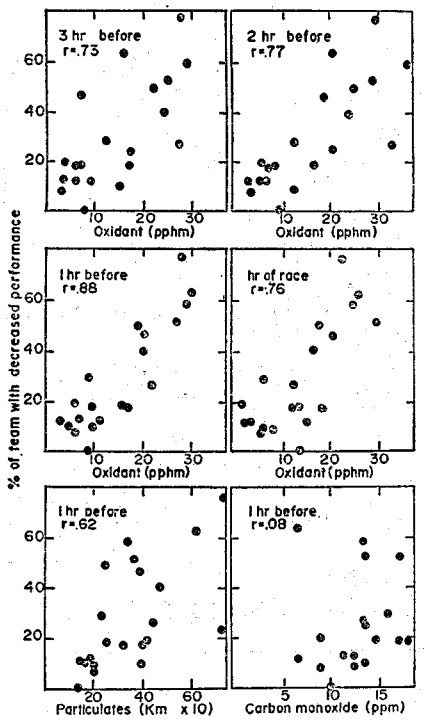
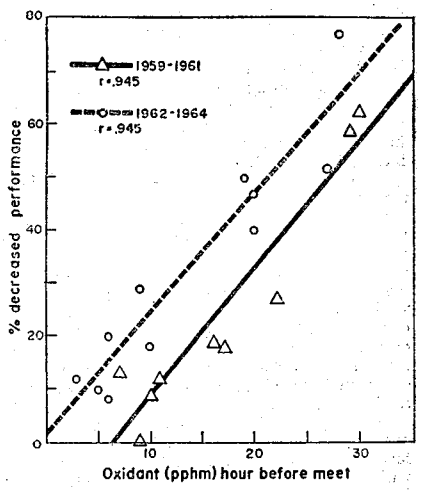


2. Correlations between selected pollutant levels and the percent of team members whose performance decreased compared to that in the previous home meet (pphm signifies parts per hundred million).



3. Oxidant level in the hour before the meet by percent of team members with decreased performance.

in individuals on the team could be responsible.

Comment

Because improvement in performance is somewhat easier to accomplish early in the season, a tendency for the days with high pollution to come late in the season could produce a spurious positive correlation. Days with high pollution, however, appear to be scattered randomly throughout the two-month cross-country running season in each of the six years. For example, in 1962 the worst pollution was during the first meet, whereas in 1963 the highest level was reached in the sixth meet. Furthermore, the average pollution level for meets held in the first half of the season is almost identical to the average for the last half. A bias also might result if the opposing team were the same on days of similar pollution; however, this was not the case.

An attempt to identify individual runners who were particularly susceptible to the effects of air pollution was unsuccessful. Careful examination of the team roster for each year indicated that none of the boys were consistently affected when they ran on heavily polluted days. Nor was there any tendency for the runners whose performance decreased to come from any particular school grade; seniors were affected as often as sophomores. Actually, this finding is not surprising since a boy whose performance drops at one meet may be strongly motivated to do well in succeeding meets. Also, any boy who showed frequent decreases in performance would hardly be desirable on a competitive team.

If the observed marked association of oxidant levels were for less specific measures of pollution, such as *daily* averages, then an explanation other than that oxidants were directly causal might be plausible. For example, other variables such as day of the week might be related to both performance and air pollution. Our results, however, indicate that the relationship is apparently limited to the oxidant level in the hour before the race. This specificity to a biologically meaningful time and the extremely high correlation ($r = 0.95$) are convincing evidence that some component of the air which is measured as oxidant has a causal effect on team performance. That a long-range, chronic effect of air pollution is not also operative can not be inferred, since the study was designed to detect immediate effects only.

The level of oxidant in the air reflects the con-