Dear Joan —

Got your letter — it must have been a nice trip you had, although perhaps hot this time of year. Your new work sounds fantastic! It does indeed seem to be just right for the special Heegaard maps. It would be amazing if it gave a presentation for $\mathcal{I}_g$! I've also got re-interested in the (finite) generation of $\mathcal{I}_g$ problem, and looked at the stuff we did for a while, but ran into some problems which seemed tough, so I've abandoned it for now. Instead I have a different approach which may work to give a minimal set of $\mathcal{W}_1$ type generators (that is, opposite twists on a bounding pair of genus 1). It was going along quite well at first, but I just ran into something which is surprising and disturbing: let $\mathcal{I}_{1,2}$ be the $\mathcal{I}$-subgroup of $\mathcal{M}_{1,2}$ (torus with 2 punctures); $\mathcal{I}_{1,1}$ is trivial and by a theorem in your book $\ker(\mathcal{M}_{1,2} \to \mathcal{M}_{1,1})$ is a free group on 2 gens: F_2 (or close to it). Then can show $\mathcal{I}_{1,2}$ = its commutator subgroup F_2' which is not F.G.! I'm not sure about $\mathcal{I}_{g,2}$ for $g \geq 2$, but it seems likely that it is also not F.G. Now $\mathcal{I}_{g,n}$ for $n \geq 2$ might be quite different from $n = 0$ or 1, however. Using the same theorem can show that $\mathcal{I}_{g,1}$ is F.G. iff $\mathcal{I}_{g,0}$ is. My idea applies to $\mathcal{I}_{g,1}$, but the $\mathcal{I}_{,2}$ example is sufficiently related to make me wonder. I actually have a candidate set of generators, but to show they work I need to see that certain relations occur in $\mathcal{I}_{1,3}$, and since this is not F.G., it may not go through. At any rate the study should be enlightening.

Here, finally, is the paper on torsion of maps in $\mathcal{I}$ that I haven't written for so long. I decided to extract this material out of the Magnus matrix rep. setting & present it in the way I originally found it — it makes the whole paper much more self contained and easier to read. The torsion, along with the "bar calculus" of my last paper (the one on your homomorphisms) is really a useful tool for suggesting relations in $\mathcal{I}$ — I've found a number of such that I would never have found without their help.

I got a letter from M. Kato from Tokyo U. asking for a preprint of "Intersection Invariants on Surfaces". Apparently you mentioned it there, but does he know what an incomplete state it is in? Should I send him the same very rough draft which I sent you, or wait until it is written up? It may take some time to do the latter — there are so many other things to do first, it seems, viz:

a) I found a very nice geometric interpretation of the torsion in terms of the Jacobi variety of the surface. In fact, the Jacobi variety gives a new way of looking at maps in $\mathcal{I}$ which could be very useful. I will probably work on this next.

b) On looking over your paper on the ρ-homomorphisms, I was struck by the statement that their seemed to be no "regularity" in the value of μ (mod 8) for Z_2-homology spheres. However, using the basic properties of the ρ's I can show immediately that μ mod 4 depends only on the symplectic double coset of the gluing map. This easy proof is not computationally effective however, so I set to work to get an actual formula in terms of the Sp-matrix itself, and I finally got one, an interesting one involving the Seifert linking invariants etc. In the process, I found some interesting ways of representing double cosets which might be of use to you in your classification of double coset problem.

Got a letter from Hilden inviting me to the April conference in Hawaii. Are you going? I hope I can make it; things are tighter here now. Send word on your latest progress —

Dennis