

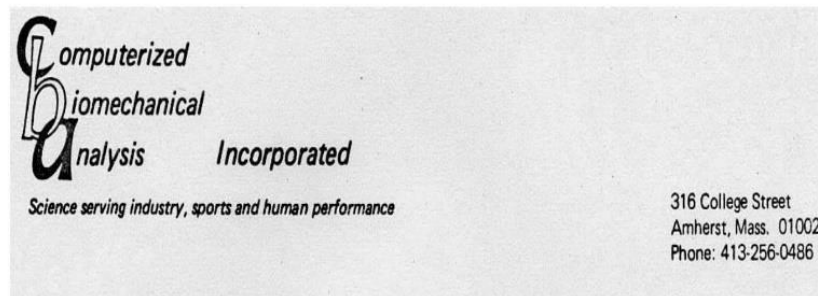
Appendix 16 – Study Results for Computerized Biomechanical Analysis of Thoroughbred Racing

Second Proposal to Mr. Pollack

COMPUTERIZED BIOMECHANICAL ANALYSIS OF THOROUGHbred RACING

prepared for Irving Pollack by

CBA/Coto Sports Research Center
September 1980



COMPUTERIZED BIOMECHANICAL ANALYSIS OF THOROUGHbred RACING

In physical science, an essential step in the direction of understanding is to find principles of numerical reckoning and methods for practical measurement. In 1889, Thomson expressed the important relationship of numerical quantification to understanding:

"When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of science, whatever the matter may be..."

INTRODUCTION:

Locomotion of any biological system is a complex mechanism, which depends on the coordinated interaction of many different subsystems. The basic unit for locomotion is the skeletal musculature, which receives neuronal input through the spinal system. It has been demonstrated, that the spinal system contains a central stepping generator which can operate autonomously to produce locomotor patterns. However, under normal conditions, this generator interacts both with the periphery and with systems located in higher brain centers to transmit locomotor information to the musculature. The outcome of muscle activation is the production of mechanical forces and moments. If certain magnitudes of forces are applied to the limb segments in an appropriate temporal sequence, the body as a whole is translated and the individual segments undergo rotations and relative translations. The ultimate expression of this integrated activity of the system is one of the several characteristic movement patterns termed a gait. A simple diagram of this is given in Figure 1.