growth of stands, the best methods for thinning stands and for obtaining natural regeneration of forests. In some localities the relation of grazing to forest regeneration is receiving attention.

UNIVERSITY AND EDUCATIONAL NOTES

THE estate of the late J. Stephen Tripp, amounting to some $550,000, "to be used as the regents see fit," has come into the hands of the University of Wisconsin, as a result of the death of the last beneficiary.

FIRE at Earlham College has destroyed the administration building and part of the museum. The damage done is estimated to be $250,000, in addition to the loss of many scientific records.

THE Ramsay Laboratory of Chemical Engineering at University College, London, was opened on November 12.

PROFESSOR GUIDO H. MARX this year succeeds Professor William F. Durand, retired, as head of the department of mechanical engineering at Stanford University.

DR. WILLIAM PINKERTON OTT, associate professor of mathematics at Vanderbilt University, has been appointed head of the department of mathematics at the University of Alabama.

DR. P. M. GINNINGS has resigned as professor of chemistry at Centenary College of Louisiana, to become professor of chemistry at North Carolina College for Women. His place at Centenary College will be taken by Dr. Albert Salathe, professor of chemistry at Sweet Briar College, Virginia.

DR. CARL ARTHUR HEDBLOM, of the Mayo Clinic, Rochester, Minn., has been appointed chief surgeon of the Wisconsin General Hospital, and professor of surgery at the University of Wisconsin Medical School, Madison.

L. P. MCCANN has been appointed associate professor of animal husbandry at Colorado Agricultural College to succeed Professor B. W. Fairbanks.

DR. EARL D. MACPHEE, of the University of Alberta, has accepted an appointment in the department of psychology at the University of Toronto.

PROFESSOR LUCATELLO, of Padua, has been nominated successor of Professor Maragliano in the chair of internal medicine at Genoa.

PROFESSOR ANDREW ROBERTSON, professor of mechanical engineering in Bristol University, has been appointed principal of Bristol Merchant Venturers Technical College, in succession to the late Dr. Wertheimer.

DISCUSSION AND CORRESPONDENCE

THE QUANTUM NUMBERS OF THE BOHR ORBITS IN THE ALKALI ATOMS

IN a recent article, Dr. L. A. Turner[1] proposes a change in the assignment of quantum numbers to the orbits in certain atoms, as given by Bohr in his latest theory.[2] This applies particularly in the principal quantum numbers assigned to the outermost orbits in the heavier alkali atoms and alkaline earth ions. The essential features of the proposed change may be indicated briefly in the following table:

Element	N	n*	n_B	n_T	q_B	q_T
Li	3	1.59	2	2	.41	.41
Na	11	1.63	3	3	1.37	1.37
K	19	1.77	4	4	2.23	2.23
Rb	37	1.81	5	6	3.19	4.19
Cs	55	1.87	6	8	4.13	6.13

In the above table, N denotes the atomic number, n^* the effective quantum number of the outermost orbit in the atom, n_B the corresponding principal quantum number as assigned by Bohr, n_T, the same as assigned by Turner, while q_B and q_T are the corresponding quantum defects (differences between n^* and n) on the two points of view, respectively. It will be seen that Turner proposes to increase Bohr's principal quantum numbers for the orbits in Rb and Cs by *one* and *two*, respectively. His reason for this step is based on an examination of the variation of the quantum defect with N. For he finds that if we plot q as a function of N, using the Bohr values, we get a broken line with the break occurring at K (as will be seen from an inspection of the table), while if we plot q as a function of N, using Turner's values, we get a very nearly straight line. (It must here be remarked that this also applies to the corresponding case in the ionized alkaline earths and certain other atoms). No theoretical reason can apparently be assigned to the straightness of this line. The present writer wishes to examine available evidence as to the justification of Turner's new assignment.

Numerical calculations have been carried out by the writer[3] for the dimensions of the orbits in the Bohr models of the alkali atoms. These show conclusively that Bohr's assignment of the quantum numbers for the outermost orbits is the only one which yields the correct values of the effective quantum numbers, provided, of course, that the *inner* groups of orbits remain as assigned in the Bohr theory. In fact, a short calculation on the basis of the results there obtained indicates that the assumption of $n = 6$ in-

[1] L. A. Turner, *Phil. Mag.*, Sept., 1924.

[2] See particularly N. Bohr, *Ann. d. Phys.*, 71, 228, 1923.

[3] Proc. Amer. Phys. Soc. 23, 552 (A8) 1924. For complete details of calculations see *Jour. of Math. and Phys.*, Mass. Inst. Tech. III, 191, 1924 (May).

stead of $n = 5$ in the case of Rb will lead to a value of $n^* = 2.80$, approximately, while the choice of $n = 8$ for Cs will yield $n^* = 3.80$, approximately.

It thus appears that Turner's assignment, if true, will necessitate a complete rearrangement of the inner quantum groups—a very serious step and one open to much criticism in the opinion of the present writer. One significant point may be mentioned here. The writer found in the calculations above mentioned that the computed values of the dimensions of the outermost orbits in the ionized alkali atoms (a measure of the ionic radii) obey the Grimm inequality law,[4] *viz.*,

$$R_K - R_{NS} > R_{Cs} - R_{Rb} > R_{Rb} - R_K$$

where R_{Na}, R_K, etc., refer to the radii of the ions of sodium, potassium, etc. This law appears to be an extremely fundamental one in connection with atomic characteristics in general. (It is interesting to note that it is followed, as might be expected, by the effective quantum numbers themselves). A rearrangement of the inner groups of orbits in Rb and Cs would vitiate this result, and lead to values for the dimensions of these ions which are much too large in comparison with the dimensions of the lighter alkalies.

In the opinion of the writer it is therefore apparent that Turner's assumption, while leading to an interesting result, can hardly be maintained.

A thorough study of the quantum defect may be expected to be of great value in the development of the Bohr theory, particularly in connection with the analysis of the spectral terms of multiply-ionized atoms. Certain simple relations relevant hereto and admitting of simple interpretation on the Bohr theory are in process of derivation and arrangement by the writer and will be published shortly.

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WHITE INDIANS OF DARIEN

LIONEL WAFER, a ship's doctor and an associate of Dampier's, has left us an interesting account of the White Indians of the Isthmus of Darien. Wafer fell into the hands of the Darien Indians on the 5th of May, 1681. These were copper-colored natives of the coast, but while a captive among them he had frequent opportunities to observe other Indians of a different complexion. He has this to say about the White Indians:[1]

[4] H. Grimm, *Zs. f. Phys. Chem.*, 5, 353, 1921.

[1] "A New Voyage and Description of the Isthmus of America," by Lionel Wafer (Reprinted from the original edition of 1699) Cleveland, The Burrows Brothers Company, 1903.

There is one Complexion so singular, among a sort of People of this Country, that I never saw nor heard of any like them in any part of the World. The Account will seem strange, but any Privateers who have gone over the Isthmus must have seen them, and can attest the main of what I am going to relate; tho' few have had the opportunity of so particular an Information about these People as I have had.

They are White, and there are of them of both Sexes; yet there are but few of them in comparison of the Copper-colour'd, possibly but one to two or three hundred. They differ from the other Indians chiefly in respect of Colour, tho' not in that only. Their Skins are not of such a White as those of fair People among Europeans, with some tincture of a Blush or Sanguine Complexion; neither yet is their Complexion like that of our paler People, but 'tis rather a Milk-white, lighter than the Colour of any Europeans, and much like that of a White Horse.

For there is this further remarkable in them, that their Bodies are beset all over, more or less, with a fine short Milk-white Down, which adds to the whiteness of their Skins: For they are not so thick set with this Down, especially on the Cheeks and Forehead, but that the Skin appears distinct from it. The Men would Probably have white Bristles for Beards, did they not prevent them by their Custom of plucking the young Beard up by the Roots continually: But for the Down all over their Bodies, they never try to get rid of it. Their Eye-brows are Milk-white also, and so is the Hair of their Heads, and very fine withal, about the length of six or eight Inches, and inclining to a Curl.

They are not so big as the other Indians; and what is yet more strange, their Eye-lids bend and open in an oblong Figure, pointing downward at the Corners, and forming an Arch or Figure of a Crescent with the Points downwards. From hence, and from their seeing so clear as they do in a Moon-shiny night, we us'd to call them Moon-ey'd. For they see not very well in the Sun, poring in the clearest Day; their Eyes being but weak, and running with Water if the Sun shine towards them; so that in the Day-time they care not to go abroad, unless it be a cloudy dark Day. Besides they are but a weak People in comparison of the other, and not very fit for Hunting or other laborious Exercise, nor do they delight in any such. But notwithstanding their being thus sluggish and dull and restive in the Day-time, yet when Moon-shiny nights come, they are all Life and Activity, running abroad, and into the Woods, skipping about like Wild-Bucks; and running as fast by Moon-light, even in the Gloom and Shade of the Woods, as the other Indians by Day, being as nimble as they, tho' not so strong and lusty.

The Copper-colour'd Indians seem not to respect these so much as those of their own Complexion, looking on them as somewhat monstrous. They are not a distinct Race by themselves, but now and then one is bred of a Copper-coloured Father and Mother; and I have seen a Child of less than a Year old of this sort. Some would