BULLETIN OF THE
AMERICAN MATHEMATICAL SOCIETY
Volume 83, Number 5, September 1977

BOOK REVIEWS

Knots and links, by Dale Rolfsen, Publish or Perish, Inc., Berkeley, California, 439 pp., $15.00

I have a friend whom I do not see very often these days. When we manage to get together, we talk for hours. The conversation is sometimes relaxed, sometimes animated and rarely formal. My friend, I admit, carries most of the conversational burden, telling me the latest gossip and retelling old stories we both know but enjoy. He doesn't tell me where he picks up his news, and credit for some exploits is undoubtedly attributed on occasion to the wrong people. Sometimes when he says something clever and no one else is mentioned, I figure his mind is the source. He's charming and I never fail to count the hours with him well spent.

So it is with this book. It is charming and the most enjoyable mathematics book I have ever read. It is also a scholarly disaster. Ideas and theorems are usually unreferenced, leaving the unsophisticated reader to either assume the author as progenitor or categorize the result as not important enough for attribution (neither alternative will please the individual who first proved the theorem or introduced the idea). Occasionally, the author has selected the second person to prove a theorem as his reference; this is even more reprehensible, as we know how much easier it is to prove a known theorem than to do it first. For example this is the case in his failure to cite Mazur [**6**], [7] in a discussion of the generalized Schönflies theorem. The effect of these shortcomings is considerable. Just two other examples (selected from many) may suffice to give a flavor of the casual style, and demonstrate the author's sloppy approach to this aspect of scholarship.

On p. 116 in the proof of the asphericity of knots in S^3, the author says, "By a theorem of Whitehead, then, . . . ". He does not say which Whitehead, much less which theorem or where to find it.

On p. 105, Remark 8 gives a certain reference, reproduced as follows in its entirety" . . . Martin Gardner's Mathematical Recreations column in the Scientific American."

These considerations aside, let us consider what knot theory is about. Classical knot theory is concerned with the study of embeddings, or placements of a circle in 3-space (or its one point compactification, S^3).

Popular generalizations of this (aCparently) simple situation are to placements of several circles (links) in 3-space, to placements of one or more circles in a 3-manifold, and to the embeddings of higher dimensional spheres in still higher dimensional spaces.

Suppose we assume (as the author does) that the embeddings in question are tame. This means that the embedded sphere, or knot is a subcomplex of some triangulation of the space in which it is embedded. In the classical case this simply means the knot is polygonal.

The fundamental problem in knot theory is that of distinguishing knots.