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Letter to Harold Davenport from Paul Erdos

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Budapest, 26. VI. 1934.

Dear Mr Davenport,

Excuse me for my long silence, but I was fully occupied with my examinations. At last I had my final examination on the 23. inst. and so I am completely and definitively free. My promotion will take place on 3. VII.

In one of my previous letters I proved that the number of integers until n^2 , that are the product of two factors $< n$ is $o(n^2)$. My prove had unnecessary complications. In its new form it runs as follows.

Let $z = xy$; $x < n$; $y < n$.

We assume two different cases.

1. At least one ~~one~~ of the factors e.g. x has less than $\frac{2}{3} \log \log n$ prime factors. In this case we get for z , $o(n^2)$ integers, for x may take only $o(n)$ different values.
2. Both x and y have more than $\frac{2}{3} \log \log n$ prime-factors. ^{In this case z has more than $\frac{4}{3} \log \log n$ prime factors} Thus in consequence of the Hardy-Ramanujan theorem, we get for z also here $o(n^2)$ integers.

In connection with this Privatdocent Dr L Kalmár/Szeged/ enounced. The conjecture that the number of integers until n^2 that are the product of two integers $< n$ is $C \frac{n^2}{\log n} + O\left(\frac{n^2}{(\log n)^2}\right)$

Presently I am concerned with the conjecture that almost all all integers have two divisors d_1 and d_2 so that $d_1 < d_2 < 2d_1$, but till now without any result.

I should be very glad to know how you are and what are your projects for the sommer.

Waiting for your kind answer, I am very sincerely Yours

P. Erdős