centuries, and the third with the establishment and consolidation of the Empire. Geography plays a minor part in the book, and the title is therefore likely to be misleading. Nevertheless it is refreshing to find a school history in which the author has departed from the time-honoured custom of subdividing his work according to the number of monarchs with whom he intends to deal.

Letters to the Editor.

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"*Spiranthes autumnalis*" in Scotland.

GREAT is the debt which British botanists—experts and amateurs alike—owe to the authors of the "Hand-book of the British Flora." It is scarcely possible to imagine a simpler or more convenient key to the natural orders. But a good deal has been added to our knowledge of British plants since the last revision of the work by Sir Joseph Hooker forty years ago, and it is to be regretted that before the latest edition was published in 1918 it was not passed through the hands of a competent editor to bring the work up to date. For instance, it is stated that the little orchid, *Spiranthes autumnalis*, is found nowhere north of Yorkshire and Westmorland. I had always accepted this as gospel until last August, when, while exploring a wood on Speyside for *Linnaea borealis*, I came upon a little colony of "lady's tresses." Since then I have received trustworthy information that *Spiranthes* grows in the valley of the Nairn.

I do not know whether this addition to our Scottish flora has been recorded hitherto.

HERBERT MAXWELL.

Monreith.

Associated Squares and Derived Simple Squares of Order 5.

THE six different types shown below are distinguished by the position of the complementary numbers (1, 25; 2, 24; 3, 23, etc.):

A	B	C
25 10 3 9 18	20 11 5 22 7	6 4 21 19 15
11 20 5 22 7	10 25 3 9 18	22 20 5 11 7
2 14 13 12 24	14 2 13 12 24	12 14 13 2 24
19 4 21 6 15	4 19 21 6 15	9 10 3 25 18
8 17 23 16 1	17 8 23 16 1	16 17 23 8 1

D	E	F
25 18 3 9 10	25 18 3 10 9	25 10 3 18 9
11 7 5 22 20	11 7 5 20 22	19 4 21 15 6
2 24 13 12 14	2 24 13 14 12	2 14 13 24 12
8 1 23 16 17	19 15 21 4 6	11 20 5 7 22
19 15 21 6 4	8 1 23 17 16	8 17 23 1 16

Constant 65.

A is an associated square, and by means of Dr. Planck's method of complementary differences it has been found that there are 3034 squares of this type, and each one can have sixteen inversions, making a total of 48,544 squares.

B. By exchanging the first and second numbers in NO. 2655, VOL. 106]

both rows and columns of A, type B is obtained. There are thus 48,544 squares of type B.

C. By exchanging the first and fourth numbers in both rows and columns of A, type C is obtained. There are thus 48,544 squares of type C.

D. Every associated square cannot be converted into type D, but by means of Dr. Planck's method of complementary differences the number can be found. It is 972, and each one can have one inversion, making a total of 1944.

E. But 36 of these 972 can be converted into type E, and each one can have three inversions, making a total of 144.

F. Also the same 36 of type D can be converted into type F, and each one, again, can have three inversions, making a total of 144.

In the last three types, squares can be constructed for each type by taking the columns as the rows and *vice versa*, and I have included these in the totals. This obviates the necessity of including types of squares when these three types are turned round through a quarter of a circle.

Totals:

A	...	48,544
B	...	48,544
C	...	48,544
D	...	1,944
E	...	144
F	...	144

147,864

These are only six out of thirty-four types of 5th order, making a total of nearly 700,000 squares.

J. C. BURNETT.

Barkston, near Grantham, Lincs.

The Spectrum of Nova Cygni III.

CLOUDY and hazy nights have seriously interfered with spectroscopic observations of this nova at Stonyhurst, but some good photographs of the spectrum were obtained with the Whitelaw short-focus prismatic camera on the nights of August 29 and 30 and September 6 by Father J. Rowland. The spectrum, the bright band spectrum characteristic of the second stage in the progressive spectra of novæ, remained practically the same during that interval. The bright hydrogen bands extended, on the average, over 20 Å. units, and consisted each of two components. There was a bright extension on the violet edge of H_γ, about λ 3870, which was possibly the first sign of the incoming of the nebular band.

Besides hydrogen, the most prominent radiations were due to enhanced iron lines, 5316, 5169, 5019, and 4924. On September 6, 4924 alone of the four radiations named left an impression on an isochromatic plate. Between H_β and H_γ were two prominent and very broad bright bands, the first extending from λ 4703 to 4628, and the other marked by three maxima corresponding to the iron lines λ 4584, 4550, and 4516. Between H_γ and H_δ were three very prominent radiations, λ 4303 iron, 4228, and 4170, the last being almost as intense as H_δ. The K calcium band was also doubled, and extended over about 15 Å. units. On August 29 the spectrum extended far into the violet. On September 6 the visual magnitude was estimated as lower than the fifth. No obvious change in the spectrum could be detected on a weak impression secured on September 10. The iron line 4924 was still present. H_α was very brilliant.

A. L. CORTIE.

Stonyhurst College Observatory, Blackburn.