latin Gymnasium receives instruction in Latin seven hours per week, which continues through the remainder of the course. All others have instead the so-called 'Real' course; in the fourth year, English and drawing; in the fifth and sixth years, English, drawing, and an hour more of German. Otherwise the courses are identical. In the fifth and sixth years two hours of French are elective. A certificate of proficiency from the intermediate school is required for admission to a Gymnasium; it also entitles its possessor to enter a technical school, and is required of a dentist. A certificate in the Real course only, admits to the naval academy and to the telegraph service; in the latter case the pupil must also have been proficient in French. The future apothecary must possess the certificate of the Latin course.

The Gymnasium — the Latin Gymnasium as well as the Real Gymnasium — is the preparatory school of the university and of the higher technical schools. It has a three-years' course, arranged as follows: —

Latin Gymnasium.

	I.	II.	III.
Normal age at entrance	15	16	17
1. Religion	1	1	2
2. Norwegian and Old Norwegian	3	3	4
3. Latin	9	10	9
4. Greek	7	7	7
5. French	4	2	2
6. German	1	–	–
7. History and physical geography	3	3	3
8. Mathematics	2	3	3
Total number of hours	30	29	30

Real Gymnasium.

	I.	II.	III.
Normal age at entrance	15	16	17
1. Religion	1	1	2
2. Norwegian and Old Norwegian	3	4	4
3. English	4	5	5
4. French	4	2	2
5. German	1	1	–
6. History	3	3	3
7. Physical geography	1	1	2
8. Natural sciences	6	5	4
9. Mathematics	5	6	6
10. Drawing	2	2	2
Total number of hours	30	30	30

The certificate of proficiency from the Latin Gymnasium entitles its possessor to enter upon any course of study. If, however, the pupil desires to enter the military academy, he must pass an examination in mathematics, the natural sciences, and drawing, the requirements in these branches being the same as at the final examination of the Real Gymnasium.

The certificate of the Real Gymnasium entitles its possessor to enter the advanced technical courses, to pursue the study of jurisprudence, and admits to the military academy. If a graduate of the Real Gymnasium desires to study medicine, he must pass an oral examination in Latin; the requirement, however, being the same as at the final examination of the intermediate school, not of the Real Gymnasium. The candidate must show that he has read three books of 'Cæsar's Commentaries,' twenty-four chapters of 'Cicero's Orations,' and five hundred verses of 'Phædrus.' In addition, there is a short written translation from Norwegian into Latin, in which the use of a dictionary is permitted. Most of the graduates of the Real Gymnasium who are to study jurisprudence also take this examination; on the one hand, because Roman law is an important factor in the State examination, and because those who have passed this examination have especial prerogatives in the *examen philosophicum* which precedes the state examination. In order to study theology and philology, the graduate of the Real Gymnasium must pass an oral examination in Latin and Greek, the requirements being the same as at the final examination of the Latin Gymnasium.

The system of preparatory instruction here described has existed in Norway now for some twenty years, so that it is possible to judge, to some extent, of its efficiency. Statistics show that the great majority of those who discontinue their studies after the completion of the course of the intermediate school take the Real course. Of those who take a higher course in the university and the technical schools, two thirds have been graduated from the Latin Gymnasium, one third from the Real Gymnasium. This result, however, is to be explained by the fact that the transformation of the former Latin schools into Latin Gymnasiums necessitated comparatively few changes. Where circumstances, accordingly, allowed but one higher school, the Latin Gymnasium was chosen, which offers, besides, certain tangible, if not materially important prerogatives. Real Gymnasiums and Latin Gymnasiums exist side by side only in the larger cities, the number of which in Norway is very small. Eight cities have both a Real and a Latin Gymnasium, and twelve a Latin Gymnasium alone. W. H. C.

ACCLIMATIZATION IN NEW ZEALAND.

IN a former article (*Science*, viii. No. 197) reference was made to the various species of animals which had been purposely introduced into these islands. In all cases it is difficult to foretell what effect will be produced upon any species by bringing about a change in its environment, and this truth has been well exemplified in the case of many animals, now, alas! too well established in the colony. Unfortunately the age of experiments in this direction has only begun. Rabbits, having no natural enemies to keep them in check, have become such a pest and source of loss to the colony, that the latest move — taken up both by interested sheep-farmers and by the government — has been to liberate sloats, ferrets, and weasels in many parts. Slowly as these animals increase, they have already made their presence felt; not, however, in the diminution of the rabbit-pest, but by their destruction of hen-roosts, and attacks upon children. Following in the wake of settlement, but not introduced purposely by man, are many other species, mostly small and noxious. When settlers first penetrate into the untrodden parts, especially of the South Island, they are attacked by hordes of bloodthirsty sandflies and mosquitoes; while the greatest care has to be taken to ward off an abundant blowfly, which lays its eggs, or ready-hatched maggots, upon every thing exposed. Blankets, flour-bags, and clothing are just as readily 'blown' as meat or offal. But as cultivation proceeds, and the ground is cleared, these insects disappear, while common European blue and house flies take their place. The latter, like the human being they follow after, even bring their diseases with them; so that every autumn their distended bodies are found attached to window-panes by the mycelium of *Empusa muscæ*.

As settlement progresses, and new trees and plants begin to take the place of the old vegetation, the familiar pests of the mother-country begin to appear. *Aphides*, *Coccidæ*, various beetles, moths, and flies, together with parasites which infest man and beast, become all too familiar. In many cases it would seem at first as if these were going to have it all their own way. Some twenty years ago it was considered nearly impossible to grow Swede turnips in this part of the colony, so enormously abundant was the *Aphis* upon them; but within these two decades a small bird almost certainly of recent introduction from Australia, called green-eye, wax-eye, or blight bird (*Zosterops lateralis*), has increased

very much, and coincidently with this has been such a decrease in the *Aphis*, that it has practically ceased to be a pest.

But the most conspicuous effects of man's influence is the introduction of numbers of species of plants which find themselves more or less at home in this new land. It is matter of common remark to every person coming to the colony, how English every thing looks. The wayside weeds, the grass with its daisies and ox-eyes, the fields and gardens with European chickweed, docks, and thistles, — all remind him of the old land. English plants chiefly have spread themselves over the country, wherever the settler has gone. One might expect that Australia, or America, being so much nearer, would have furnished the greatest proportion of immigrants; but this is not found to be the case. It is what Sir Joseph Hooker has called the aggressive Scandinavian flora, which so strongly asserts itself on all sides. The reasons of this are perhaps not far to seek. Nearly all the seeds brought to the colony in the earlier days of settlement came from Britain. English grasses were brought and sown down, and along with them came the weeds of English pastures. Compressed hay was brought frequently with imported stock; straw-packed goods were, and are, scattered throughout the country; and thus, in one way and another, it is the European species of weeds which have found their way here in the greatest abundance. The conditions of acclimatization are very dissimilar in different parts of the colony, extending as it does through twelve degrees of latitude, and thus embracing very different climates. The southern parts of the South Island are as different from the Bay of Islands as Scotland is from Italy. Throughout the greater part of the east side of the South Island, night frosts are experienced during the winter, even along the coast; while inland the cold is much more intense and continued, the summer being at the same time hotter. But in all other parts, frost, at ordinary levels, is the exception, while in no portion of the country are the droughts prolonged, as in Australia.

One of the results of such a distribution of climate is, that fewer introduced plants have succeeded in acquiring a foothold in the southern and colder parts than elsewhere in New Zealand; and as we go farther north we find the number of acclimatized species becoming more and more abundant. While those of Otago are chiefly such as are to be met with in England and Scotland, those of the north of Auckland are largely mixed with mid-European plants, and many of tropical and sub-tropical distribution. This is well seen by comparing the appearance at different ports. On landing in the Bay of Islands, one sees large patches of *Agave Americana* marking the sites of old gardens, but spreading far and wide, as if quite at home. The ground is carpeted with the familiar 'doab-grass,' as it is called in Bengal (*Cynodon dactylon*). Lily-of-the-Nile (*Richardia*) blocks the water-courses, while other tropical forms (*Amarantus, Aponogeton, Lycium*, etc.) occur freely as wild plants, intermingled with others of much more temperate habitat. Pursuing his journeys south, the traveller enters Napier, and, passing from the landing-place to the town through a ravine-like cutting, finds scarlet geraniums and forests of fennel competing with mesembryanthemum and introduced fuchsias for possession of every bit of soil. He infers at once a climate quite free from frost. But now let him land at Dunedin, and none but old country friends meet him. Shepherd's purse, groundsel, and docks occupy the wayside with similar equally familiar weeds. The meadows and pastures are white with daisies and ox-eyes (*Chrysanthemum leucanthemum*), or yellow with cat's-ear (*Hypochœris radicata*), buttercups, and self-heal (*Prunella*), and, with a slight effort of imagination, he might almost fancy that he was back in 'bonny Scotland.' The tropical element is here wanting. While nearly four hundred (387) species have been recorded as occurring in the Auckland district, not more than 160 are known from Otago in the south.

It is a much-disputed question among local botanists, whether the native flora can hold its own against the introduced plants, or not. When we consider that species brought from old (from a human point of view) and long populated countries, in more or less close proximity to one another, have acquired their present characteristics after long ages of a keen struggle for existence with one another, and with herbivorous animals to fight against, we should certainly expect them to prove extraordinarily aggressive in such a country as this. Here the animals are wanting, the climate is milder, moisture is abundant, and all the field seems to lie open. Accordingly, wherever the settler goes with the axe and plough, and, above all, with fire, the introduced plant follows him, and thrives. But it is now pretty well ascertained that if man stays his hand, the native vegetation does not continue to recede before the alien: on the contrary, it seems once more to tend to re-assert itself. That, at least, is the testimony of our two most competent botanists, Mr. Cheeseman in Auckland, and Mr. Kirk in Wellington, as well as of the writer in Otago.

The way that some plants have spread is most remarkable. The common thistle (*Carduus lanceolatus*) has gone over the country like smoke, especially following fire and cultivation. When first established, it forms thickets which frequently are impermeable; but this state never lasts long. The soil appears to refuse, at the end of two or three years, to yield up its former abundance, and the plant exhausts itself. This process in many parts is absolutely beneficial to the soil. In the limestone districts to the north of Otago, the writer has seen vast areas, which had been once ploughed, covered with an impenetrable forest of thistles six feet or more in height. In autumn the whole crop dies down, leaving the rocky soil penetrated in all directions by its long roots. As these decay, water finds its way down to the lower levels; and on ploughing the soil, and sowing a crop of winter wheat, the farmer is rewarded by a sixty-bushel crop.

Two or three species truly indigenous are now abundantly represented by the introduced European form. This is certainly the case with the dandelion (*Taraxacum*) and sowthistle (*Sonchus*), and most probably also with the smooth geranium (*G. molle*). The native form is all but extinct, the introduced being abundant.

In some cases characters are developed which appear to tend towards the formation of new varieties. Thus *Bartsia viscosa*, always considered a root-parasite in Europe, is truly established on its own roots in this country. Water-cress, which grows to a length of from two to four feet in its native habitats, attains gigantic proportions in many New Zealand streams. In the Avon at Christchurch it is frequently found with stems as thick as a man's wrist, and twenty feet in length. Sheep's-sorrel (*Rumex acetosella*) is here an unmitigated garden and field pest, especially in poor soils, where its tough underground stems will creep as much as a yard in a season, if the soil be kept well stirred. Equally remarkable is the changed character of *Poa pratensis*, so famed as a pasture-grass in the States. In New Zealand it gives a poor return as a permanent pasture-grass, while in arable land it is a curse, matting the surface soil into an unworkable mass. No doubt one cause of the troublesome nature of many of the common garden-weeds is the comparative absence of frost. Many plants which are strictly annuals in Europe or America, become biennial or perennial here. Chickweeds (*Stellaria* and *Cerastium*) and groundsel flower all the year round.

One of the most aggressive species in the country is the white or Dutch clover (*Trifolium repens*), which has shown great power of spreading, both laterally and vertically. Introduced plants are often met with also in most unexpected localities. The writer, when rambling along the slopes of Mount Torlesse, in the Canterbury Alps, was surprised to find some of the valleys — miles away from human habitation — full of a common mullein (*Verbascum thapsus*); but such instances are rare. The botanist rather wonders, that, considering how greatly specialized to their surroundings New Zealand plants are, they do not more quickly succumb to the intruders.

Finally, an interesting question, puzzling to the acclimatizer, is the difficulty of introducing certain — to him — desirable plants. Primroses and cowslips, foxgloves, and many other sylvan and meadow beauties, will not run wild. They die out if removed from the garden. The cause seems to lie in the absence of the insects necessary for their fertilization.

Both in the case of plants and animals, then, an interesting field for future observation exists in this country; and fortunately, accurate information on the whole subject has been accumulating from the very outset, so that the future naturalist has no 'dark ages' to look back to, but will always have some trustworthy record to refer to.

GEO. M. THOMSON.

Dunedin, Aug. 11.