Reply to Axelrod et al.

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It is believed (Thompson, 1973) that Junge used the Saltzman method of analysis. Levaggi et al. (1973) reports that the ratio of the Jacob-Hochheiser (J.-H.) to automated Saltzman (J.-H./Saltzman) is between 2 and 3. EPA states that the J.-H. results for the Island of Hawaii should be lowered by 1/2 to 1/3 (Thompson, 1973). In comparing the arsenite method with the J.-H. method, EPA shows a J.-H./arsenite ratio of 2.0 for the five lowest concentrations reported (Federal Register, 1973). They also report a ratio of 2.0 for J.-H./arsenite data taken on the Island of Hawaii (Thompson, 1973). Furthermore, the Department of Health, State of Hawaii recorded a 1973 NO_2 average for Hilo of 29 $\mu g/M^3$ using the J.-H. method, and a value of 17 $\mu g/M^3$ for the first quarter of 1975 using the arsenite method; giving a J.-H./arsenite ratio of 1.7. All of this seems to indicate that for Hawaii Island concentrations the J.-H. values should be lowered by about a factor of 2. A change of collection efficiency from 35% to 100% would be a factor of 2.86, but even if they were lowered by a factor of 3, they would still be higher than that reported by Junge (1956), by a factor of 3 to 5.

As there are no local NO sources (the volcano is not a source of NO nor NO_2), and since the NO–NO_2 conversion has a half-life of approximately 17 minutes (Davis et al., 1974), the positive interference exhibited by NO to the J.-H. method should not be a factor in these measurements.

Junge (1956) states that his values are "minimum values", the NCAR data appears to vary from approximately Junge's values to considerably below those values. As all other methods of analysis in Hawaii have yielded considerably higher values, I would withhold judgment on the NCAR data until further data is available on it, similar to the data available on the arsenite and other methods (Federal Register, 1973; Baumgardner et al., 1975).

It should also be noted that Galbally (1975) reports that anthropogenic nitrogen oxide emissions increased 60% between 1960 and 1970, that they are now comparable in magnitude with the upper limit estimate for natural sources, and that an equivalent or larger increase can be expected during the current decade.

Thus, I still believe the Hawaii Island data does show a finite increase over that reported by Junge almost 20 years ago. As to whether it reflects an increase in background or sporadic transport from the Far East is still undetermined (Goldman, 1975).

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