Table 1. Selected interatomic distances and angles for muscovite and muscovite without potassium (*18*).

Atom	Interatomic distance (Å)
Muscovite (Al–OH–H angles, 117° and 119°)	
$H–O_a$	2.94
O_a	2.80
O_a	2.72
O_b	2.94
O_b	2.85
O_b	2.69
Al	2.53
Al	2.53
K	3.74
Muscovite without K (Al–OH–H angles, 128° and 129°)	
$H–O_a$	3.06
O_a	2.84
O_b	2.88
O_c	2.94
O_d	2.40
O_e	2.89
Al	2.64
Al	2.63
(K)	3.23

tation of the transition moment as determined by Vedder and McDonald (*10*).

Gatineau (*13*) and Burnham and Radoslovich (*14*) have reported more accurate refinements of the muscovite structure. The structure described by Gatineau is derived from a least-squares refinement in which Radoslovich's x-ray intensities (*12*) were used. The Burnham and Radoslovich structure contains appreciable amounts of sodium and for this reason was not considered. The same procedure, as described earlier, was used to locate the minimum in electrostatic energy with Gatineau's positional parameters. The hydrogen positional parameters are $x = 0.371$, $y = 0.649$, and $z = 0.065$. The OH bond makes angles of 18° with the cleavage plane and 31° with the *b*-axis in the *a-b* plane and is 2.5° away from the transition moment orientation. Vedder (*15*) has suggested that the difference in orientation between the OH bond and the transition moment should not be more than 3°, an indication that the electrostatic energy approach described here is capable of considerable accuracy. In addition, the difference in the results obtained by use of the Radoslovich structure as opposed to the more accurate Gatineau structure indicates that the minimum in the electrostatic energy is very sensitive to errors in the atomic positional parameters.

Radoslovich (*16*) has suggested that, if the potassium ion were not present in the muscovite structure, the OH bond would make an angle of 60° to 70° with the cleavage plane. This result has been questioned by Farmer and Russell (*17*). For this reason I repeated the calculation of the electrostatic energy as described above (using the Gatineau structure) except that the potassium ion was excluded. The minimum value occurs when the OH bond makes angles of 53° and 30.5°, respectively, with the cleavage plane and the *b*-axis in the *a-b* plane. The positional parameters for the hydrogen are $x = 0.413$, $y = 0.617$, and $z = 0.089$. This result indicates how great is the influence of the interlayer cation on the hydroxyl orientation. Some selected interatomic distances and angles are listed in Table 1 for the hydrogen ion position in normal muscovite and in muscovite without potassium (*18*).

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18. The notation is that used by Radoslovich (*12*) in which the capital letters indicate the nature of the atom (OH = hydroxyl oxygen) and the subscripts distinguish atoms of the same kind that are not related by symmetry. The appearance of the same atom in the list more than once indicates interatomic distances to two or more atoms related by the space group symmetry.
19. I thank Dr. W. Baur for supplying me with a copy of his computer program. Work supported in part by the Research Foundation of the State University of New York and the National Aeronautics and Space Administration.

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Polywater or Sodium Acetate?

Abstract. *Measurements of the infrared spectrum of sodium acetate suggest that high concentrations of this impurity may account for the unique spectrum of anomalous water.*

It has been suggested that the infrared spectrum of anomalous water (*1*) is unique and does not correspond to the spectrum of any known substance (*2*). This conclusion does not appear to be correct since the infrared spectrum of sodium acetate is remarkably similar to that of anomalous water. Electron microprobe examinations (*3*) have indicated the presence of large quantities of sodium impurity in the anomalous water, and Rabideau and Florin (*4*) have reproduced the physical properties ascribed to anomalous water with concentrated salt solutions such as sodium metaborate and sodium tetraborate decahydrate. However, although parts of the infrared

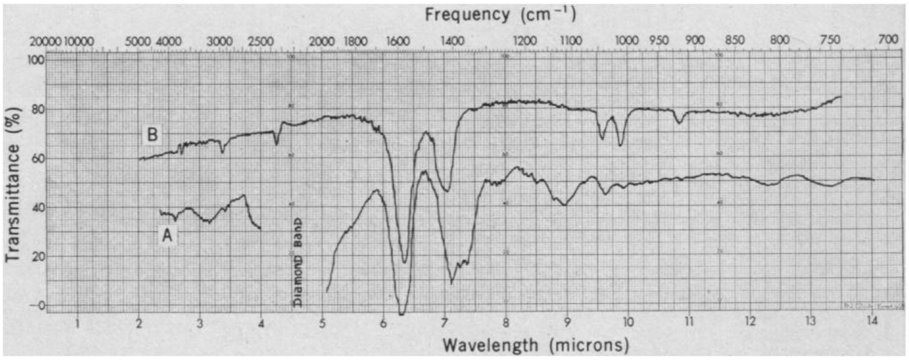

Fig. 1. Infrared spectrum of anomalous water on a diamond platelet (curve A) [reproduced from (*2*)]; infrared spectrum of sodium acetate on a silicon platelet (curve B). The spectrum of sodium acetate was recorded on a standard double-beam spectrometer (Perkin-Elmer model 21). The sample was deposited on the platelet from a methanol solution. The silicon platelet background (not shown) is flat.

spectrum of these salts somewhat resemble that of anomalous water, the spectra contain many additional lines.

Curve A of Fig. 1 reproduces the reported (*2*) infrared spectrum of anomalous water and is equivalent to the spectrum reported by other investigators (*5, 6*). Curve B is the infrared spectrum of sodium acetate. The spectrum of anomalous water is strikingly similar to that of sodium acetate. In particular, strong absorption lines for sodium acetate occur at 1595 and 1410 cm^{-1}, exactly as in the spectrum of anomalous water. In addition, in the sodium acetate spectrum there are weak lines around 1046, 1014, and 925 cm^{-1}, which can also be observed in the anomalous water spectrum. The spectral line for anomalous water that sometimes appears at 1120 cm^{-1} varies from preparation to preparation and has been assigned as a sulfate impurity (*3, 5*). Finally, the additional line at 1365 cm^{-1} probably results from a nitrate impurity, for example, sodium nitrate, which has a single strong line at that frequency (*7*). Thus all the unique characteristics of the infrared spectrum of anomalous water appear to originate from simple impurities, a major component being sodium acetate.

Two processes are suggested to account for the production of sodium acetate. In many laboratories it is common practice to wash tubing, capillaries, dishes, and desiccators with ethyl alcohol. The oxidation of ethyl alcohol produces acetic acid which reacts with the sodium-rich, highly absorptive glass surface to produce sodium acetate. Sodium acetate is also produced in the vicinity of acetylene-oxygen flames, which are used to draw capillaries and to flame tools and containers. Acetic acid is produced from acetylene in the presence of water and oxygen, both of which are readily available.

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Carbon Monoxide: Association of Community Air Pollution with Mortality

Abstract. *Regression analysis of daily mortality in Los Angeles County shows that there is a significant association between community carbon monoxide concentrations and mortality. Cyclic variation and maximum temperature were the main contributors. No association was demonstrated between oxidant and mortality.*

Acute carbon monoxide poisoning claims more than 1000 lives each year in the United States. Exposures to lower concentrations, on the order of 50 parts per million (ppm), may result in temporary impairment of judgment and motor performance but are not known to produce any serious or long-lasting impairment (*1*). Cohen *et al.* have reported elsewhere a possible effect of exposures to community carbon monoxide on case fatality rates for myocardial infarction (*2*). We report here statistical evidence that carbon monoxide, when present in the ambient atmosphere at concentrations of the order of those that occur in Los Angeles, is associated with increased mortality.

Our data consist of the total number of deaths occurring in Los Angeles County for each day from 1 January 1962 through 31 December 1965, together with temperature, carbon monoxide, and total oxidant measurements for each day from 26 December 1961 through 31 December 1965. Temperature measurements are the maximum temperatures for downtown Los Angeles as published by the U.S. Weather Bureau. Carbon monoxide and oxidant concentrations are basin averages (arithmetic mean of all measurements at all monitoring stations in the Los Angeles Air Pollution Control District during each 24-hour period).

An arbitrary numbering sequence was established, with each day numbered consecutively starting with day 1 for 1 January 1962 to day 1461 for 31 December 1965. This gave us a total of five variables for input: total number of deaths, day number ("day of occurrence"), maximum temperature, basin averages for carbon monoxide concentration, and basin averages for oxidant concentration, for each day in the study period, with environmental data for the week preceding the study period.

A number of factors entered into our choice of analytic method. Mortality follows a cyclic pattern, with mortality maxima occurring in winter (*3, 4*) (Fig. 1). Many environmental factors, such as temperature and levels of air pollution, also occur in a cyclic pattern with similar periodicity. Temperature is an important factor and would tend to mask the relatively small contribution expected for air pollutants (*5*). In Los Angeles, there is a secular trend both for total mortality and for carbon monoxide concentration. Substantial correlations exist among environmental variables. The effect of some environmental variables might be delayed by hours or days, so that the possibility of lag effects must be considered. A further consideration is that we wanted a model that could be adapted for surveillance on a real-time basis. For these reasons we chose multiple regression, because this one formulation will simultaneously identify significant variables, estimate the contribution and relative importance of each, and provide an estimate of the expected number of deaths under specified conditions.

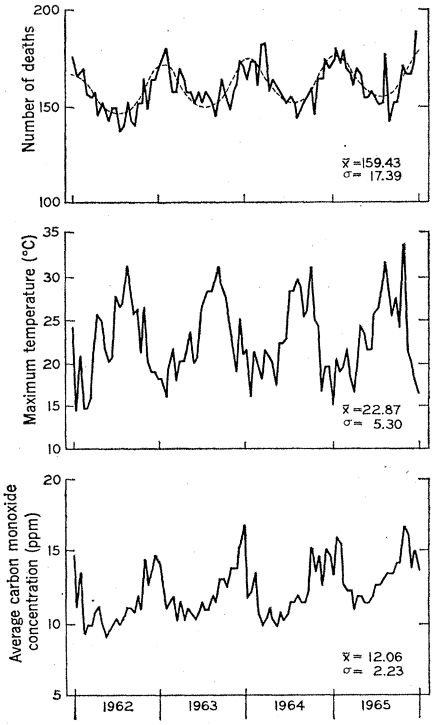

Fig. 1. Mortality, temperature, and carbon monoxide concentrations in Los Angeles, 1962–1965. Points plotted are the medians of 15-day intervals. The dashed line is the mortality predicted by the model with trend and cyclic variation terms. σ, Standard deviation; $\overline{X}$, mean.