than Up-to-Date. The choice of the thirteen lines was quite random—they happened to be the first available for testing out of doors—and there is no reason for believing the results to be atypical.

All available evidence considered, it seems fairly certain that there are among the varieties from the Andes some which are very good and also some which are very bad. The exact proportions of good and bad have not been determined, and do not concern us here. What matters is that the varieties are certainly variable and probably, on the average, less well bred and selected than the European. This is to be expected in the circumstances that new seedlings arise comparatively easily in the free-fruiting Andean varieties, that there does not seem to have been any conscious effort to breed new varieties[2], that mixed varieties are commonly cultivated, and that no selection is practised except perhaps in a reverse way by the eating of the large tubers and the planting of the small ones[3]. These circumstances must lower the general standard of varieties in any collection which aims at being fairly representative or complete.

It is therefore felt that the belief that poor yields of Andean varieties in Britain are caused in the main by the long days of summer, even when the growing-season includes weeks of short days in autumn, is charitable to the varieties, but still unproved.

That extreme intolerance of long days had to be removed before potatoes could become what they are in Europe to-day has never been disputed. Tolerance of long days is necessary for earliness, and, by comparison with the first European potatoes, all modern European varieties are early, especially in north-eastern Europe where, in the absence of a long frost-free autumn, earliness is a necessity. (This, as I hinted before[4], may explain why the potato did not go to the north-east for centuries.) But that the incomplete shift from autumn to summer tuber-growth has, by itself and apart from greater care in breeding and selection, improved yields in western Europe is still an assumption by European workers.

Because the opinions of Mr. Hawkes and Mr. Driver are held in such high regard, I am sorry to see that they have not dropped the name *S. andigenum*[1]. It seems fairly satisfactorily proved, both on grounds of photoperiodism[4] and morphology[5], that there is no question of more than one species among the cultivated tetraploid potatoes ; this being so, the statement of Mr. Hawkes and Mr. Driver[6] that type herbarium specimens and many rare documents need examination loses its point so far as the immediate problem of discarding invalid names is concerned. The name *S. andigenum* is new, but the hypothesis of the Andean origin of the potato is not. Linnæus gave the habitat of *S. tuberosum* as Peru, and twenty years ago botanists generally believed that the potato came from the Andes. One could slip back twenty years, and lose the name *S. andigenum* without great inconvenience.

J. E. VAN DER PLANK
Department of Agriculture, Pretoria.

[1] *Nature*, **158**, 168 (1946).
[2] Salaman, R. N., *J. Roy. Hort. Soc.*, **62**, 261 (1937).
[3] Hawkes, J. G., Pub. Imp. Bur. Plant Breeding and Genetics (1944).
[4] *Nature*, **157**, 503 (1946).
[5] Salaman, R. N., *J. Linn. Soc.*, **53**, 1 (1946).
[6] *Nature*, **157**, 591 (1946).

DR. VAN DER PLANK'S experiments at Pretoria afford additional evidence for the view, which, incidentally, we have never disputed, that certain Andean potatoes yield better than others, even under short day, and that only the best of them will yield, even under those conditions, as well as the domestic potatoes of Great Britain. It seems fairly obvious that selection for yield with the early European potato should have picked out those genotypes combining both tolerance to long day-length and intrinsic capabilities for high yield.

We have mentioned more than once our agreement with the view, first stated by Dr. Bukasov[1], that the yielding capability of a variety is dependent both on its photoperiodic response and on its inherent yielding capacity ; but we have felt it necessary, and still do, to stress the importance of the photoperiodic response on yield.

It seems to us that in paragraph 4 of Dr. van der Plank's letter the significance of the short days at the end of the growing season in Great Britain is too greatly stressed by him. Many short-day Andean potatoes have not progressed far enough with their tuberization by the beginning of October ever to be able to catch up with those varieties more tolerant of longer days. The result with these varieties that do not begin to form their tubers until they get a 12-hour day is that, even if they are not cut off by frost, their growth is soon brought to a standstill and they therefore have no chance to complete their tuber formation owing to the low temperatures and low light intensity. We feel that perhaps Dr. van der Plank does not adequately realize the difference in temperature and light condition between a short autumnal day in Great Britain and a normal short day in his own latitudes.

Finally, on the nomenclature problem, we would respectfully ask Dr. van der Plank to tell us, since he considers it unnecessary to wait until something is published on the subject, how we are to distinguish botanically between the Andean potato (at present known as *Solanum andigenum*) and the Chilean one (known now as *S. tuberosum*). We agree that they are not specifically distinct, but are they to be classed as varieties, forms or subspecies, and what are they to be called ? For our part, we totally disagree with any precipitate attempt to modify or delete a validly accepted botanical name without due regard to the precepts laid down by the International Rules of Botanical Nomenclature, since what has once been published requires another refuting publication before it can be abolished. In this case, the adequate publication of the botanical type for *S. tuberosum* would be necessary, as we have already stated[2], and the naming and describing of the Andean and Chilean varieties (or subspecies) within its boundaries. Until that is done we feel that it is better to continue using the name *Solanum andigenum*.

J. G. HAWKES
C. M. DRIVER
Imperial Bureau of Plant Breeding and Genetics,
School of Agriculture, Cambridge.

[1] Bukasov, S. M., Lenin Acad. Agric. Sci., Inst. Plant Ind., Leningrad (1933).
[2] *Nature*, **157**, 591 (1946).

Testing the Difference between Two Means of Observations of Unequal Precision

I AM sorry my use of the word 'tolerable' should be a difficulty to Dr. Bartlett[1], but the explanation is really very simple.

In 1936 [2] Bartlett, discussing what has come to be known as Behrens' problem, put forward a solution which, on examination, can be seen to be invalid