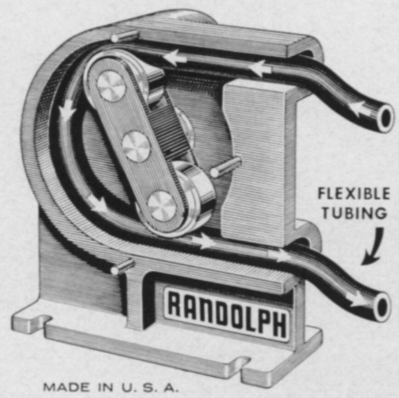

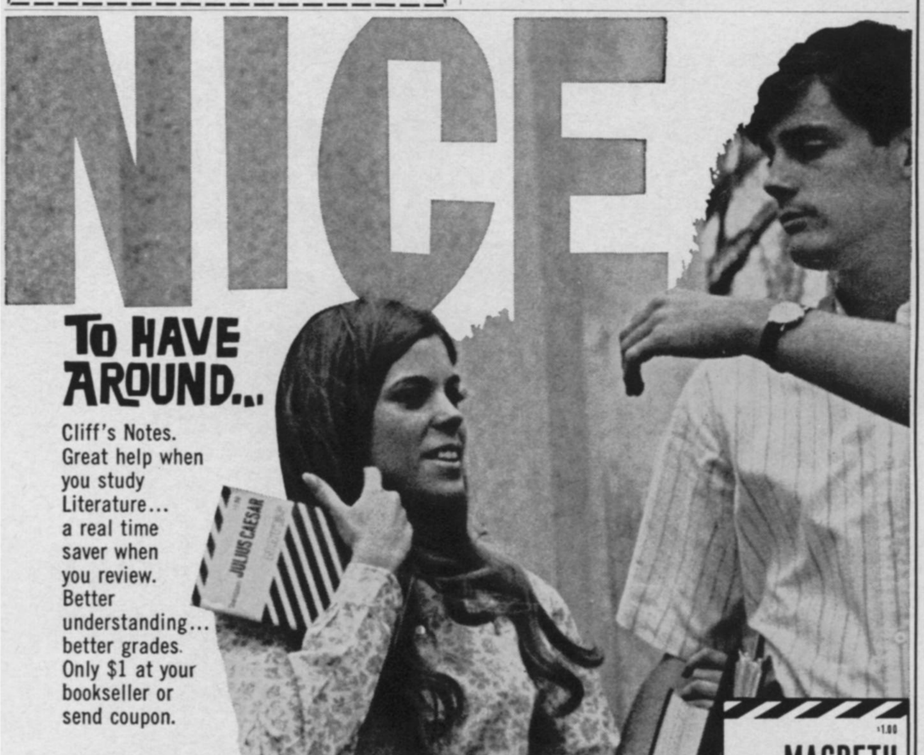

LETTERS

to the editor

Hijacking prevention

Sir:

Your article describing the new Lockheed device which promises to detect metal objects carried by passengers boarding planes (SN: 8/31, p. 204) was very well done.

If this can be perfected so that only objects the size of guns will trigger the alarm system, then we will have gone another step toward better control of the situation.

Certainly the casual and business passenger, as well as the crew of each plane, deserve such protection if it can be provided.

I am glad that you are following developments in this matter through the pages of SCIENCE NEWS.

(Senator) Warren G. Magnuson
Washington, D.C.

No four-color solution

Sir:

The brief account concerning the four color problem (SN: 7/27, p. 89) may leave your readers with the impression that this famous problem has been solved. This is not the case. The paper by Gerhard Ringel and J. W. T. Youngs: Solution of the Heawood Map-coloring Problem, PROC. NAT. ACAD. SCI., vol. 60 (1968) pp. 438-445, concerns the Heawood conjecture, not the four color problem.

Heawood proved in 1890 that any map on an orientable surface of genus p, $p > 0$, (that is, a sphere with p handles) can be colored using at most $H_p = [\frac{1}{2}(7+\sqrt{1+48p})]$ colors, where the square brackets represent the greatest integer function. In particular, seven colors are sufficient for any map on the torus ($p=1$). Heawood described a map on the torus consisting of seven countries, each having a portion of its boundary in common with every other country. This map therefore required seven colors. The possibility was still open that for some particular $p > 1$, every map on a surface of genus p could be colored with fewer than H_p colors.

That this was not a trivial problem was shown by the fact that a similar formula for non-orientable surfaces gave the number seven for the Klein bottle, while in fact it can be proved that every map on the Klein bottle can be colored with six colors.

Ringel and Youngs have proved that for every $p > 0$, there exists a map on the orientable surface of genus p having