

to each almanac R. A., and the two reductions which must be added to each almanac Dec., in order to reduce to the system of the *Jahrbuch*.

The catalogue of each almanac, after the application of the systematic reductions from this table, is then compared with the Fundamental catalogue. For the *Nautical almanac*, the mean difference in declination is $0''.395$; in R. A. (from 134 stars), $0''.0332$. Of the 168 stars common to both almanacs, there are 27 whose R. A. differs more than $0''.067$, and 8 whose declinations differ by more than $1''$. These differences are, in the main, errors of the *Nautical almanac*, and are largely due to the erroneous proper motions adopted in the Greenwich catalogues.

For the *Connaissance des temps*, the table shows large systematic errors. After these have been eliminated, the comparison shows for 229 stars, common to the *Connaissance des temps* and the *Berliner Jahrbuch*, a mean difference of $0''.373$ in declination, and a mean difference of $0''.0282$ (from 162 stars) in R. A. The errors here, again, are largely due to erroneous proper motions.

The correspondence of the reduced positions of the *American ephemeris* with those of the *Jahrbuch* varies according as one or another basis of comparison is chosen. A complete comparison can only be made for those stars for which ephemerides are given, since the newer stars have their positions derived from several sources, not comparable among themselves.

The declinations of the *American ephemeris* and those of the *Jahrbuch* agree excellently for those stars which have been investigated by Boss. The mean difference (162 stars) is $0''.177$. The other 111 stars do not agree so well, there being 12 differences between $0''.5$ and $1''$. The stars north of 64° depend upon Gould's R. A.; and, of the 36 stars common to both almanacs, 15 differ by more than $0''.15$. Of the remaining 126 stars whose ephemerides are given, 8 have differences as great as $0''.067$. The mean difference for 100 stars between $+40^\circ$ and -20° is $0''.0127$. For the 111 stars without ephemerides, there are seven cases where the difference is more than $0''.067$.

For the stars south of -32° , the *Nautical almanac* will give the best positions, on account of its data being derived from the most recent catalogues.

A comparison of the system of the *Jahrbuch*, 1861-82, with the new system, and a general table for the reduction of the data of any almanac to the *Berliner Jahrbuch* system, concludes this very important paper.

It is to be hoped that in the immediate future all star positions may be reduced to the system of the *Jahrbuch*, and its admirable list of stars will be amply sufficient for observers in the northern hemisphere. For the determination of time and longitude, the stars of the other almanacs will serve a useful purpose, especially as they may easily be made homogeneous with the Berlin list by tables given by Dr. Auwers in this paper.

EDWARD S. HOLDEN.

Washburn observatory, University of Wisconsin,
Madison, July 24, 1883.

LETTERS TO THE EDITOR.

English *ch*.

IN SCIENCE, ii. 452, you assert that the English '*ch* (in *chair*) is not a simple consonant, but a compound,' consisting of '*t* followed by *sh*, as is apparent in pronouncing with 'due lingering emphasis' the words, 'even *such* a man, so woe-begone,' etc. Now, the same length and emphasis may be produced by a prolongation or continuous repetition of the vowel-sound of the word '*such*,' and, it seems to me, would be so in the case of anybody who was unacquainted with the *tsh* theory. But even if not, the change from a simple *ch* to a compound *tsh* would not be the only instance in the language, where under special circumstances, such as a prolongation or drawl, a sound is liable to an essential change; and it must be peculiarly so where the sound can be properly made only by an instantaneous movement. *Ch* seems to be caused by such a movement, just as a smack of the lips is, which is certainly a decidedly different sound from the one made in the same way, except more gently and slowly, — a *p* made with inward-drawn breath. The relation between the smack and that *p* seems to be the same as the relation between the English *ch* and *t*, and the difference in each case to depend on the mode of contact and of its interruption, not on any combination or succession of sounds.

Again: it appears quite possible to pronounce the word '*chair*' perfectly with the teeth kept slightly open by the finger or a pencil, and held, therefore, in such a position that it is impossible to pronounce the word '*share*' correctly, showing that *sh* is not properly a part of the *ch*.

Moreover, if *ch* is the same as *tsh*, or the German *tsch*, the Germans would at the outset have no difficulty in pronouncing the English *ch* in a way not noticeably different by its hissing sound from ours.

It has been said, that after pronouncing the word '*check*' to a phonograph, on turning the machine backwards, the sounds re-appear as *kesht*; but is that not wholly due to an incorrect, prejudiced pronunciation of the first word, as if written *tshék*? L. B.

Nov. 9, 1883.

[Argument is out of place in reference to what is a matter of mere observation. The suggested experiment by 'lingering emphasis' ought to satisfy any ear as to the reality of the stopped or shut commencement of the sound of *ch* in *chair*, and of its hissing termination. L. B. evidently associates some meaning different from the ordinary one with the terms 'simple' and 'compound.' *Ch* is compound because its shut commencement and its hissing termination are elementary effects, each of which is susceptible of separate utterance. — EDITOR.]

Report of the Assos meeting.

Henry W. Haynes, Esq., calls my attention to an error in the remarks on Assos made by me at the meeting of the Archaeological Institute, Oct. 31, and printed by you in your recent report (SCIENCE, no. 41).

For 'to fight against Ramses III. — the Rhampsinotos of Greek story,' read, 'to fight against Ramses II. — the Sesostris of Greek story.'

May I beg you to make this correction public.

JOSEPH THACHER CLARKE.

Boston, Nov. 19, 1883.

Analysis of the wild potato.

In the spring we received from Mr. J. G. Lemmon, Oakland, Cal., some tubers said to be of *Solanum tuberosum*, var. boreale, and collected in Arizona. Of