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230 Washington Ave,
Brooklyn, N.Y.
August 12th 1897.

Prof. Felix Klein,
University of Göttingen, Germany.
My dear Prof. Klein,

In thinking over
my sojourn in Europe, the pleasant
spring weather, the walk on the
Wall, the University without it,
the hallway and rooms lined with
books and models come often to mind.
With these come memories of busy
students, faces of kindly instructors,
and inspiring fragments from masterly
and suggestive lectures. All these and
more make me look back with
pleasure upon Göttingen and prompt me
to send you a little of the fruit of
labors stimulated by your teaching.

While attending your lectures upon
applied mechanics I became much in-
terested in the discussion of "three bar"

denne nun, dass man mit
 p_1 zusammensetzen. Man heftet nun p_1 an m_1 , m_1 an m_2
 m_2 an m_3 , schliesslich m_3 an p_1 ; dann hat man den
gewünschten Mechanismus, wenn die Linie A B irgend eine Strecke
der Ebene m_2 ist. Die möglichen Mechanismen dieser Art mit der

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"motion," and the curves drawn by such mechanisms. You will remember I drew some of the curves. Since then my work at Princeton University has again brought me into contact with mechanical problems. I was thus led to take up the study of mechanisms this spring.

My work this summer during the vacation has been to construct models of ruled surfaces whose sections by planes parallel to a given one are the curves drawn by mechanisms. The principle upon which they are constructed is as follows: If a line AB of length l move continuously in a plane p_1 , the points A and B will describe curves C_1 and C_2 respectively. Project orthogonally C_2 upon a plane p_2 parallel to p_1 , and distant from it. Points of C_1 and C_2 correspond when they are the extremes of AB for one of its positions. Join the points of C_1 with the corresponding points of

C_2 (in p_2) and we obtain a ruled surface. Any plane passed parallel to p_1 , and distant d from it cuts the surface in a curve which projected upon p_1 is the same as that generated by the point of AB distant d from A .

For moving the line AB over the plane p_1 , I have made use of the following mechanisms. When one plane is attached to another (lying parallel and near to it) so that they have a point in common, but are free to turn about that point I denote the attachment by "1." When they have a line in common and may slide along that line, the attachment is denoted by "2." In machine construction "1" is a pivot, crank, or wheel and "2" a piece sliding in straight guides. Consider now that we have three planes coincident with p_1 and denote them by m_1, m_2

m_1 zusammenfallen. Man heftet nun p_1 an m_1 , m_1 an m_2 an m_3 , schliesslich m_3 an p_1 ; dann hat man den gewünschten Mechanismus, wenn die Linie AB irgend eine Strecke der Ebene m_2 ist. Die möglichen Mechanismen dieser Art mit der

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m_3 to p_1 , attach m_1 ; to m_1 , attach m_2 ; to m_2 attach m_3 and attach m_3 to p_1 ; then we have the mechanisms considered, the line AB being any line of the plane m_2 . The possible mechanisms of this kind with the cases under each are as follows:

Type	1111	Cases	86	Three bar motion connecting rod.
	1112		14	
	1121		10	
	1122		1	
	1212		5	
	1221		2	
	2112		2	Elliptograph, trammel
No. degrees of freedom	1222	{	2	equivalent to attachment "2".
	2122			
Attachments in order above given.				

I have made twenty-five of these models, by means of thread held on a wooden frame, which I expect to exhibit at Toronto next month. I think you might be interested in seeing some of them I have drawn.

slicated five which I take the liberty of sending you by express. I hope you will accept them. Enclose herewith, explanatory drawings and directions for assembling the models. My kindest regards to Prof. Hil-

bert and Dr. Sommerfeld.

With grateful remembrance of many favors received at your hand I remain

Sincerely

E. M. Blake.

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