Subject:
A force can have two effects: acceleration and deformation of a body.
Electric currents can have three effects: thermal, magnetic and chemical.

Deficiencies:
To get a clear idea of these classifications, which are found in schoolbooks, let us compare the two statements. This is not far-fetched since a force is nothing else than a momentum current. Thus, both classifications are about the effects of currents: a momentum current in the first case and an electric current in the second. Such a comparison brings to light some incongruities.

1. Let us begin with the first effect of a force: the acceleration. It can also be expressed in the following way: A force that is acting on a body can change the momentum of the body. The corresponding electric statement would be: An electric current that is flowing into a body (or out of it) can result in a change of the electric charge of the body. This statement is certainly correct. But why is it not mentioned as one of the effects of an electric current? Because it is obvious and trivial. Now, the acceleration effect of a force is just as trivial. When momentum enters a body and does not leave it simultaneously, it inevitably accumulates in the body.

2. We next consider the thermal or heating effect of an electric current. Heat is generated not only by an electric current. Also momentum currents (forces) can produce heat, namely in frictional processes. Why is it not mentioned as an effect of a force (a momentum current)?

3. The enumeration of the effects of currents is far from complete. So there is yet an electric effect of a force (the piezoelectric effect), an optical effect of a force (birefringence), optical and light effects of the electric current (in an LED), a cooling effect of an electric current (in a Peltier element) etc.

In summary it can be said: The cited effects are no characteristic for the respective current. Not all the effects of the two currents are mentioned, and those which are mentioned are not necessarily the most important. In short: Both classifications contain pretty much arbitrariness.

Origin:
Since mechanics has developed independently from electricity, different models and teaching habits have established in the two disciplines. Too much importance is attributed to momentum conservation (in the form of Newton's laws) as compared to the conservation of electric charge. Mechanical friction on the contrary, as compared to “electric friction” (electric resistance), is stigmatized as a phenomenon that only impairs the mechanical activities.
Disposal:

1. Drop the accelerating effect of a force (momentum current) or include the “charging effect” of an electric current. Our choice would be not to include these two phenomena in the list of effects, since in contrast to the other effects both occur only if the current has divergences.

2. If one engages in a classification then the thermal effect should be mentioned for both currents, the electric and the momentum current.

3. It should be clear that the effects represent only a selection.

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