

at the Beginning, is nothing but an unform'd Mass. These Observations I made in the Month of *September*, 1718.

*Delft*, June 13.  
1722.

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II. *Observations upon the Callus of the Hands and Feet, by the same curious Gentleman. Translated by John Chamberlayne, Esq;*

**I**N the Month of *September*, 1719. feeling an acute Pain in one of my Feet, at the Joint between the Foot and the little Toe, which I imagined to proceed from the more than usual Thickness of the *Callus* or hard Skin, upon that part; I caus'd my Servant, partly with his Nails, and partly with a Penknife, to take off that hard Skin, and let it fall upon a blue Paper, that I had set my Foot upon.

This *Callus*, or hard Skin, was compos'd of little scaly Shivers lying upon one another, and the whole Piece was as large as a small Nail of a Man's Hand.

I view'd the said Shivers thro' a Microscope, but could not satisfy myself, because they lay so irregularly on each other.

Moreover, I took a little Bit of the aforesaid hard Skin, laid it on a clean Glass-Plate, steep'd it in pure Rain-Water, and gently dividing it with a Piece of a Quill, I was amazed to see into what a vast Number of Particles it separated, and that with as much Readiness, as if they had never been join'd.

Afterwards

Afterwards I took two or three of the said Particles, of which many were of the Figure of a Weaver's Shuttle, being broad in the middle and pointed at each End, with a Line in the middle, like those upon the uppermost or outside Skin of Fruits, or of our Bodies, but generally irregular; they were very thick in Proportion to their Bigness. I took, I say, two or three of the said Particles, and laid them on a clean Glass, and put to them a Drop of Water, as large as a coarse Grain of Sand, and divided the same as well as I was able; and viewing the divided Particles thro' a Microscope, I was astonished at the prodigious number of exceeding small Particles that occur'd to my Sight, and which were of the same Figure as before-said.

Moreover, I took some of the thickest Pieces of the horny Skin, but not half so thick as the Back of a small Knife, and slit them into as thin Slices as I could, and placed them upon a clean Glass, with the Design of discovering the exceeding thin Particles lying upon one another; and having moisten'd them, they spread themselves out further, and when they became dry again, they separated into several Parts; and I observ'd likewise that each of these separated Parts were composed of many thinner Particles lying on each other. In order to have a clearer Notion of the Contexture of those Particles, by which the Skin of the Hands and Feet of those who are inured to hard Labour, or walk much, increases in Thickness, and is surrounded, I caused a small Portion of the aforesaid separated Particles to be drawn, as appears by *Fig. 6. ABCD*, tho' they were not all so exact and compleat, as they are represented in the said Figure; and according to the best of my Observation, they had

had all been separate Pieces, and none of them united to one another.

Again I placed several little Pieces of this hard Skin, which I had cut off at the thickest Part of it, before a Microscope, and moisten'd them with fair Rain-Water when I put them upon the Glas-Plate, by which Means they acquired a great Extent; and being dry'd, they shrunk again, and thereby appear'd in several long Particles, and each of them seem'd to consist of other long Particles, as they are represented in *Fig. 7.* E F G H. So that E H or F G, was the Thickness of that Piece of thick Skin, which I had cut through.

From this Observation, I consider'd with myself, whether one of these long stripe-like Particles, such as appear'd to the Eye at E F or H G, might not be the Thickness which the horny Skin had acquir'd in the Space of a Month; and whether the very thin Particles, which appear'd in such a little Stripe, were not the Accretion which the hard Skin receiv'd in one Day. This last mention'd little Piece, represented by *Fig. 7.* was not so large to the naked Eye as a common Grain of Sand. And whereas I placed before a Microscope another very small Piece of Skin, that was something thinner than the former, I could perceive the exceeding thin Particles represented by *Fig. 8.* I K L M, which were the *Strata*, or Beds, in which the horny Particles of the Skin lay, and so compos'd the Thickness thereof.

For my further Satisfaction, I sent for a Mason's Servant, who was a laborious Workman, and cut out of his Hand, where it was most thick and brawny, two Bits of the hard Skin; and then I slit it into small Slices, and observ'd easily enough the thin Particles lying upon each other, but could not separate the little  
Scales

Scales, of which each little *Stratum* of the hard Skin consisted, because, as I fancy'd, thro' the hard working of the Man, the Particles of the said Skin were so pressed upon one another, and so closely join'd, that they could be no longer separated.

Now forasmuch as the Hands of the Mafons or Bricklayers are often cover'd with the sharp Salts of the Chalk or Lime, which might prevent the Separation of the very small Parts of the hard Skin; I sent for a Master-Carpenter, who was likewise a diligent Workman, and viewing his Hands, in order to pare off some of the Brawn thereof, I found them as soft in the Palms, as if he had never been used to Labour; upon which I said to him, you wash your Hands very often I believe: to which he reply'd, ten times a Day at least, for I hate to see them foul. Then I sent for a Ploughman, who was mostly a Tiller of Corn-Land; this Person's Hands were very hard; however, I cut two Pieces of horny Skin out of them, which after I had done, I cut them in little Bits, but they were so hard, that a sharp Knife, which I us'd, got several Notches in doing it. And I observ'd that the uppermost part of the Skin was full of little Rents, and all the *Strata* were pressed so closely together, that I could not make any Discoveries therein, save only that the little Beds lay on each other, and that the Thickness of the Skin consisted thereof.

Furthermore I put the two Pieces of hard Skin into warm Water, in order to soften them, and then to separate the Parts from each other, but could not do it, because they were so strongly joyn'd together.

I have several times observed, in washing my Hands, that when I rubb'd the Palms of my Hands strongly against one another, with very little Water between them, some Particles would be rubb'd off from the Skin, and continue between my Hands.

For my farther Satisfaction in this Matter, I put one of my Fingers into fair Rain-Water, and with that washed the Part of my Thumb which is join'd to my Hand ; after which I rubb'd both Finger and Thumb hard against each other, then I gently scraped with a Pen-knife, the Matter, which I had loosn'd from the Skin by moistening and rubbing it ; and taking off a little of that which stuck to the Knife, I put it upon a clean Glas-Plate, and setting it before a Microscope, I saw with Astonishment the great number of Particles of Skin, which lay scatter'd upon the Glas, but were more irregular than those, which I separated from the brawny Skin of my Foot, and which were not very closely pressed together, because I don't walk much, it being troublesome to me at my great Age.

After this I moisten'd the back of my Hands, and then rubb'd them ten or twelve times against each other, and having so done, I scraped off, with a Pen-knife very gently, some of the Matter which I had loosn'd by rubbing ; and placing it on a clean Glas, I view'd it with a Microscope, after having separated the Particles of the said Matter from each other with a little Water, and discover'd abundance of little Scales which come off our Hands.

Forasmuch as the Skin of my Hand is in no part thicker than that, which is upon my Thumb next to the Nail, having in my advanced Age chiefly used my Thumbs in the Examination of Microscopical Objects, I made one of my Thumbs a little moist, and rubb'd the other against it, and placed the rubb'd off Matter before a Microscope, thro' which I observ'd such a prodigious Number of Particles, like those represented by *Fig. 6. A B C D*, but all irregular, that no Man can conceive it without having seen it.

Now as we find, that such a Quantity of Particles is separated from the Hands, and is daily renewed in a well constituted Body ; we must conclude, that we eat several of the said rubb'd off Particles in our Bread, and that they turn to Nourishment ; and I am of Opinion, that there is hardly any Food prepared for us, especially such as passes pretty much thro' the Hands, but that some of the rubb'd off Particles are mix'd therewith, especially when they knead Dough from Meal or Flower ; and still more, when the Bakers knead with their Feet, as in making of Rye-Bread.

Since these Observations concerning the Friction or rubbing of my Hands, I take more notice thereof, when I wash and dry them, than formerly ; and I stand amazed at the numerous Particles that daily separate themselves from my Hands, and grow on them again ; and at the particular Provision, that is made for producing these Particles, in the Palms of our Hands and Bottom of our Feet, whereas we do not by far meet with such a Quantity of Particles constantly produced in other Parts of our Body ; for if we observe those, who work much with the back of their Hands, we shall not meet with any of that hard Skin we have been speaking of, but only a kind of Tumor, or rising, as the Dry-sheerers, or those who dress Cloth, have upon their left Hands.

In short, the Manner of the Production of these small Particles will be a Mystery to us, though our Hands and Feet must be fortified with such a Matter, to enable them to support all that Force, and Pressure which they are obliged to undergo.

*Delft, July 7.*

1722.

FIG. I.

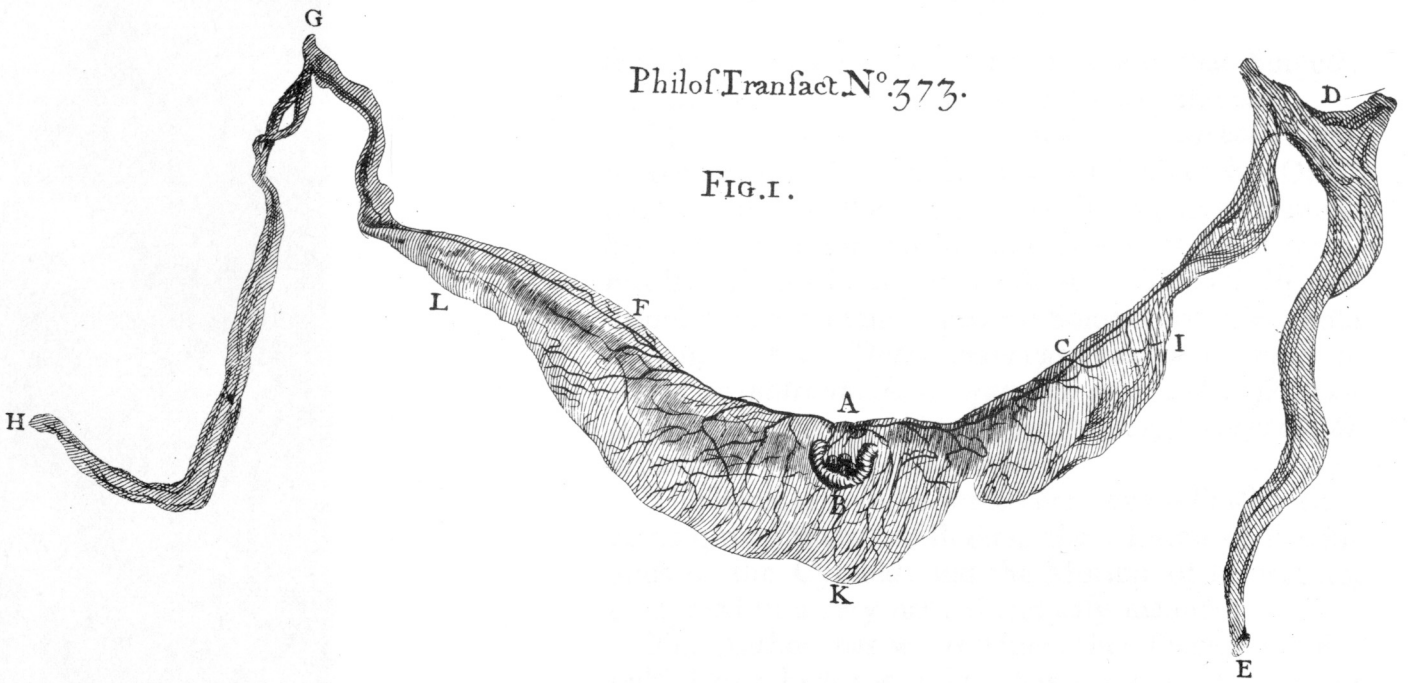


FIG. II.

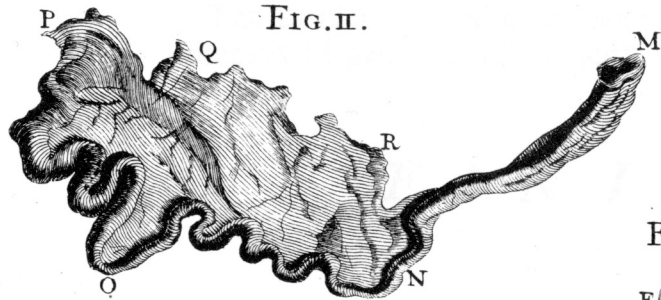


FIG. III.

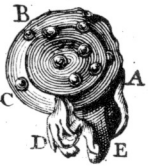


FIG. IV.



FIG. V.



FIG. VII.

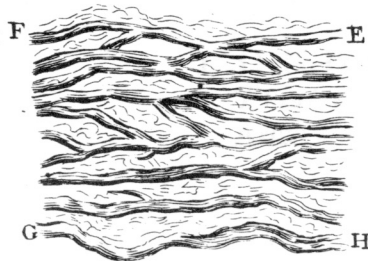


FIG. VIII.

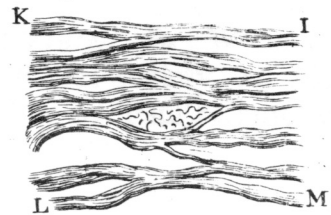


FIG. VI.

