

Universal Physics Journal

Article III: The Equality of Opposing Forces

Author: Ethan Skyler

Publication Date: October 24, 2000

Revision Date: July 6, 2003

Purpose

To answer the question: "Is it possible to push or pull harder or softer upon an object than the object pushes or pulls in return? Introducing the Universal Law of Mutual Forces.

Article III

The best place to begin this investigation is with the work of Isaac Newton. Newton's LAW III states: "To every action there is always opposed an equal reaction: or, the mutual actions of two bodies upon each other are always equal, and directed to contrary parts." In his descriptions that follow, Newton explains LAW III.

(2) "Whatever draws or presses another is as much drawn or pressed by that other. If you press a stone with your finger, the finger is also pressed by the stone. If a horse draws a stone tied to a rope, the horse (if I may say so) will be equally drawn back towards the stone; for the distended rope, by the same endeavor to relax or unbend itself, will draw the horse as much towards the stone as it does the stone towards the horse, and will obstruct the progress of the one as much as it advances that of the other. If a body impinge upon another, and by its force change the motion of the other, that body also (because of the equality of the mutual pressure) will undergo an equal change, in its own motion, towards the contrary part." [1] (Note: Here Newton's reference to "motion" is not a reference to "movement" but rather a reference to the homocentric, frame-related system for rating the uniform motion of an object compared to the uniform motion (rest-motion) of the observer, known today as "momentum".)

(3) From his descriptions, it is clear that Newton's reference in LAW III to "action" and "reaction" is a reference to an "action force" and to a "reaction force." Regarding his prediction that every action force is opposed by an equal reaction force, it is easy to understand his thinking once you realize the truth of Newton's words in the second set of parentheses: "(because of the equality of the mutual pressure)". The "mutual pressure" between any two contacting objects is always equal in opposite directions.

(4) Newton's LAW III does seem to ignore the fact that two "action" forces may be responsible for maintaining a value of "mutual pressure" between two contacting objects with no reaction forces present. For example, if you impress an "action force" by pushing with your finger against the finger of a friend, your friend "(because of the equality of the mutual pressure)" is impressing an equal "action force" by her finger against your own. There are no reaction forces present at the point of contact between the two fingers. If equal and opposite reaction forces were present, then

they would be present in both directions and thereby effectively double the force each finger is impressing against the other. But setting this oversight aside, Newton's LAW III, including his reference to "the equality of the mutual pressure" between objects, is a grand recognition of the Universal Law of Mutual Forces. It is important in our work to recognize that Newton realized that his law applied not only during non-accelerative events, but to accelerative events as well. This understanding of Newton's is clearly indicated by his reference to how a body may, "by its force change the motion of the other". Here each body is experiencing acceleration while the "mutual" forces between them remain equal and opposite. Remember this fact, for I will refer back to it when we take a hard look at the Modern Physics theory regarding the manner in which a "single" or "net" force is thought to somehow exist alone and unopposed while acting as the cause of an object's acceleration.

(5) While I can present example after example of you pushing or pulling on an object that is either non-accelerating or accelerating, once you recognize "the equality of the mutual pressure" and therefore the equality of the mutual forces responsible for producing the "mutual pressure" between your hand and the object, you will understand that it simply is not possible to push or pull harder or softer on an object than the object pushes or pulls in return. An ordinary spring scale will display the truth of the equality of the mutual forces present between any two contacting objects, in perfect agreement with both Newton's Law III and the Universal Law of Mutual Forces.

The Universal Law Of Mutual Forces

I. Mutual Forces Affecting A Single Object.

Every force affecting an object is always equal in magnitude and opposite in direction to the mutual resultant force composed of the sum of the vectors of all other forces affecting the same object.

II. Mutual Forces Affecting Two Contacting Objects.

Every force impressed by one object upon a second object, across a mutual point of contact between the two objects, is always equal in magnitude and opposite in direction to the mutual force being impressed by the second object upon the one object across the same mutual point of contact.

III. Energy Emission Based Mutual Forces Affecting Two Contacting or Two Non-contacting Objects.

The resultant force composed of the sum of the vectors of the myriad of individual forces being generated internally and separately within the individual components of the matter of one object, due to the operational imbalance of these components caused by their reception of energy emissions, of one type or another, sent from a second object, is always equal in magnitude and generally opposite in direction to the mutual resultant force composed of the sum of the vectors of the myriad of individual forces being generated internally and separately within the individual components of the matter of the second object due to the operational imbalance of these components caused by their reception of energy emissions sent from the one object.

(6) The Universal Law of Mutual Forces holds absolutely true for all objects, at all Universal present-times, and in all Universal locations. The Universal Law of Mutual Forces tells us that every force is always immediately opposed by an equal force of one type or another. These equally opposed forces are "mutual" for the presence of each force is dependant upon the presence of the opposing force. In Part III regarding energy emission based forces, the presence of the resultant force within the one object is dependant upon the presence of the matter of the second object and vice versa. Also in Part III when the two objects are non-contacting, each mutual force is finding terminating support from action and/or reaction forces that are immediately present within the same object, and most definitely not finding such required support from the mutual force being generated within the other non-contacting object located some distance away. (See Article X, for background regarding the Universal Physics four-force understanding of the Earth/Moon System.)

It is also important to note, regarding part III, that the quantity of matter may vary greatly between these two objects yet the resultant force being generated within either one of these objects will remain equal in magnitude and generally opposite in direction to the resultant force being generated within the other object. (The absolute rotation of one of the objects about its own axis, and/or the absolute sideways motion of one of the objects, will each have an effect upon the absolute direction of the resultant force being generated within the other object, as first predicted by Johannes Kepler.)

(7) Overall, the three parts of the Universal Law Of Mutual Forces tell us today, what Newton's LAW III told us hundreds of years ago, that no force can exist without the presence of an opposing mutual force of equal magnitude.

Ethan Skyler

Reference

[1] Sir Isaac Newton, 1686, 1729, Mathematical Principles of Natural Philosophy and His System of the World, 1934, 1962, PRINCIPIA, University of California Press, Berkeley, Los Angeles, London, pages 13 - 14.

Author's Commentary

While the Universal Law of Mutual Forces may seem self-evident and therefore somehow unimportant, quite the opposite is true. There is a particular area of Modern Physics regarding the manner in which forces cause the acceleration of matter where the accepted explanation remains valid only if the truth displayed by an ordinary spring scale and the logical predictions of Newton's LAW III and the Universal Law of Mutual Forces are set aside. Understand that the first and foremost indication of a false theory is if it's acceptance requires the abandonment of truth and logic. The truth is always true, and logic is always upgradeable through improvements in understanding. Thus logic is forever logical. Beware of any "solution" that runs counter to your own common sense. Common sense is amazingly sensible. If the repeated professions of others in support of some cause are insufficient in helping you to improve your understanding and thereby upgrade the logic that forms the basis of your common sense, then accept their professions as

evidence that is insufficient to affect the advance of their cause beyond the starting-gate status of a theory.

Ethan Skyler

Copyright Notice

Article III "The Equality of Opposing Forces." (C) Copyright 2000-2007 by Ethan Skyler. All Rights Reserved. No portion of Article III, minus the exceptions noted below, may be copied by any means without the author's written permission and even then only if the author's copyright notice is permanently affixed to each approved copy. Requests for written permission may be directed to Ryan Skyler, Editor, Universal Physics Journal, 9734 Manitou Place NE, Bainbridge Island, WA, USA.

The author grants each visitor to The Universal Physics Journal the right to make one copy of Article III for his or her own personal archive as long as the author's copyright notice is permanently affixed to the archive copy.

The Author's Commentary to Article III, and the Universal Law of Mutual Forces, including its three parts, are hereby granted by the author, Ethan Skyler, into the realm of the Public Domain. As such they may be freely copied, in full, or in part, by any means so long as a reference to the author and the primary web site address <http://www.UniversalPhysics.org/> are included with each copy.