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Classical and modern topology. Topological phenomena in real world physics.

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This article is divided into two quite distinct and independent sections, with the titles as indicated in the heading. The first section is a history of topology emphasizing the developments of the last half of the twentieth century. The author here laments the lack of complete published proofs of many results considered to be true by topologists, as well as the lack of any uniform presentation of the results obtained during that 50-year period. He points out some particular informational messes created during the 1970s. He concludes with the following interesting observation on the relationship between physicists and mathematicians: “Let me point out that the physics community did not create any informational mess in topology. According to their training tradition, theoretical work produces conjectures which should be proved only by some kind of experiment. Starting to do beautiful nonrigorous mathematics, they do not claim that they ‘proved’ something. They are saying that they ‘predicted this fact’. In the case of pure mathematics, the final proof done by pure mathematicians these people may treat as an ‘experimental confirmation’.” That is, some forms of pure mathematics may really be experimental physics!

The second section of the paper is a discussion of the author’s work on the boundary between topology and physics. He emphasizes the mathematical aspects, which often get lost among all the physics jargon. He also includes some thoughts about current and future directions and open problems.

{For the entire collection see MR1821864 (2001m:00020)}

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Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.

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