always the first and third component. These groups of lines allow us to conclude that in Dahmen's observations some lines are absent which are present in Dik and Zeeman's tables.

Some examples of " quintets " may be given here.

I.

I.	ν (Vacuum).	
2	20224·50	(D, Z)
	1468·83	
5	21693·33	(G)
	1089·05	
3	22782·38	(G)
	417·95	
4	23200·33	(G)
	473·01	
5	23673·34	(G)

890·96 → 1507·00 ← 1980·01

II.

I.	ν (Vacuum).	
2	21753·81	
	1468·82	
3	23222·63	(G)
	1089·18	
1	24311·81	(G)
	417·82	
2	24729·63	
	473·22	
3	25202·85	

891·04 → 1507·00 ← 1980·22

III.

I.	ν (Vacuum).	
4	22189·68	(G)
	1468·93	
5	23658·61	(G)
	1088·79	
1	24747·40	
	418·25	
3	25165·65	
	473·14	
2	25638·79	

891·39 → 1507·04 ← 1980·18

IV.

I.	ν (Vacuum).	
6	24178·63	(G)
	1469·17	
8	25647·80	
	1088·85	
2	26736·65	
	418·26	
6	27154·91	
	473·54	
5	27628·45	

891·80 → 1507·11 ← 1980·65

V.

I.	ν (Vacuum).	
(7)	23449·36	(G)
	1468·76	
1	24918·12	
	1088·88	
0	26007	(D, Z)
	418·23	
1	26425·23	
	473·50	
1	26898·73	

891·73 → 1507·11 ← 1980·61

(D, Z) means observed by Dik and Zeeman.

(G) refers to Goldstein's observations of the " Grundspectrum." Goldstein (*Verh. deutsch. phys. Ges.* 321. 1907; 426. 1910), who was the first to obtain the spectrum of ionised potassium, observed 16 lines in the red part of the spectrum. Ten of these lines are incorporated in the " quintets " given.

Further details will be published by one of us (de B.) on another occasion.

T. L. DE BRUIN.
P. ZEEMAN.

Amsterdam, December 29.

The Ages of Peat Deposits.

DR. W. H. PEARSALL'S article on this subject in NATURE of December 6 refers to the absence of definite forest layers in the Pennine peat, in contrast to the peat with tree layers described by Lewis and others. Dr. Pearsall appears to have overlooked the fact, however, that both the age and composition of mountain peat may differ considerably from that of marsh peat, in which tree layers are invariably found, and the presumption is that the Pennine peat to which he refers belongs to the former class. The absence of tree layers in mountain peat is general throughout Ireland, whatever it may be elsewhere. This is due, not to the elevation at which it is formed, but to the stratum on which it rests, and which is invariably a surface soil, not always waterlogged, but deficient in lime and other alkaline bases, and on which the ordinary decomposition of humus is retarded or checked altogether. Tree stumps of Scots pine and birch, and more rarely oak, occur under the mountain peat up to elevations of 1500 feet to 2000 feet, and in situations where trees could not attain a similar size or rate of growth to-day.

Dr. Pearsall states that tree layers are not necessarily an indication of climatic change, and I agree with him. But they are undoubtedly an indication of change in the soil or peat water upon which the tree layers subsist, and also of the level at which the water table stood when they were growing. These root layers invariably show a decreasing size and rate of growth the higher they stand above the water table of the marsh which gave rise to the peat formation. The question is somewhat complicated by the fact that in most mountain districts, marsh and mountain peat are intermixed over wide areas, the mountain peat covering the higher and better drained surfaces, and the marsh peat the depressions or hollows which were originally small shallow lakes. The former never contains definite root layers, the latter root layers up to the level at which the sphagnum peat was formed, indicating a point at which sterility prevented all plant growth except mosses, stunted heather, and similar plants.

So far as I am aware, few investigators distinguish between these two types of peat, and when tree layers are found in the shallow marsh peat of mountain districts, the fact is overlooked that they may be distinctly older than the mountain peat lying between them, and *under*, but *not in* which the tree stumps occur on the natural soil. It is highly probable that the mountain peat corresponds in age to the Submerged Forest period, and also to the margins of the deeper and larger bogs of Ireland and Scotland. In these margins Scots pine and oak are usually found mixed, but in the deeper layers oak is absent.

It is possible that considerable errors may arise by assuming that Scandinavian peat is of the same age as that of Ireland and Scotland. Existing peat could not have been formed until the final retreat of the ice sheet, but probably began immediately after that retreat in the form of plant growth in the shallow lakes and marshes. Thousands of years may have separated the final retreat of the ice from the British Isles and its retreat from Southern Scandinavia, and in the interval peat has been forming wherever the conditions were suitable, irrespective of climate, although climate must have affected its rate of growth. That peat formation is going on to-day can be seen in many parts of the north and west wherever stagnant water accumulates, or soil surfaces are leaching out. Neither the marsh peat in the one, nor the mountain peat in the other, is necessarily an indicator of climate, but the root layers in and under the marsh peat suggest that it is of a much greater age than the mountain peat so far as the lower layers are concerned. The sphagnum peat is evidently a more recent growth, and reaches a more or less definite height in relation to the average diameter of the bog.

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IN NATURE for December 6, 1924, Dr. W. H. Pearsall directed attention to the results which have recently been achieved in work on the Pennine peat of Yorkshire; and discussed some of the problems of correlation which arise. Several of the points raised demand further comment.

After enumerating and discussing the validity of the conclusions reached by Lewis for the Scottish Peat Mosses, Dr. Pearsall says: " Samuelsson has

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