In ordinary running the arms are also moved, each in reverse direction from the homonymous leg. This movement is impossible or at least very limited in the ricksha-coolie, because he puts the forearms on the shafts; but as the ancient Greeks practiced running in an ambling pace, *i.e.*, right arm and right leg forward at the same time, it appears that the movement of running is not hindered by fixing the arms.

In estimating the work done in drawing the ricksha it must be remembered that the ricksha is so constructed that during motion the center of gravity is over the axle. Consequently the coolie need exert no force upwards, but can apply all his power for pulling. This traction on level ground need only overcome the resistance of friction. I have found this resistance to be from 2 to 5 kg for the occupied ricksha, according to the nature of the ground. These figures harmonize with other data for the frictional resistance.

The work done by the ricksha-coolie is consequently the same as if he were drawing a cord over a pulley at the end of which is fastened a weight of from 2 to 5 kg. In effect while traversing one kilometer he lifts a weight of from 2 to 5 kg to a height of a thousand meters and does a quantity of work of from 2,000 to 5,000 kgm. The work done in one minute is from 260 to 650 kgm.

Thus during fast locomotion about one tenth of a horse-power is used for drawing the ricksha. This is the expenditure of energy over and above that which would occur during running at the same pace without drawing the loaded ricksha. The period during which this high velocity can be maintained is only a few minutes at a time. Both the amount of external work per minute and the duration for which it can be maintained are therefore less than that of the Egyptians who lift water from the Nile,[1] while themselves standing still, or that of French navies[2] ascending a ladder. It is much less than that of the oarsmen in a university crew during a boat race.[3] The energy which the coolie can apply to drawing the ricksha is limited by the considerable exertion involved in transporting his own body by running.

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[1] J. S. Haldane and Y. Henderson, "The Rate of Work Done with an Egyptian Shadouf." *Nature*, August 28, 1926.

[2] Jervis Smith, "Dynamometers." (Quoted by Haldane and Henderson (1).)

[3] Y. Henderson and H. W. Haggard, "The Maximum of Human Power." *Am. Jour. of Physiology*, 72: 264, 1925.

CHEMICAL "TESTS"

EVERY profession, trade or branch of knowledge has its use of words and phrases which convey specific meaning which can be accurately and briefly conveyed in no other way. In chemistry the word "test" carries a very specific meaning. When a chemist "tests" a certain material for phosphorus, he wishes to determine if there is any of this element present and expects to obtain only a very general idea of the relative amount of the phosphorus present. He may not be able to say whether there is nearly 5 per cent. or nearly 20 per cent. present in the material "tested." He may "test" a substance to determine the presence or absence of potassium by a simple flame test requiring less than a minute of time. This "test" is *qualitative* and gives only a vague idea of the per cent. of potassium present. If a chemist wishes to determine the per cent. of potassium in a sample he uses an entirely different procedure requiring several hours of time. This latter procedure is not a "test" but is a *quantitative* determination of the amount of potassium present. The material is *analyzed* for potassium.

In research and other publications, in conversations with scientific men and in correspondence one often notices the word "test" used when reference is actually made to a method of analysis to determine quantitatively the amount of a certain element or compound present in a substance. One may incorrectly mention a protein "test" when he actually has reference to a procedure (Kjeldahl method) which will determine the quantity or per cent. of protein (N) present. A test for the presence or absence of protein may be made by simpler methods (Biuret, etc.). Most requests which come to a chemist are actually for an *analysis* of a sample (for protein, for instance) and not for a "test" (for protein). He *analyzes* the sample and makes a determination of the *per cent.* of protein. He does not "test" the sample for protein or run a protein "test."

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ATMOSPHERIC ELECTRICITY DURING SAND STORMS

THE Jornada Range Reserve—near Las Cruces, New Mexico—is an experiment station maintained by the U. S. Forest Service for the purpose of the study of range problems. Since grazing studies are paramount, the station laboratory is not equipped with the instruments used in the measurement of electrical energy. However, the article entitled "Electricity from the Air" which appeared in the News Supplement of SCIENCE of March 30, 1928, brings