tion is only about 3 per cent. greater than that of the exciting one, and is about inversely proportional to the sixth power of the atomic number, we get $v=2\cdot23\times10^{8}(M-1)$ cm./sec., while Bohr finds $(M=N)$:

$$v=2\cdot18\times10^{8}N \text{ cm./sec.}$$

Now from this value of v, and $\nu=2\cdot47\times10^{15}(M-1)^2$, we can calculate x from $xmv^2=2h\nu$, which must be a constant, because both v^2 and ν depend on $(M-1)^2$. As $mv^2/2$ is energy to be, at least in part, radiated away periodically, on the right side of the equation, not only the number of times energy is radiated away per second (ν), but also the total time of radiation (t) and the mean energy radiated away per period (E) must occur, so that $xmv^2=2t\nu E$, and tE is a constant (which may mean only that the time during which radiation is emitted is inversely proportional, for a given frequency, to the quantity of energy that is radiated away during each period). Hence

$$x=2h\nu/mv^2=2.6\cdot62\times10^{-27}.2\cdot47\times10^{15}(M-1)^2/0\cdot88\times10^{-27}.2\cdot23^2\times10^{16}(M-1)^2=0\cdot748, \text{ or } 3/4,$$

as assumed by Moseley.

From $mv^2/a=e^2(M-1)/a^2$ we can calculate $mav=e^2.(M-1)/v=4\cdot78^2\times10^{-20}(M-1)/2\cdot23\times10^{8}(M-1)=1\cdot03\times10^{-27}$, while $h/2\pi=6\cdot62\times10^{-27}/2\pi=1\cdot05\times10^{-27}$, so that $mav=h/2\pi$, as assumed by Bohr, and

$$a=5\cdot12\times10^{-9}(M-1)^{-1} \text{ cm.}$$

All this is in agreement with Bohr's theory.

As may be seen from a previous letter (NATURE, March 5, 1914, p. 7), some properties of the elements depend not on the atomic but on the "periodic" number $P=8r\pm b$ (r is the number of horizontal rows preceding that of the element period of rare-earth elements not counted, and b the maximum or positive valency). Now the sum of these electrons of valency may be easily seen to be for all regular (non-elementar) inorganic molecules an integer multiplum of eight. Hence the same holds for the sum of all P electrons in these molecules (ions and rare-gases-atoms included). Affinity is then the tendency to build up systems of $8n$ P-electrons, and, of course, if such a molecule breaks up into atoms with each similar systems of $8n$ P-electrons, such ions must be formed as known from electrolysis. The great facility with which molecules like H_2O, NH_3, HCl, though neutral, are added to such systems, may be due to each of them, containing 8 P-electrons. According to Bohr, rings of electrons, whether belonging to one or to more atoms, may unite if the number of electrons in both is equal, so that rings of 2, 4, and ultimately 8 will be the most probable (16 only if the charge is very great).

Of course, the objections to the "Saturnian" atom hold for such systems also. Indeed, the structure of the periodic system as a whole, and the curious relation between the number of the non-periodic (Q) elements, H, He, Co, Ni, Rh, Pd, and that of the horizontal rows in the periodic system: 2/1, 2/2, 2/3, 4/3, 4/4, 4/5, 6/5, 6/6, 6/7, suggests systems of n equal non-coplanar rings of 8 electrons surrounding one or more (even n), positive nuclei, with n or $n\pm1$ electrons in or near the axis, and additional rings of electrons of valency, rather than a Saturnian atom. But, generally speaking, Bohr's theory is not in disagreement with the atomic number hypothesis.

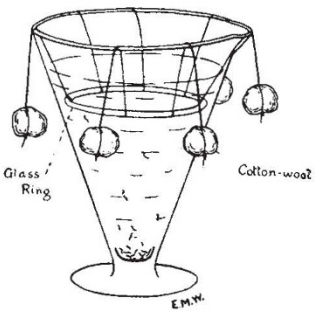
A. VAN DEN BROEK.

Gorsel (Holland), April 15.

Means of Collecting Eelworms.

THE rhubarb, when cultivated as a field crop, is subject to a wasting disease, which, attacking the root-stock and causing it to decay, occasions considerable loss to the grower. The diseased tissue, when examined, is frequently found to be infested with the stem eelworm, *Tylenchus devastatrix*, Kuhn, and, in districts where this disease is prevalent, a supply of Tylenchus material is at hand which, since the rhubarb is a perennial plant, is available not only in summer but during winter also.

When pieces of decaying rhubarb tissue are enclosed in a corked tube, any Tylenchus worms that are present migrate to the surface and, provided they have not been corked up too long, will, if placed in water, remain alive for weeks. Material can be obtained in quantity, and with very little delay, by placing pieces of rhubarb in a strainer covered with fine gauze, and suspended in a vessel of water. The eelworms, forsaking their feeding-ground, wriggle through the muslin and accumulate in a writhing mass on the floor of the vessel. This water method, it may be added, is also useful in examining the eelworm fauna of soil samples, and provides a simple means of ascertaining roughly what forms are present.



When thus collected from rhubarb, the eelworms are usually mixed with sediment, but this defect can be remedied by placing the material, while still unsorted, in a porous vessel, such as a candle-filter, which, when placed in water, allows only living eelworms to pass through. A better method of cleansing the material, however, is obtained by taking advantage of the habit that eelworms have of climbing up capillary films when these are present. For this purpose, silk threads are employed, to each of which is suspended a blob of cotton-wool, the cotton-wool serving as a receptacle for holding the crude material obtained from the rhubarb. The upper ends of the threads are attached to a glass ring which is supported upon the sloping sides of a funnel-shaped vessel containing water—this shape being chosen in order that the blobs may hang clear.

As the threads become saturated, the eelworms, leaving all impurities behind in the cotton-wool, ascend amongst the silken strands, and, passing over the brim into the water, congregate on the floor of the vessel—a feat on their part which, besides providing the student with clean material, raises the question whether, in respect of their acrobatic accomplishments, eelworms vary to any appreciable extent; and, if so, whether the rough method here described can be extended so as to provide a means of sorting out one species from another, when two or more species are present in the material employed.

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THE PROHIBITION OF EXPERIMENTS ON DOGS.

THE Dogs' Protection Bill for the second reading of which 122 members of Parliament were induced to vote the other day is one of those measures which are born of ignorance and fostered on misrepresentation. All our knowledge of the functions of the body is fundamentally based on experiments which have been made upon dogs. The action of the heart and its nerves; the