# LETTERS TO THE EDITOR

*Prompt publication of brief reports of important discoveries in physics may be secured by addressing them to this department. Closing dates for this department are, for the first issue of the month, the twenty-eighth of the preceding month; for the second issue, the thirteenth of the month. The Board of Editors does not hold itself responsible for the opinions expressed by the correspondents.*

## Wave-length Measurement of Gamma-Rays from Radium and its Products

In my paper on the $\gamma$-ray spectrum of radium and its products (Phys. Rev. [2] **36,** 460 (1930)) it was pointed out that the peaks appearing on the intensity curve and interpreted as $\gamma$-ray lines were sharp, and were apparently resolved by the spectrometer when the glancing angles of reflection from calcite differed as little as 20 seconds of arc, although the geometry of the arrangement did not account for such high resolving power.

Professor Niels Bohr in private correspondence with Professor Kovarik has emphasized the importance of this question concerning resolution in my experiments, and a further study of the matter has shown that the discrepancy between the resolving power as estimated from the experimental curves and that computed from the dimensions of the apparatus is greater than can be accounted for by any reasonable hypothesis regarding accidental inclination of the slit faces. He also points out that besides this there is a further difficulty in connection with the apparently great relative intensity of the very short wave-length lines or bands. Theories of scattering predict much lower intensity for scattered radiation of such high frequency. The reality of the reported results thus assumes considerable theoretical importance and needs more experimental justification.

It is impossible to give, at present, any other interpretation of the experimental results than that first offered. It is my intention, therefore, to reinvestigate the problem with improved apparatus. Meanwhile the question regarding the existence or non-existence of new lines of strong intensity in the $\gamma$-ray spectrum of radium and its products must be left open.

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## Arrangements of Atoms in Crystals

In the January 1st number of the Physical Review (**37,** 105 (1931)) is an abstract of a paper by Zachariasen in which the author reports the results of crystal structure investigations of $KBrO_3$, $KCl_3$, $NaClO_3$ and $Na_2SO_3$. He finds, in agreement with the earlier work on $NaClO_3$ and $NaBrO_3$ (Kolkmeijer, Bijvoet and Karssen, Verslag akad. Wetenschappen Amsterdam **23,** 644 (1920); Dickinson and Goodhue, J. Am. Chem. Soc. **43,** 2045 (1921)) that the $XO_3$ groups in these crystals can be described as "tetrahedral groups with one tetrahedral corner removed," and notes that this is a similar arrangement to that around As or Sb in $As_2O_3$ crystals (Bozorth, J. Am. Chem. Soc. **45,** 1621 (1923)). The statement is then made that in each case "the cation has got only 2 electrons in the outer shell," the non-coplanar arrangement being explained "as due to deformation in the outer shell of the cation, where the charge distribution is very diffuse."

It seems more likely to the writer that these are merely cases of shared electron pairs, as postulated by G. N. Lewis ("Valence and the Structure of Atoms and Molecules," Chem. Cat. Co., New York, 1923). The total number of valence electrons in each of these ions is 26, and if Lewis is correct, that there is a tendency toward the completion of valence shells containing eight electrons (four pairs tetrahedrally oriented) around the kernel of every electronegative atom, the distribution in space of the atoms must be similar to that observed,