on the basis of this difference Fourier synthesis. Instead, the difference map indicated anisotropic vibrations in the light atom positions, particularly C_1. The fractional coordinates and isotropic temperature factors obtained are listed in Table 1 and bond distances are given in Fig. 1.

Discussion

With these parameters C–C = 1·55 ± 0·03 Å and C–N = 1·51 ± 0·03 Å, with the CNC bond angle equal to 114° and all other angles averaging to 109° ± 3°. The C–N distance appears to be somewhat long if it is compared with the 1·48 Å in studies on simpler amines by Atoji & Lipscomb (1951), Jellinek (1958) and Gabe (1961). However, it is comparable to the 1·51 Å which has been obtained in somewhat more complicated molecules for C–N^+ distances. To cite only a few examples one can look at the studies by Senko & Templeton (1960), Kartha, Ahmed & Barnes (1960), Rerat (1960) and Raman, Reddy & Lipscomb (1963). It seems likely that when one is considering all but the very simple molecules, a distinction should be made between C–N^+ distances and C–N distances. A survey of the literature indicates that a pattern of systematically longer distances (about 0·03 Å) is emerging when there is a positive charge in the vicinity of the nitrogen atom.

Hydrogen bonding through $Cl(A) \cdots N \cdots Cl(B)$ is indicated by the distances of 3·16 and 3·21 Å, which are significantly shorter than the corrected van der Waals distance of 3·30 Å given by Pimental & McClellan (1960). All other non-bonding distances are greater than 3·87 Å.

Financial support from the National Institutes of Health (GM-08348-02) is gratefully acknowledged. We also wish to thank Remington Rand Corporation for their generous assistance in the use of the 1103 digital computer.

References

ATOJI, M. & LIPSCOMB, W. N. (1957). *Acta Cryst.* **6**, 770.
DICKERSON, R. E., WHEATLEY, P. J., HOWELL, P. A. & LIPSCOMB, W. N. (1957). *J. Chem. Phys.* **27**, 200.
GABE, E. J. (1961). *Acta Cryst.* **14**, 1296.
JELLINEK, F. (1958). *Acta Cryst.* **11**, 626.
KARTHA, G., AHMED, F. R. & BARNES, W. H. (1960). *Acta Cryst.* **13**, 525.
MEYERS, A. I. (1961). Private communication.
PIMENTAL, G. C. & MCCLELLAN, A. L. (1960). *The Hydrogen Bond.* Freeman.
RAMAN, S., REDDY, J. & LIPSCOMB, W. N. (1963). *Acta Cryst*, **16**, 364.
RERAT, P. C. (1960). *Acta Cryst.* **13**, 459.
SENKO, M. E. & TEMPLETON, D. H. (1960). *Acta Cryst.* **13**, 281.
WASER, J. (1951). *Rev. Sci. Instrum.* **22**, 567.

Notes and News

Announcements and other items of crystallographic interest will be published under this heading at the discretion of the Editorial Board. The notes (in duplicate) should be sent to the General Secretary of the International Union of Crystallography (D. W. Smits, Mathematisch Instituut, University of Groningen, Reitdiepskade 4, Groningen, The Netherlands). Publication of an item in a particular issue cannot be guaranteed unless the draft is received 8 weeks before the date of publication.

International Union of Crystallography

Radiation Hazards Associated with X-ray Diffraction Techniques

In the April issue of this journal an article on the above topic was published under the sponsorship of the Commission on Crystallographic Apparatus of the International Union of Crystallography (*Acta Cryst.* (1963), **16**, 324). Reprints of this article can be obtained from the author, Dr E. G. Steward, Northampton College of Advanced Technology, St. John Street, London, E. C. 1, England, or from the General Secretary of the Union, Dr D. W. Smits, Mathematisch Instituut, University of Groningen, Reitdiepskade 4, Groningen, The Netherlands.