Clear as Huyghen's principle appeared to himself, it was, after some time, attacked by the Abbé Catelan, a zealous Cartesian. Catelan also put forth principles which he conceived were evident, and deduced from them conclusions contradictory to those of Huyghens. His principles, now that we know them to be false, appear to us very gratuitous. They are these; "that in a compound pendulum, the sum of the velocities of the component weights is equal to the sum of the velocities which they would have acquired if they had been detached pendulums;" and "that the time of the vibration of a compound pendulum is an arithmetic mean between the times of the vibrations of the weights, moving as detached pendulums." Huyghens easily showed that these suppositions would make the centre of gravity ascend to a greater height than that from which it fell; and after some time, James Bernoulli stept into the arena, and ranged himself on the side of Huyghens. As the discussion thus proceeded, it began to be seen that the question really was, in what manner the Third Law of Motion was to be extended to cases of indirect action; whether by distributing the action and reaction according to statical principles, or in some other way. "I propose it to the consideration of mathematicians," says Bernoulli in 1686, "what law of the communication of velocity is observed by bodies in motion, which are sustained at one extremity by a fixed fulcrum, and at the other by a body also moving, but more slowly. Is the excess of velocity which must be communicated from the one body to the other to be distributed in the same proportion in which a load supported on the lever would be distributed?" He adds, that if this question be answered in the affirmative, Huyghens will be found to be in error; but this is a mistake. The principle, that the action and reaction of bodies thus moving are to be distributed according to the rules of the lever, is true; but Bernoulli mistook, in estimating this action and reaction by the *velocity* acquired at any moment; instead of taking, as he should have done, the *increment* of velocity which gravity tended to impress in the next instant. This was shown by the Marquis de l'Hôpital; who adds, with justice, "I conceive that I have thus fully answered the call of Bernoulli, when he says, I propose it to the consideration of mathematicians, &c."

We may, from this time, consider as known, but not as fully established, the principle that "When bodies in motion affect each other, the action and reaction are distributed according to the laws of Statics;" although there were still found occasional difficulties in the