DISCUSSION ON "COMMUTATING-POLE DIRECT-CURRENT RAILWAY MOTORS", AT NIAGARA FALLS, N. Y., JUNE 27, 1907

Gano Dunn: I see a tendency to hail the commutating-pole motor as the direct-current motor of the future. I heartily appreciate Mr. Anderson's paper, and the facts it brings out with which I am in substantial agreement; but I think it illustrates that we are liable to fads, and that the great success that has attended the introduction of the commutating pole so far has led some of us to attach to it too much importance. I regard the commutating-pole motor as applicable to certain classes of machines or conditions of design, such as low voltage, very large size, very high speed. These are found in direct-current turbo-generators, variable-speed motors, such as are known as field-weakening motors, railway motors where the space is crowded—in short, all machines where the commutating limit of capacity is reached before the heating limit. There still remain other classes of machines where none of these conditions applies. We have not yet exhausted our ingenuity in designing motors, so perhaps we may soon be able to equal in weight, cost, and efficiency, the commutating-pole motors, and without their complication.

It should be borne in mind that the commutating pole adds considerable complication. One of the principal advantages of direct-current motors in the past has been their simplicity, and simplicity is of first importance in electrical design.

It may be said that in a four-pole motor we need add only two commutating poles, and we may modify in one way or another the general type of the commutating-pole motor to make it more simple; but, when all has been said and done, we have a motor that has several more poles and considerable additional complication in its windings and connections.

J. C. Lincoln: Have these 1200-volt motors ever been used in practice?

E. H. Anderson: I do not know that there are any 1200-volt motors in this country in railway service. There are some contracts, however, which have been taken, and motors are building for 1200 volts. These motors have been tested on testing stands as high as 1800 volts for commutation.

W. N. Smith: Does the commutator require any more room, any more air-space around it, than with the older type of motor in order to prevent flashing-over to the frame in actual service.

E. H. Anderson: On the 600-volt motor there is usually about 1.25 in. flashing distance, and on some motors as low as 0.5 in. Dirt, copper, and carbon dust affect the flashing distance very materially. If we have a commutator which runs very much cleaner, does not have the copper and carbon dust, we do not need as much flashing distance. However, in order

to improve in that direction, $1\frac{3}{8}$ or $1\frac{1}{2}$ in. creeping distances are allowed on 600-volt motors and 2 to $2\frac{1}{2}$ in. on 1200 volts. The commutator does not need to be as long on 1200 volts as on 600 volts, because of less current to be carried.