MANGEL ROOTS LAID OUT FOR SELECTING STOCK SEED: "SURVIVAL OF THE FITTEST."

THE TESTING OF FARM AND FLOWER SEEDS.

By William G. FitzGerald.

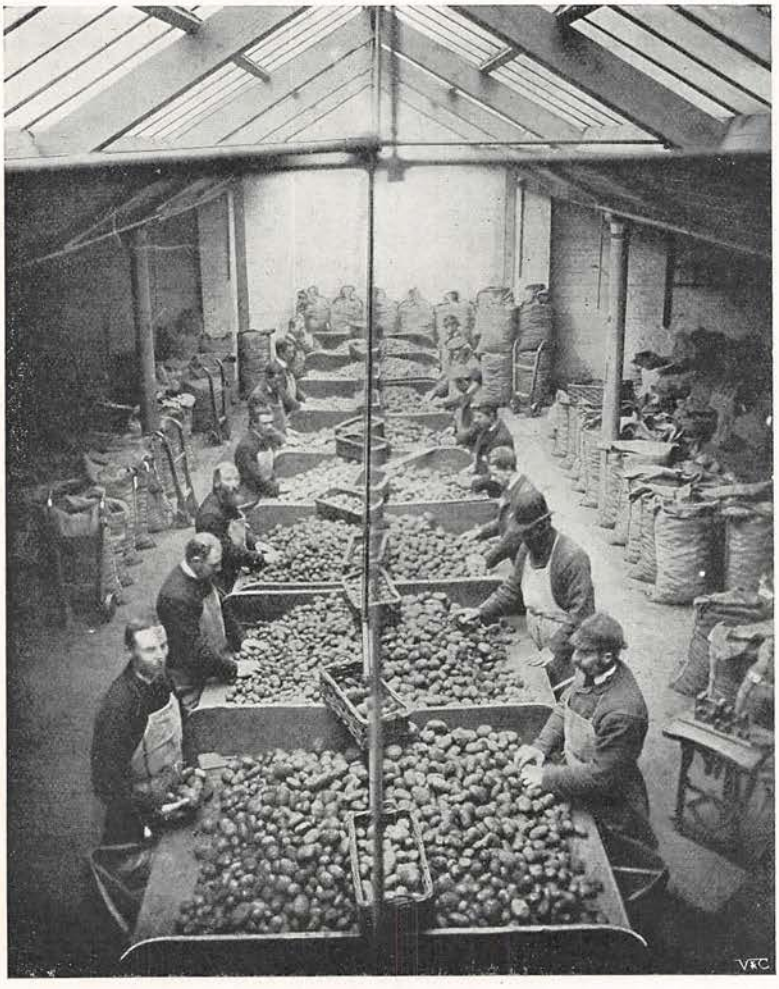
Illustrated from Copyright Photographs specially prepared for this article at Messrs. Sutton and Sons', at their famous Seed Establishment, Reading.

IT is one thing to procure flower, vegetable, and other seeds from growing stock, and quite another to be sure that those seeds have any life in them. You or I probably have never thought of this before, but a moment's reflection will show how important a thing it is to the entire nation. Take a sackful of seed. It may be expensive stuff—probably worth ten times its weight in gold, as we shall presently see; but that is only on the supposition that the seed is alive. How is this difficulty to be got over without planting, and therefore sacrificing the whole of this valuable property? The thing is really simple enough: a pinch or a handful of that seed is taken out of the sack and tested. As there are legions of different kinds of seed, however, and they have to go out to farmers, flower-growers, and many other people throughout the country, in tons, the testing of seeds is a most important and peculiar industry, and one which, notwithstanding its extraordinary interest, has never before been dealt with in a popular magazine.

Fifty or sixty years ago "live" seeds were rare, and adulteration was the rule. In fact, there was a big trade in dead seeds, which were no more use than dust and sand, and, though you may hardly believe it, such seeds as *might* have had any life in them were actually killed by specially made machinery for fear they should give the game away! The machine-makers actually guaranteed that not a single seed would remain whose vitality would testify to the swindle. It was a great business. Cabbage, broccoli, and other round seeds are worth several shillings a pound. Well, what was easier than to get another seed like this in form and colour and mix it up in large quantities with the costly stuff—"killed rape," for example, at 2*d.* or 3*d.* a pound? For years this kind of thing went on, but at last a Government inquiry was instituted, and the Seeds Adulteration Act was the result. Nowadays the great seed merchants of this country test their seeds before they are sent out, no matter whether the order consists of a thousand bushels of turnips or a little bag of some costly flower seed.

In one of the greatest establishments in

the world of this kind you will see, under unnumbered acres of glass, nearly every rare flower in the world in gorgeous profusion, the whole force and energy of each plant being concentrated into one solitary bloom or bunch of bloom, from which the seed is raised. Remember, the idea always is to get the finest possible quality and species in the seed, and to keep up the strain at all costs.



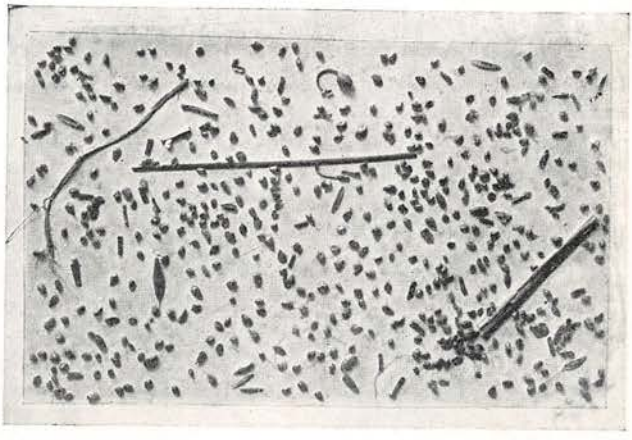
HAND-PICKING POTATOES FOR SEED.

It is a big step from primulas to mangel-wurzels; but here, again, the procuring of the ideal seed of high germinating power is an extraordinarily intricate business, calling for the experience of a lifetime. Take a handful of mangel-wurzel seed. How are you to know that that seed will produce the ideal mangel—not a lofty, but a useful ideal? Will the resulting mangel be of noble proportions and the right consistency? Will he be among mangels what the Venus of Milo is to artists considering the female form? It is impossible to say, unless the pedigree of that seed is well known. The matter is finally set at rest by the system of procuring the mangels which produced that seed. Often you will see an enormous field laid out with serried rows of mangels, and a keen-eyed expert, of perhaps half a century's experience, going down the rows singling out ideal roots. What could be more simple? These are planted, and seed obtained from them, with the certainty that the parent stock was the finest that could be grown. The same routine is gone through with swedes, of which a fine pedigree crop will be laid out, and several tons of typical specimen roots chosen for the raising of seed. Said the expert inspector himself to the writer: "There must be the characteristic small neck, freedom from side roots, the true colour, hardness, and, above all, density, which means high 'feeding' quality." It is an extraordinary fact in connection with these "ideal swedes" that they have to be planted in a secure spot, as they are liable to be ruined by pollen borne on the wind from a kindred variety. Between the choosing of the roots and the sale of seed from the selected stock a period of six years will elapse.

It is pretended that we are not an agricultural country, and yet in the height of the seed season 15,000 letters and post-cards

have passed through the private post-office of one of our great seed merchants.

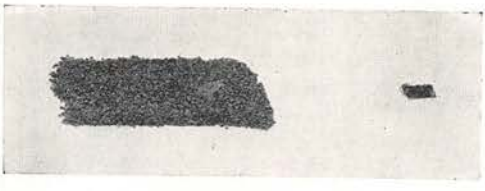
As in the case of the mangels, so you will see great rows of experts picking over seed potatoes, with eyes and judgment trained by years of experience in the matter of the "survival of the fittest." Here, again, the "table qualities," and a constitution capable of resisting blight, must be considered.



CLOVER SEED AS FIRST FROM THRESHING-MACHINE.

The seed of its weed parasite is exactly like it, rendering a test absolutely necessary.

Even when some kinds of seed are delivered from the threshing-machine, they are no more fit to be sent out than if they were so much sawdust. Take clover seed, for example, which is never pure as it is grown naturally, therefore it is essential that every parcel of it should be thoroughly cleaned before passing into the hands of the farmer, who would otherwise unconsciously introduce into his land weeds of a pernicious brand that years of labour would fail to exterminate, so that the resultant crop, instead of being a source of profit, would be the cause of something more than loss.

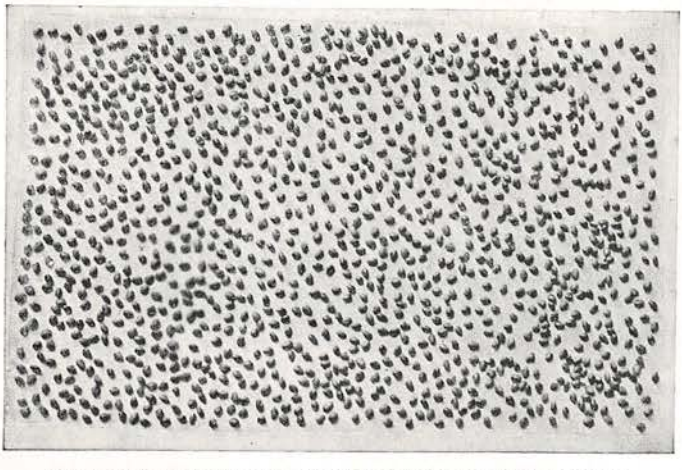


VALUE OF BEGONIA SEED COMPARED WITH THAT OF MIGNONETTE SEED.

Comparative values shown by a photo from Nature. Begonia seed worth sixty times the mignonette seed.

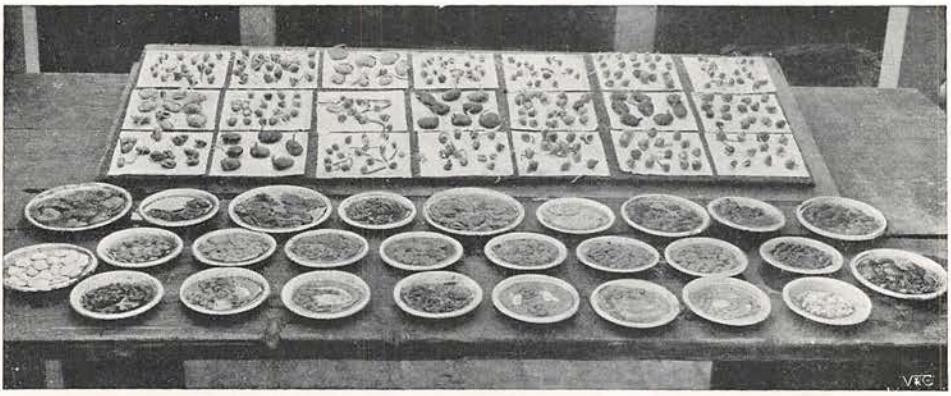
Strange to say, certain weeds are peculiar to different varieties of seed, and the similarity of these pests in shape, size, and colour, to the seed they infest, is as astonishing as it is troublesome. But besides the weed seeds that infest every lot of clover as it comes from the thresher, there are other "foreign bodies," such as fibres of plants, particles of stone, earth, and scraps of wood. These are not only in themselves harmful to the crop, but in mere point of weight would prove a serious thing for the buyer of, say, 200 lb. of seed.

You would hardly know the clover seed after it has been perfectly cleaned by machinery of a very elaborate and costly kind, which extracts the weed seeds, and even feeble clover seeds, with a kind of unerring mechanical "instinct."



PERFECTLY CLEANED SEED AFTER IT HAS PASSED ITS FIRST OR "MACHINE" EXAM.

You would think the burglar a dull creature who broke into a great seed-growing establishment and made off with sacks of flower seeds, but, as I will show you presently, these may be worth many times their weight in gold. Many of the choicer strains are far too expensive to be treated in the ordinary way, and calceolaria seed is so minute that the actual cost of producing the finest strain exceeds ten

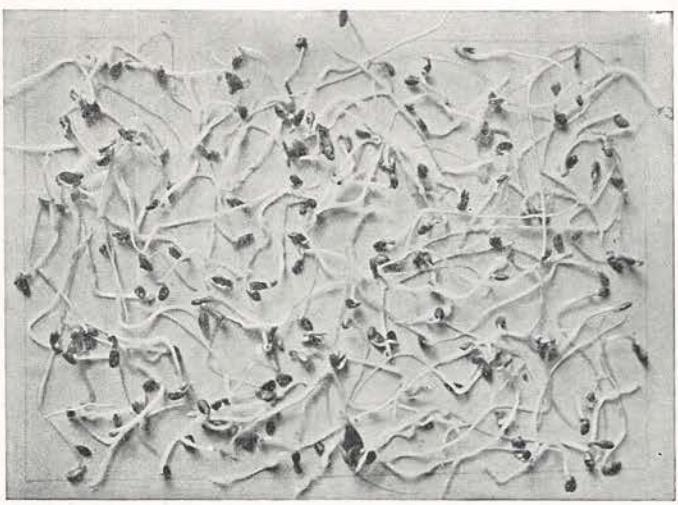


PEAS AND BEANS ("CANDIDATES" FOR EXAMINATION) SOAKING IN WATER BEFORE GOING INTO THE GERMINATOR.

The peas and beans laid out above have been in germinator.

times the weight of the seed in pure gold!

I have never before seen the comparative values of seed shown in a photograph, but a unique photo of this kind was specially prepared for this article by some of the greatest experts in the world. The picture shows the value of begonia seed as compared with that of mignonette, the former being worth sixty times more than the latter. The outlay in growing double begonia seed is so great that a liberal allowance for a five shilling packet is measured in a tiny spoon with an outside diameter of three-sixteenths of an inch. And yet in that tiny spoonful there would be enough seed to produce more than one hundred stately begonia plants! Naturally such very minute and precious seed has to be handled with extreme care, and as a sudden draught from an open door would scatter perhaps one hundred pounds' worth, the counters where these seeds are being packeted are closed to traffic, and so arranged that not a puff of wind can ever enter. But not all precious flower seeds are minute as to bulk. For example, cineraria, cyclamen, gloxinia, and primula.



A PEEP INTO GERMINATOR.

Every seed sprouting on wet blotting paper on to which seed throws clinging root.

The curiosities of flower seeds are almost incredible. Of aster seed alone there are no less than one hundred and eighty-five varieties, including the different colours, and stocks are almost as numerous. Of sweet pea seeds you can have one hundred varieties.

Of course, it is obvious that our farmers are largely dependent for their crops and their prosperity upon the quality of their seeds, hence all the ingenious machinery that has been devised to separate the "sheep" from the "goats," so to speak, and even such fine-looking seeds as are delivered by the threshers are required to pass a very stringent examination, as we shall see. Every defective-looking vegetable seed that may have been passed by the machinery is removed separately by hand, and only one variety is dealt with at a time in the room, lest the "wheat"

PRIMULAS FOR SEED, SHOWING HOW ALL FORCE OF EACH PLANT IS CAREFULLY CONCENTRATED INTO THE CENTRE TRUSS OF BLOOM FROM WHICH SEED IS OBTAINED.

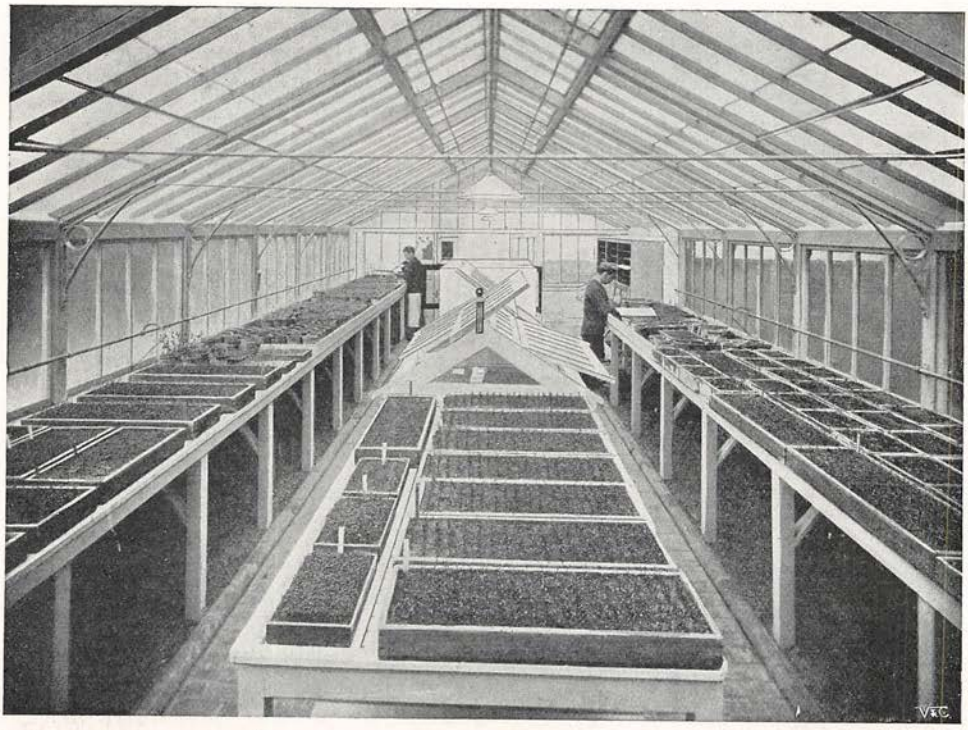
and the "tares" should get mixed, with strange results.

The anxiety of the seed grower does not end when he has his seed tested and cleaned, for turnip, swede, and other round seeds have to be stored in special cool places, so as to prevent the depredations of a tiny insect which infests this class of seed, and which under a microscope looks exactly like a cheese-mite.

Very interesting is it to see unnumbered tons of seeds and great avenues of sacks, each labelled not only with its name, but also with a record indicating the particular farm from which the seed was secured.

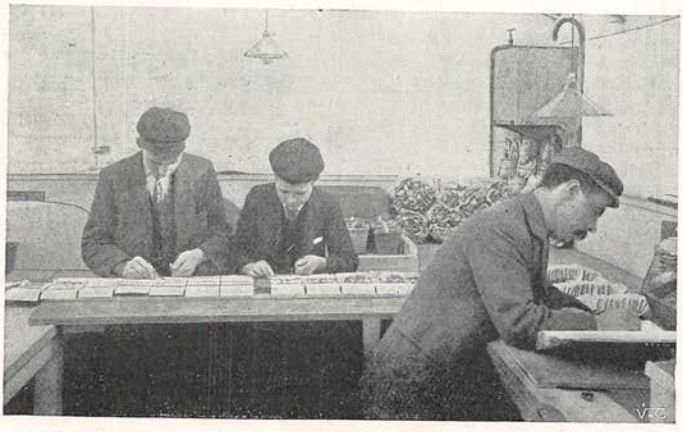
In the bad old days, unproductive meadows and pastures used to be sown with the sweepings of hay-lofts, with the result that agriculturists of to-day are fighting against the resulting weeds and plants which they owe to their predecessors. Nowadays, however, regular scientific research is made as to the properties of grasses which are known to be fattening for beasts; and now that agriculture is a high science, seeds are produced and cultivated to this end, and every mixture of grasses and clovers is now made up with the precision of a doctor's prescription, according to the soil in view and the object of the sower.

But, after all, the great thing is to find out whether the seed has any life in it. Here, again, there are all kinds of curiosities. Mangel seed will show 160 to 170 per cent.



PASSING A "PRELIM. EXAM." IN THE BIG SCHOOL: "INSPECTOR" GOING ROUND TO SEE HOW CANDIDATES ARE PROGRESSING.

of growth, and sometimes as much as 200 per cent. That is to say, almost every seed will give two growths! Then, again, sample lots of pea and bean seeds, if soaked in water previously, will show germination or otherwise reveal themselves in about forty-eight hours; whilst if not soaked, they will take at least four days. Celery, parsley, parsnip, and onion absolutely refuse to grow in a heated "germinator" such as coaxes the peas and beans into life, and, therefore, they have to be tested apart in a cool glass case in the testing-house or "examination hall." Lettuce, mustard-and-cress will germinate with extraordinary rapidity if soaked in water; but perhaps the most curious behaviour of all is that of the flower-seed known as portulaca, which is almost explosive in its energy, as germs of life will be visible in "candidates" in about two hours; oddly enough, the seed looks exactly like gunpowder! On the other hand, parsley seed is a slow and dull candidate at examinations, and twenty days at least must elapse before it shows any signs of life and is allowed to "pass." Seeds of the rose,

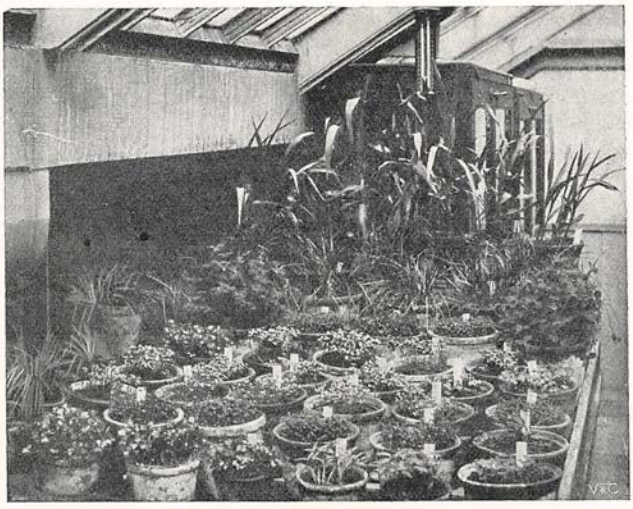


YOUNG "INSPECTORS" COUNTING OFF THE GROWTH OF SEEDS AFTER THEIR TESTING IN THE GERMINATOR.

Each lot of seeds that has passed has sprouted on wet blotting-paper.

auricula, and violet are also slow and very erratic in germination.

In every case the seeds to be tested are counted, and a careful entry made of the date of the sowing. Then, as the germs appear, their number is recorded. To prevent error, the trials are duplicated, and in the event of conflicting results entirely repeated. The methods of testing are, of course, varied according to the characteristics of the seed; temperature and moisture are essentials, and must be uniform night and day. With most seeds it is pretty easy to find the percentage of germination by artificial means; but then you must remember that the seed grower has to get this most valuable information during the waning days of autumn, and in the low temperature of winter, when natural forces are practically inactive.



THE TEST IN EARTH.

A further and more searching test than the sprouting on wet blotting-paper. Each pupil labelled.

It is impossible to fix a hard-and-fast rule in connection with seed testing. Such a hardy subject as furze, for example, seldom or never yields so high a percentage of growth under glass as in the open ground.

In many cases a pinch of seed is sprinkled on to a small sheet of soaking wet blotting-paper, and then put into the germinator. In a few hours, or in a day or two, a peep into the "ovens" will show that the seed in bulk is all right, for its representative has "passed its exam." A few days later quite a little garden has sprung up on the scrap of blotting-paper, the plants being two or three inches high, and with strong clinging roots thrown out all over the surface. The rigidity and vitality of the little plants is quite extraordinary, as also is the grip they have upon the blotting-paper. The writer has amused

THE FINAL OPEN-AIR TEST.

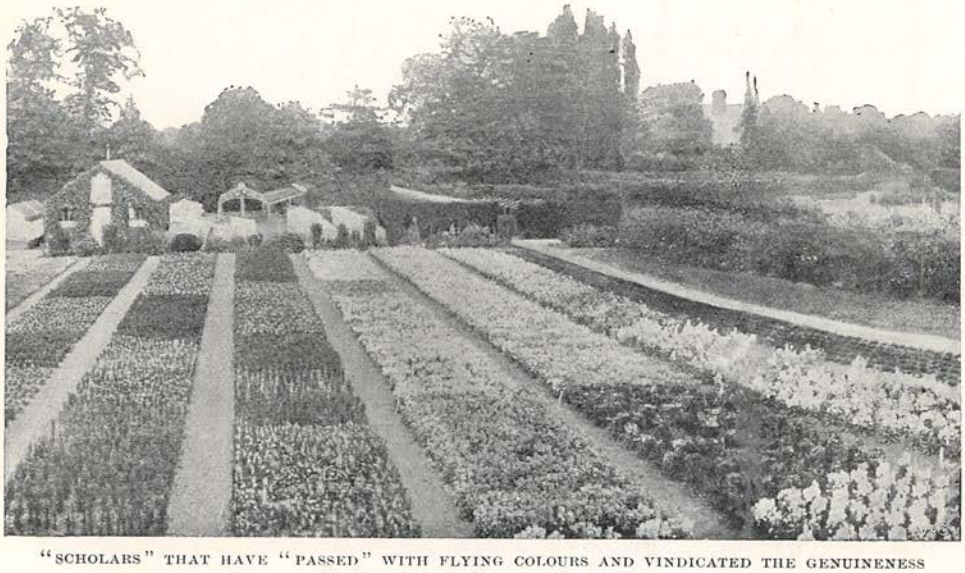
The last "exam." Successful seeds nearing their "degree."

himself with quite a little blotting-paper garden of beetroot, turnips, and many other plants, tested and forced in the germinator, and these may be kept in a room in a saucer of water for many days after they come out. Not all seeds, however, go into the germinator, for many other varieties are tested in earth, and yet others in the open air where desirable and possible. During the various tests of seed, "inspectors" go round, precisely as they would in a big school of children, to see how the candidates are progressing, and to keep an eye upon them generally. The candidates are—so to speak—awarded marks, and their behaviour praised or condemned according to their performance. Unremitting care and attention are lavished upon them, and finally they may be transplanted into the open air, where they pass their final "exam." with what may be truly termed "flying colours."

But the business is never really at an end, for experiments are constantly being made with (so to speak) the fathers and mothers of both farm and flower seeds. The hybridiser is at work in the hot-house all the year round, crossing new varieties and trying experiments of every kind. Then when he has succeeded in raising a glorious new variety, specimens of it are sent out and seed raised from the finest examples. One of the richest coloured primulas yet raised was obtained by crossing the pollen of the old lilac variety with a very handsome white flower. Yet, strange to say, subsequent attempts with similar parents all proved failures. Another curiosity was the crossing of gloxinia with gesnera. Fertile seed was obtained, but all the seedlings proved sterile and utterly declined to be propagated. In 1891 the seed of "Her Majesty"—a white gloxinia—was declared successful, but experiments had been commenced as far back as 1877. In that year the flower selected for the seed experiments was excellent in form and substance, but it had a pink band at the throat which the seed experts wanted to get rid of. Selection and crossing were continued year after year until the flower came true from seed as a pure white in 1891.

During the summer of 1888, a row of new late pea that was undergoing its "exam." produced a single pod which attracted a good deal of attention. This was marked and allowed to mature, and was in due course posted to one of the greatest experts in the country, who was in the North of England at the time. On its return the box was wrecked and every pea except one was damaged. From that single seed, however, a superb new variety was raised.

The experimental open-air grounds are the scene of yet another final examination, and it is well known to the inspectors who go round to report the progress of candidates, that a thin row of plants does not necessarily mean faulty seed, as birds, insects, mice, and ground vermin have much to answer for. The entries in the trial book, however, tell the whole history.



"SCHOLARS" THAT HAVE "PASSED" WITH FLYING COLOURS AND VINDICATED THE GENUINENESS OF ALL THE REST OF THEIR KIND.