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**Colin McLarty\*** ([colin.mclarty@case.edu](mailto:colin.mclarty@case.edu)), Case Western Reserve University, Philosophy and Mathematics, Cleveland, OH 44106. *Grothendieck's cohomology founded on finite order arithmetic.*

Despite rumors to the contrary, Grothendieck and others published proofs using Grothendieck universes, which are sets so large that ZF does not prove they exist. Number theorists to this day cite those published proofs. More conservative references avoid universes but still use far stronger set theory than the number theory requires, such as large amounts of replacement. We describe the issues and show how to formalize the entire Grothendieck apparatus at the strength of finite order arithmetic (simple type theory with infinity) and describes progress towards yet weaker foundations. (Received September 18, 2012)