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ON 3-MANIFOLDS WITH SUFFICIENTLY LARGE DECOMPOSITIONS*: CORRIGENDUM

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I would like to thank G. A. Swarup for pointing out that our proof in the above paper does not yield the theorem as stated, but rather gives the following.

THEOREM. *Let M, N be compact, orientable, boundary irreducible 3-manifolds. Suppose that ∂M, ∂N contain no 2-spheres. Suppose that M has sufficiently large decomposition,*

$$M \approx M_1 \# M_2 \# \ldots \# M_n.$$

If there exists an isomorphism $\psi : \pi_1(M) \to \pi_1(N)$ which respects the peripheral structure, then N has a decomposition $N \approx N_1 \# \ldots \# N_n \# H$, where $N_i \approx M_i$ and H is a homotopy 3-sphere.

The original theorem follows from this only if we assume in addition that (at least) $n - 1$ of the summands of M admit orientation reversing homeomorphisms (or if $n - 1$ summands of M are non-orientable and satisfy the conditions of Remark 1).

In general the original theorem is false: Let F_1, F_2 be irreducible, closed, orientable, and sufficiently large Seifert fiber spaces such that $\pi_1(F_1) \not\cong \pi_1(F_2)$ and F_1, F_2 do not admit orientation reversing homeomorphisms. (F_i exists, e.g., $F_i = (0, \text{o}; p|b_i; \alpha_{i1}, \beta_{i1}; \ldots ; \alpha_{ir_i}, \beta_{ir_i})$ with $p \geqq 2$, $b_i \neq -r_i - b_i$. Then (see [**2**]) F_i admits no orientation reversing fiber preserving homeomorphisms and therefore, by Walhausen's result [**1**], no orientation reversing homeomorphisms.) Let M and N be the two possible connected sums of F_1 and F_2. Then $\pi_1(M) \cong \pi_1(N)$, but $M \not\approx N$.

REFERENCES

1. F. Waldhausen, *Eine Klasse von 3-dimensionalen Mannigfaltigkeiten. II*, Invent. Math. *4* (1967), 87–117.

2. H. Seifert, *Topologie 3-dimensionaler gefaserter Raume*, Acta Math. *60* (1933), 147–238.

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