

**ON ARTIFICIAL LIMBS, THEIR CONSTRUCTION  
AND APPLICATION, BY HENRY HEATHER BIGG,  
TO THE GOVERNMENT HOSPITALS OF CHELSEA  
AND GREENWICH ; THE ADMIRALTY, EAST  
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BY  
**HENRY HEATHER BIGG,**  
ANATOMICAL, SURGICAL, AND ORTHOPÆDIC  
MECHANICIAN

TO THE  
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160. C. 3.

TO THE

## Members of the Medical Profession

The following pages are respectfully dedicated by one who, attributing entirely to their recommendation and kind instruction, the experience necessary for the successful pursuit of his particular calling, takes this opportunity of recording his grateful thanks for past favors, and sanguine expectations of their future continuance.





## PREFACE.

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At a time, like the present, when the vicissitudes inseparable from War are largely adding to the number of that class of the community who, even in order to fulfil the simple requirements of daily life, are compelled to have recourse to artificial aid, a few remarks explanatory of the nature and form of various mechanical substitutes for natural limbs, accompanied by a description of the scientific principles involved in their construction, the method of their application, and advantage possessed by one particular kind over another for special purpose, may not be altogether undeserving of notice. Few persons, unless made acquainted by practical experience with the difficulty of successfully imitating the mechanical action of a

leg or an arm, can be at all aware of the extreme pains-taking and care with which every movement simulated must be studied. In ordinary contrivance it is simply requisite to consider the end to be attained, and then render the means subservient, but where the needed apparatus is of an anatomical character, and must strictly be conformed to certain symmetric proportion, sometimes at apparent mechanical variance with the point to be accomplished, the difficulty of construction is considerably increased. To prove this it is only necessary to examine a natural leg, and suppose its shape superficially followed in the formation of a mechanical substitute, the result of which would be that when needed for use, instead of offering support capable of sustaining the *weight* of the human body, it would yield in its joints the moment such weight was applied, the reason being that the *actual* centres of motion differ from their *apparent* external position.

In the form of the knee joint, for instance, the motion is not, as would at first be imagined, derivable from a point in the middle of the knee, but has its existence at least half an inch behind such supposed centre, the action resem-