

The N.M.R. broadline spectrometer has been described elsewhere¹² and the record of hexamethylenetetramine (Fig. 1) was taken at



FIG. 1. Showing proton resonance of Hexamethylene tetramine at room temperature at 25 Mc/sec.

25 Mc/Sec. by one of us at the University College of North Wales, Bangor, U.K. The practical value of second moment is found to be 22.43 gauss² which agrees well with theoretical value (22.46 gauss²) when C-H distance is taken 1.09 Å.

The rotational second moment has also been calculated which is totally intermolecular and found to be .9 gauss². Therefore intermolecular contribution must be included by Yagi. Also the C-H distance (1.09 Å) taken by Yagi is well in agreement than the distance taken by Smith (1.13 Å). The C-H distance concluded by the authors is also confirmed by *Tables of Interatomic Distances*¹¹ published by Chemical Society, London.

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COMPTON SCATTERING OF GAMMA-RAYS FROM BOUND ELECTRONS

THE available data on Compton scattering of gamma-rays from bound electrons are too scanty to derive any useful information regarding the incoherent scattering function $S(q, z)$ which describes the effect of binding and motion of the scattering electrons. Our earlier experiments¹ on the small angle scattering of low energy gamma-rays showed that for small values of momentum transfer involved in the scattering process, the Compton scattering cross-section from bound and moving electrons is less than that from free and stationary electrons, i.e., the value of scattering function is less than unity and its value decreases as momentum transfer decreases. The experiments²⁻⁴ on large angle scattering of high energy gamma-rays, however, show that the situation is reversed at large values of momentum transfer. The scattering function attains values greater than unity and the Compton scattering from bound electrons becomes more intense than that from free electrons. No information is yet available about the integrated Compton cross-section from bound electrons where the momentum transfer may vary from zero to some maximum value depending upon the energy of gamma-rays. From the data so far available it may be guessed that the integrated Compton scattering cross-section from bound electrons may be either less than, or equal to, or greater than that from free electrons depending upon the maximum value of the momentum transfer which in turn depends upon the energy of gamma-rays. Unfortunately at low gamma-ray energies the interference from the photoelectric interaction becomes too great to make the measurement of integrated Compton cross-section from bound electrons possible. It is, therefore, hard to draw any worth-while conclusions regarding the integrated Compton cross-section of low energy gamma-rays from bound electrons. However for gamma-rays of energy higher than 1 MeV the contributions of Compton and photoelectric interactions are comparable and this makes the determination of the integrated Compton scattering cross-section from bound electrons possible.

We have measured the integrated Compton scattering cross-section of Co-60 gamma-rays (1.17 MeV and 1.33 MeV) from K-electrons in tungsten and report the result in this letter. The experimental details are omitted and will be reported elsewhere.

1.17 MeV and 1.33 MeV gamma-rays from about 500 mc. Co-60 source were collimated on

a 1 inch diameter tungsten target and the fluorescent K-radiation emitted as a result of the interaction of gamma-rays with K-electrons were analysed with a NaI (Tl) scintillation spectrometer. As described earlier⁵ the determination of the yield of K-radiation and number of gamma-rays falling on the target, gave a value of 3.1 ± 0.4 Barns for the cross-section of the interaction of Co-60 gamma-rays with K-shell electrons in tungsten. The processes that may contribute to the production of K-radiation are (i) K-shell photoelectric effect, (ii) Compton scattering from K-electrons and (iii) excitation or ionization of the atom by the photo and Compton electrons which are produced in the target as a result of (i) and (ii). Being a second order effect the contribution of (iii) is rather small and can be neglected. The K-shell photoelectric cross-sections for Co-60 gamma-rays are fairly well known to be 2.4 Barns.⁶ Subtracting this from the total cross-section the value of 0.7 ± 0.4 Barns is obtained for the Compton scattering cross-section of Co-60 gamma-rays from K-shell electrons in tungsten. This value when compared with 0.38 Barns⁶ obtained for free and stationary electrons by Klein and Nishina shows that the integrated Compton scattering cross-section of Co-60 gamma-rays from K-shell electrons in tungsten is greater than or at the most equal to that from free and stationary electrons. It may be of interest to perform similar experiments with higher energy gamma-rays to see if for still larger values of momentum transfer the overall Compton scattering cross-section for bound electrons is more than that from free electrons.

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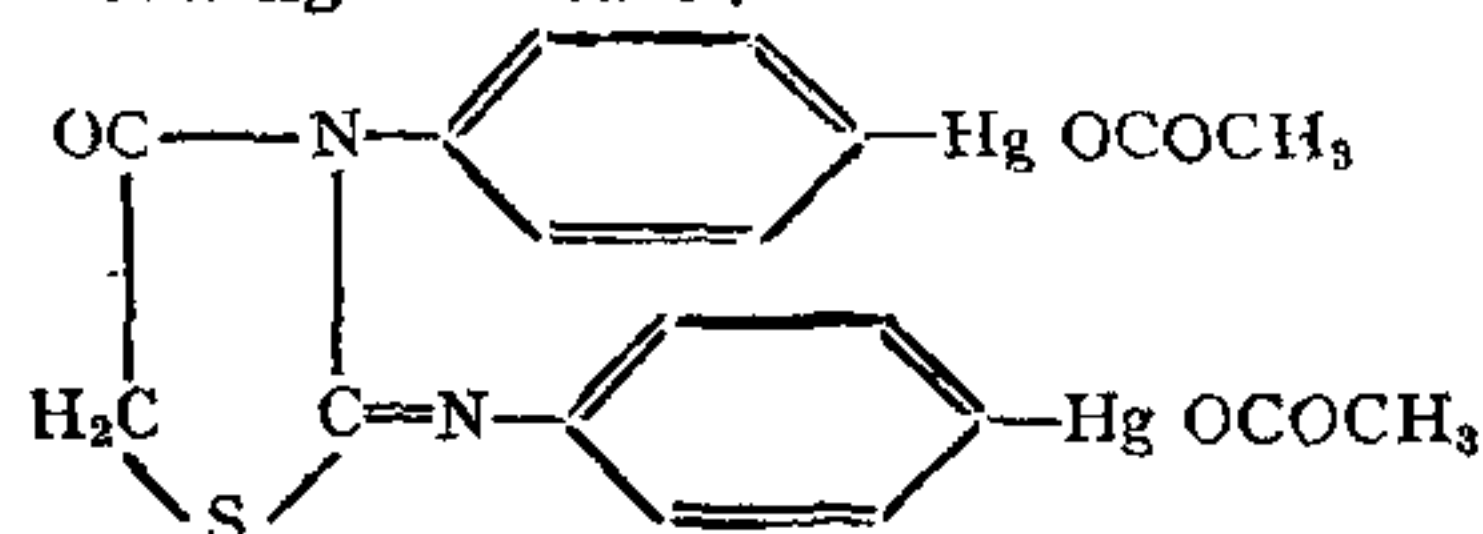
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MERCURATED THIAZOLIDONES AS ANTIFUNGAL AGENTS

DURING our investigations¹ on the chemistry and possible biological applications of 3-aryl-2-aryl-iminothiazolid-4-ones, it appeared of interest to examine their antifungal properties. These compounds have a cyclic ring containing the

grouping N-C-S which is present in many well-known fungicides. The observations of Horsfall and Rich² that carbonyl group in the ring of various heterocycles confers fungitoxicity on the molecule especially if the carbon occurs in the ring further prompted the author to carry on fungicidal assay of some of these compounds. Efforts proved fruitful when some of these compounds were shown to possess fungitoxicity.³ As it has been shown by different workers that the introduction of mercury in organic compounds enhances considerably the toxicity of the parent compounds, a number of mercurated derivatives of the thiazolidones were prepared by the author and it was considered worthwhile to test them for their antifungal action.

Nine 3-aryl-2-aryl-iminothiazolid-4-ones were prepared by the reaction of sym-diaryl-thioureas with monochloroacetic acid in presence of anhydrous sodium acetate by a method reported earlier by the author¹ and were mercurated by treating with mercuric acetate in acetic acid by a modified method already reported.⁴ The 3-acetoxymercuriaryl-2-acetoxymercuriaryl-iminothiazolid-4-ones have been shown to have the following structure:



All these compounds have been tested for their antifungal action by the agar-growth method as recommended by Horsfall.⁵ *Aspergillus niger* was used as the representative mould. The inhibition in growth by the mercurated thiazolidones at different concentrations was determined by comparison with the growth in controls, i.e., untreated Petri dishes.

The organo-mercurials were shown to be highly toxic. The mercurated derivatives of 3-*o*- (*m*-, *p*-) chlorophenyl-2-*o*- (*m*-, *p*-) chlorophenyliminothiazolid-4-ones almost completely inhibited the growth at a dilution of 1:10,000. A number of compounds were highly fungicidal even at a dilution of 1:100,000.

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