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).