

centration of a number of specific compounds including ozone. The exact mechanism by which one or several of these components affects performance is not clear. Smith<sup>1</sup> claims that athletes require more oxygen during exercise when they breathe air polluted with one of the oxidant components, peroxyacetyl nitrate (PAN). His observed difference in oxygen consumption, however, is small (2.3% increase). In addition, his failure to describe adequately the experimental design and statistics used makes the results essentially uninterpretable.

Ozone at levels several times higher than those usually reached in Los Angeles seems to have some effect on pulmonary function.<sup>2,3</sup> That breathing some of the oxidant compounds might cause an increase in airway resistance and hence an increase in work of breathing is not unreasonable. Maximal exertion in healthy boys, especially at sea level, however, is not limited by ventilation or work of breathing.<sup>4</sup> Thus, it seems unlikely that the observed effect of oxidants on performance is due to decreased availability of oxygen.

Oxidizing pollution is definitely irritating to the eyes, and athletes often complain of chest discomfort after exercising in the Los Angeles area on days with high pollution. Thus, the observed effects may be more related to lack of maximal effort due to increasing discomfort than directly to physiologic capability.

Determination of exactly how oxidants affect performance in these athletes is of great importance. For example, the relevance of these results to patients with borderline cardiac competence or chron-

ic lung disease is completely different if the effect is directly on physiologic mechanisms such as ventilatory capacity rather than secondarily through an effect on motivation. Careful studies of pulmonary function and oxygen debt incurred during a race might help clarify the issue. Analyses of other types of athletic events requiring less ventilation and less aerobic metabolism are also needed.

Our results should not be interpreted as representing an effect of air pollution in general, since a predominately oxidizing type of pollution is not present in most cities. Repetition of the study is necessary in situations where oxidant pollution is not present. Care should be taken to be sure that oxidants are really nonexistent, however, as high levels of common pollutants such as sulfur dioxide can interfere with the usual tests for oxidants and give a false zero level.<sup>5</sup>

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Jack Bradford provided the athletic data.

#### References

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3. Young, W.A., et al.: Effect of Low Concentrations of Ozone on Pulmonary Function in Man, *J Appl Physiol* 19:765-768 (July) 1964.
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#### Fee Increased

#### Radiology Board Sets Written Examination

The following change in policy and procedures of the American Board of Radiology was received too late for inclusion in the Nov 21, 1966, Education Number of THE JOURNAL. It is published here for the attention of all physicians concerned with specialty certification by the American Board of Radiology.

The American Board of Radiology wishes to announce the institution of a written examination to be given for the first time during the latter half of June 1968. This is to be given in various centers over the country, and all residents having completed three years of approved training as of June 30, 1968, will be eligible to take the examination. Passing of the written examination will be a prerequisite to taking the oral examination. The fourth year of further training or practice presently required will still be mandatory.

Applications for the written examination or either of the oral examinations (June or December) in any given year must be filed before Jan 1 of the year in which the examination is given.

The present examination fee of \$150 will, as of July 1, 1967, be increased to \$200. This fee, however, will cover both the written and oral examinations where both are required. Candidates eligible for the oral examinations in June 1968 will not be required to take the written examination. All reexamination fees will be increased from \$75 to \$100 as of the above date.

The December 1967 examination will be held at the Statler Hilton Hotel, Dallas, Dec 4-8, inclusive; the deadline for filing applications is June 30, 1967.

The June 1968 examination will be held at the Fontainebleau Hotel, Miami Beach, Fla, June 10-14, inclusive; the deadline date for filing applications is Dec 31, 1967. Deadline for filing for the written examination in June 1968 or the oral examination in December 1968 is Dec 31, 1967.