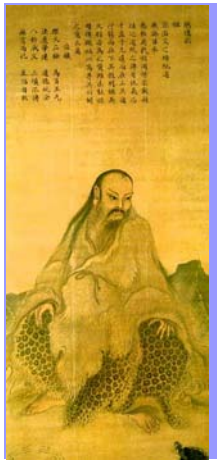


**The Parable of the Emperor of China**
**(The Emperor of China's New Clothes)**

Pictures from:
http://www.chinapage.com/emperor.html

**The Parable of the Emperor of China**

'There also appears to be some confusion as to the significance of the reproducibility of measurements and the accuracy of the data.

In this connection it appears appropriate to recall the Emperor of China story attributed to the astronomer Kapteyn, for which I am indebted to Prof. G. Uhlenbeck.'

***Results of the I.U.Cr . precision lattice-parameter project.***
*Parrish, W., (1960). Acta Cryst. 13, 838-850.*

**The Parable of the Emperor of China.**

'*Once upon a time there lived in China an Emperor who ruled his 50,000,000 loyal subjects wisely.*

*However, he had one well known vice …*'

**The Parable of the Emperor of China**

*'It is clear that millions of measurements of, say, a table with a meter stick will not give an average measurement accurate to an Angstrom unit.'*

Repeating a bad experiment without changing the method will not make it a good experiment

**The Parable of the Emperor of China**

**How precise are measurements of unit-cell dimensions from single crystals?**
F. H. Herbstein, Acta Cryst. (2000). B56, 547-557

**E. Bright Wilson (1952[Wilson, E. B. Jr (1952). An Introduction to Scientific Research, pp. 252-254. New York: McGraw-Hill.])**

## The Plymouth Ox

http://galton.org

Life of Francis Galton by Karl Pearson Vol 2 : image 0468

Picture from:http://www.ruralhistory.org/index.html

## Weighing an Ox

Some good illustrations of the merit and defect of the ogive-median method may be found in a further paper published in 1907.

In "Vox populi'" Galton begins by stating that

"in these democratic days any investigation into the trustworthiness and peculiarities of popular judgments is of interest,"

and proceeds to illustrate the "Vox populi" by discussing the 787 answers given in a weight-judging competition at the West of England Annual Fat Stock Show at Plymouth. The judgments turned on what a selected fat ox would weigh after being slaughtered and dressed. Galton considers that the entrance fee of 6*d.* and the hope of a prize deterred practical joking and that the judgments would be largely those of butchers and farmers experienced in the matter.

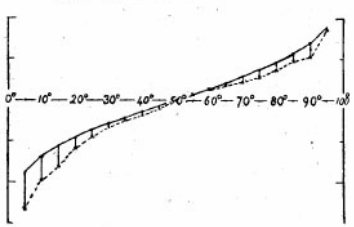
"The judgments were unbiased by passion and uninfluenced by oratory and the like.... The average competitor was probably as well fitted for making a just estimate of the dressed weight of the ox, as an average voter is to judge the merits of most political issues on which he votes."

## Weighing an Ox

Galton gives the following table of results and the diagram on page 404:

*Distribution of the estimates of the dressed weight of a particular living ox, made by 787 different persons.*

*Diagram, from the tabular values.*




The vertical axis is the deviation from the mean weight. The horizontal axis is the % of the ranked deviations.

## Weighing an Ox

According to this method of dealing with the matter the "Vox populi" was only wrong nine pounds (1207 against 1198), or 0·8 per cent. Galton considers that the judgments were not distributed normally and that negative errors were magnified and positive errors minimised by the competitors. But what if Galton be not fitting the best curve to his data? It is not hard to show that the judgment of the middlemost man is not the best median—paradoxical as it may seem! Almost any pair of symmetrical percentiles gives a result with less probable error. For example, the median of the quartiles ½(1162 + 1236) is 1199, only 1 lb. out. Other medians are:

| 20° and 80° | 30° and 70° | 35° and 65° | 40° and 60° |
|---|---|---|---|
| 1195 lbs. | 1202 lbs. | 1203 lbs. | 1203 lbs. |

—all better than the middlemost value.

# Measuring a Bond

**International Tables, Volume C**

**9.5. Typical interatomic distances: organic compounds (By F. H. Allen, O. Kennard, D. G. Watson, L. Brammer, A. G. Orpen, and R. Taylor)**

*Acta Cryst.* (1983). **B39**, 517–525

**The Estimation of Average Molecular Dimensions from Crystallographic Data**

BY ROBIN TAYLOR AND OLGA KENNARD

*Crystallographic Data Centre, University Chemical Laboratory, Lensfield Road, Cambridge CB2 1EW, England*