1125-01-861 **Eric Barkan** (ebarkan@jps.net), 98 Gazania Court, Novato, CA 94945, and **David Sklar*** (dsklar@sfsu.edu), Department of Mathematics, San Francisco State University, 1600 Holloway, San Francisco, CA 94132. *Riemann, Siegel, and a Translation of Siegel's 1932 paper "Uber Riemanns Nachlass zur analytischen Zahlentheorie".* Preliminary report.

Riemann published one paper in number theory. In this 1859 paper he obtained an explicit formula for the prime counting function, revealed the deep connection between the distribution of primes and the zeros of the zeta function, and stated the Riemann hypothesis.

An unpublished asymptotic expansion of the zeta function was discovered in Riemann's private notes by Carl Ludwig Siegel, and published in his 1932 paper "Uber Riemann's Nachlass zur analytischen Zahlentheorie". This expansion, now called the Riemann-Siegel formula, remains our primary tool for numerical investigation of the zeta function. Siegel's paper showed that, in analytic number theory, Riemann was seventy years ahead of his time.

Hoping to learn what Siegel found in Riemann, what he added, and how he worked his way through Riemann's fragmented papers; we decided to look at Siegel's paper. Although this historic paper is widely cited we were unable to locate an English translation. Despite our limited knowledge of German, we have produced a translation of the paper as it appears in Siegel's collected works. We are currently working on an annotated version.

In this talk we discuss some of what we learned and didn't learn about the Riemann-Siegel collaboration.

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