DEFENCE OF MR. HARRISON'S CALCULATION OF THE RUPEE CIRCULATION

[THIS article, published in the ECONOMIC JOURNAL, 1900, forms a supplement to O; defending Mr. Harrison's method against certain criticisms contained in the *Report from the Head Commissioner of Paper Currency, Calcutta, to the Secretary to the Government of India, Finance and Commerce Department.* (No. 146.) 1899.]

This document deserves notice here on account of the criticism which the Head Commissioner has bestowed on Mr. F. C. Harrison's method of evaluating the rupee circulation in India.[1] Mr. Harrison may comfort himself with the reflection which one of the older moralists offers to a person suffering under detraction : consider that you, as you really are, are not blamed, it is an imaginary character with attributes not yours that is held up to condemnation. The misrepresentation of Mr. Harrison's system has been effected by presenting only a part of it. The Head Commissioner describes it as an adaptation of Jevons's method; which he illustrates happily enough. This description does not comply with the schoolmen's rule of defining by *genus* and *differentia;* what is most characteristic and distinctive is omitted. True, Mr. Harrison's method belongs, as we may say, to the genus Jevons : but it is a very peculiar species, a highly composite variety of that genus. Jevons computed the amount of the circulation from the percentage of the total circulation formed by the coins of a particular recent date, together with the absolute number of those coins in circulation as given by the statistics of the mint. Mr. Harrison has based analogous estimates not only on recent coinages, of which the amount in circulation may be supposed to be approximately given, but

[1] For Mr. Harrison's explanation of his method, see ECONOMIC JOURNAL, Vol. I. p. 721, and Vol. II. p. 256; also Vol. VI. p. 122; and for some appreciation of the work, Vol. II. p. 162, and Vol. VII. p. 644.

also on older coinages, of which the amount in circulation is calculated from the yearly rate of waste. The peculiar cogency which the consilience of diversified computations imparts to the results has not been noticed by the critic. He tests the strength of the rope by detaching a single strand and subjecting it separately to a severe strain.

The sort of certainty which the physicist obtains by averaging numerous independent observations, attaches more particularly to that part of Mr. Harrison's reasoning by which it is concluded that the rupee circulation remained approximately constant for several years after 1876. His conclusion as to the absolute amount of the circulation does not appear to rest on quite the same foundation. For, as pointed out in a former number of the ECONOMIC JOURNAL,[1] if each coinage soon after leaving the mint were docked of a certain proportion, e.g., by emigration or hoarding (in excess of that which Mr. Harrison estimates to be lost during the two or three years which a coinage may take in getting into circulation), the beautiful consilience of the results would not be affected, provided that the proportion abstracted were the same for each coinage; the constancy of the circulation in the years after 1876 would still be manifested, though for the absolute amount we should have only a superior limit. To make certain of the absolute amount we require another datum, which Mr. Harrison obtains by tracing the history of the coinage after it has left the mint, estimating how much is hoarded or melted or sent abroad in specie. If we likened the prime argument with its mutually supporting parts to a magnificent arch, this supplementary datum performs the part of an external buttress which secures the arch against a certain subsidence to which it may be liable. But all the strength and beauty of this archi-tecture is lost on the undiscerning eye of the official inspector; he sees nothing but the foundation stone which was laid by Jevons.

Having failed to appreciate the cogency of the premises, it is no wonder that our critic should be sceptical about the con-clusions. But it may excite surprise that he should suppose his case to be strengthened by the following remark :—

" Mr. Harrison's general conclusion drawn in 1894 from the above rather divergent results was that the circulation had from 1876 to 1886 been approximately constant at 115 crores, that it then gradually expanded to 120 crores in 1889-90, and had risen to about 125 crores in 1892-93. It may be reasonably

[1] Vol. II. p. 166. Above, p. 411.

doubted whether, with a population increasing at the rate of one per cent. a year, and with the issue between the years 1876 and 1886 of upwards of 70 crores of new rupees, the circulation can have remained during eleven years even approximately constant."

But according to Mr. Harrison's estimate of the waste of the coinage, about 6·77 per cent. per annum, the loss on a circulation kept constantly at 115 crores ought to be about 11 × 6·77 crores, that is, upwards of 70 crores. What wonder then that the addition of upwards of 70 crores of new rupees per annum should be just sufficient to keep the volume of the circulation constant! The observation which was meant as an objection proves to be a verification.

It sometimes happens that an advocate opening a strong case does not urge every tittle of evidence, whether through mere inadvertence or exercising a discreet reserve. If under these circumstances the counsel on the other side insists on cross-questioning he is apt to elicit some point damaging to his own case. The Head Commissioner has put himself in the unpleasant position of that cross-questioning counsel in the passage above quoted, and also in the following :—

" Mr. Harrison's examination was made in nine cases in the year immediately following the year of coinage, in six cases in the second year, and in one case in the third year. It seems very unlikely that equal diffusion can have taken place within one or even two years."

It will be remembered by our readers that Mr. Harrison selects for the date at which the coinage of any particular year (e.g., 1874) may be assumed to have made its full contribution to the circulation, that year in which the proportion of the particular (e.g., the 1874) coinage constitutes a maximum percentage of the circulation (in the case instanced the year 1877). This procedure is countenanced by the probability that the circulation was constant during the years under consideration. Still, as above admitted, the main argument in its bearing on the absolute quantity—as distinguished from the constancy—of the circulation is open to the suspicion that a uniform proportion of each coinage might, without any warning given, have been withdrawn from the amount assumed to have entered into circulation. The probability of this uniform subtraction becomes less the greater the variety of the circumstances under which the different coinages entered the circulation. Accordingly some additional probability is imparted to the whole argument when it is pointed out that there is a certain diversity in the data on which the different estimates are based.

Random as are the shots of the hostile critic, it is not to be
expected that they should always be so very wide of the mark
as actually to hit his own side. They mostly hit nothing at all.
Thus in the continuation of the passage last quoted it is
remarked :—

"The results arrived at were certainly irregular, for they
represented the circulation in successive years to be 98, 110, 113,
142, 110, 107, 104, 108, 118, 143, 137, 157, and 133 crores."

The impression of irregularity is here conveyed by quoting
one particular set of results out of the numerous sets which Mr.
Harrison has obtained by consequent computations. When
Mr. Bowley, by a masterly application of the theory of probabili-
ties, concluded that the average money wage in England had
remained constant over a period of years, it would have been
no refutation of a conclusion based upon that theory to point
out that the wages in a particular trade for that series of years
were not constant, but irregular.

The Head Commissioner has peculiar notions about the nature
of an average when, referring to Mr. Harrison's estimate of the
average yearly loss of coinage, he remarks :

"This very precise figure can hardly be admitted to be correct
for all years."

As if an average could be expected to be equal to each of
the items averaged !

A knowledge of the theory of averages removes the sting
from the following remark :—

"Mr. Harrison is, apparently, himself dissatisfied with the
outcome of his labours, for, when examined last year as a witness
before the Currency Committee, he stated that he would not be
surprised to find that the circulation, instead of being 128 crores
(his latest estimate), was found to be 140 crores on the one side,
or 90 crores on the other."

It is not quite clear what degree of surprise Mr. Harrison
intends to indicate by this *obiter dictum*. A person who plays
backgammon often would not be very much surprised at throwing
three aces in succession. If Mr. Harrison is to be understood as
assigning a corresponding degree of improbability to the limits
90 and 140 being overstepped, it follows from well-known
principles that, supposing the usual law of error to prevail, at
least roughly, a "probable error" of about 6 is attached by
Mr. Harrison to his estimate of 115. Surely a result may be of
some practical value even though liable to this degree of error.
For instance, an index-number of prices may well be liable to
as great a probable deviation.

Our confidence in this result is not much shaken by the existence of certain inaccuracies in the data :—

" The returns cannot be accepted with implicit confidence, for every now and then evidence appears of neglect of duty. Thus, in May 1894, two Bengal Treasuries reported the existence of coin dated 1894, though there is no such coinage, and it was afterwards acknowledged that the entries were mistakes. The same has happened in 1898, and again in the present year [1900] when the Amritsar Treasury returned 87 rupees of 1894, 100 of 1895, and 116 of 1896, while Sealkote reported 129 of 1894, 165 of 1895, and 116 of 1896, though there is no genuine coin of those dates. All the neighbouring treasuries found no rupees of those years, and it must be concluded not that there are perfectly made counterfeits in the Punjab bearing those dates, but that the persons entrusted with the duty of examining the coins have, to use a slang expression, *fudged* these returns."

The correction of these errors does not seem to affect sensibly the average result. The incident is paralleled by the French monetary statistics from which M. De Foville, according to the method of Jevons, has calculated the number of five-franc pieces in circulation. A certain number of offices, he tells us, made returns of coins as having dates at which there was no French coinage. But the errors were not on a scale to appreciably vitiate the calculation; the only consequence was to teach the offenders, by a severe reprimand, the danger of being too witty.

The Head Commissioner concludes by reflecting on the ingenious " inverse Jevonian " method which Mr. Harrison has based, not on the addition of new coinage to the circulation, but on the withdrawal of the coinage of date earlier than 1836. Taken by itself, Mr. Harrison admits, this elegant construction would not be strong enough to support the conclusion; if only for the reason that, as the amount of coin withdrawn forms a small percentage of the total circulation, a comparatively small error in the former is apt to considerably vitiate the latter. But, considered as an additional strand in the coil of circumstantial evidence, which is all that Mr. Harrison claims, this supplementary method has a certain cogency which the Head Commissioner's disparaging reflections do not invalidate.

On the whole, it appears to us that Mr. Harrison's method emerges from the test of the hostile criticism to which it has been subjected, not only unscathed, but even with added lustre.

Merses profundo, pulchrior evenit.