

IV. *An Essay upon the Causes of the different Colours of People in different Climates; by John Mitchell, M. D. Communicated to the Royal Society by Mr. Peter Collinson, F. R. S. **

Read at several Meetings, from May 3. to June 14. 1744.

THE Cause of the Colour of Negroes being a Subject so little known, but so much inquired after, and withal so curious and useful, as to excite the particular Attention and

* *Extract of Part of Dr. Mitchell's Letter to P. Collinson, F. R. S. from Urbana in Virginia, April 12. 1743.*

SIR,

I Promised you some Returns for your Favours, by sending you my Essay on that strange *Phænomenon* in Nature, the Cause of the Colour of Negroes.

I cannot promise you much, because my daily Employments engross so much of my Time: But this I shall beg Leave to say, that with great Care I have made the Experiments and Observations on purpose to find out the Truth. I must own I was surpris'd at first to see them differ from the Opinions of some learned Men; especially in Matter of Fact, which they rather allege than prove, relating to the fluid *Mucus* of the *Cuticula*, or *Corpus reticulare*; for which Reason I repeated my Experiments on living Subjects several times, but could never see any Tokens of that black Juice.

I am apt to think, that the Anatomists, perceiving the *Corpus reticulare* in dead Bodies to be a soft pappy Substance, have rather imagin'd than really found it to be, or contain, a fluid mucous Humour.

But, as I am afraid this will come too late for a Solution of the Prize-Problem, propos'd by the Academy of *Bourdeaux*. If you think it deserves so great an Honour, pray communicate it to the *Royal Society*; and if it merits their particular Regard, I submit it to be printed in your learned and curious Memoirs. I am

Your obliged humble Servant,

John Mitchell.

and Inquiries of the learned in *Europe*, particularly the Academy of *Bourdeaux*, in their Prize-Problems, to which they have received no satisfactory Answer, as I have been lately informed; I have therefore ventured to offer my Thoughts to you on that Subject, having had frequent Opportunities to make the proper and necessary Observations; and which, at least, I hope, may not be unacceptable, that some one, of better Skill, and more Leisure, for such nice philosophical Inquiries, may make more correct and fuller Conclusions from them. This Problem supposes the Knowledge of the Causes of Colours in-general; so that if I can deduce the Colour of the Skin from its Structure, &c. in the same manner, and for the same Reasons, from which the great *Newton* deduces the Colours of other Substances, it is all I can pretend to, which will be as much as that Branch of Philosophy will permit: And as this Problem will include the Cause of the Colour of the Skin in general, I shall first inquire into the Cause of the Colour of white People; with a Change from that Colour in some preternatural Affections, whose Causes seem not well understood. This I shall do in so many Propositions, that you may the better perceive how far each Proposition is demonstrated, or of what Consequence it may be in deducing the desired Solution of the Problem, concerning the Cause of the Colour of Negroes.

PROPOSITION I.

The Colour of white People proceeds from the Colour which the Epidermis transmits; that is, from the Colour of the Parts under the Epidermis, rather than from any Colour of its own.

The Truth of this Proposition will plainly appear to those, who consider, that the Colour of white People is always more or less clear or vivid, as the Skin is thinner or thicker, finer or coarser; that is, as it is more or less adapted to transmit the Colour of the white Parts below it. These Parts are the *Parenchyma* of the Skin, *Corpus reticulare*, *Papillæ nervosæ*, the limpid and clear Juices contained in the Vessels, and perhaps the inner *Epidermis* itself may appear thro' its outer porous Coverlet; all which Parts we know are white, and are what appear so in white People.

But this will be better confirmed, from the following Considerations; 1. The Palms of the Hands, Lips, &c. where the *Epidermis* and Skin are so thin, as to transmit the Colour from any thing below them, appear red, or of the Colour of the red Blood under them; especially in those in whom the Skin is fine and thin; but where the Skin is thick and coarse, those Parts appear almost of the same Colour with the rest of the Body. 2. The Blushings of the Cheeks, and their Redness in Fevers, seem to be another Proof of this Cause of their Colour; for, in a Moment, they change from a pale to a deep Red; but no one will imagine, that the *Epidermis* then changes its Colour, or Power of reflecting the Rays of Light; but

but that it transmits the Colour of the Blood; which is, at such times, more forcibly driven into the capillary subcutaneous Vessels, and shines thro' the *Epidermis*; but, before, these Vessels contained only a serous Liquor, and, accordingly, the Skin appeared of that Colour: Which will further appear upon squeezing such red Parts, which drives the Blood out of them, and makes them appear white; whereas, on removing such Pressure, they recover their Colour, as the Blood does its Place. 3. The yellow Colour of the Skin in the Jaundice is a further Proof of this Assertion; where the yellow Bile is diffused thro' the Vessels of the *Cutis*, and appears thro' the *Epidermis*; but no one will imagine, that the *Epidermis* itself receives this viscid Bile into its Vessels; which are so small, that many accurate Anatomists, as *Morgagni*, have denied it to have any Vessels at all; and the most accurate could never shew them. 4. The pale Look of those, in whom the Blood is viscid, or circulates with little Force, shews, that the *Epidermis* then transmits the Colour of the Juices and Fibres below it, which are then unmix'd with red Blood. 5. The same is manifest in those whose Blood is poor and serous, as the Leucophlegmatic, &c. in whom the *Epidermis* transmits the Colour of the Water or Serum under it.

From hence it appears, that the *Epidermis* is a transparent Membrane, which easily shews the Colour of the Parts under it, in the same manner as the *Cornea* of the Eye transmits the Colour of the *Iris*. But this will appear more plainly, from some Considerations below; where we shall assign the Cause of this Pellucidity; and shew, that the Numbers of

Pores in the *Epidermis* necessarily make it transparent; and that the Smallness of the Particles, into which it is divided by them, make it unfit to reflect any Rays of Light, and consequently to manifest any Colour of its own.

But, to this, some, perhaps, may object, that the *Epidermis*, when taken off of the Body, appears white, and consequently reflects such Rays of Light. But then we must consider, that its Pores and Fibres are much contracted, and its Substance, consequently, rendered more dense, and fitter to reflect any Colour; besides, it is then evacuated of those transparent limpid Juices, which it before contained, from the Vessels of the Skin which pervade it; and which, as Sir *Isaac Newton* shews (a), will render any Body transparent; especially since those Juices, which then pervade the *Epidermis*, are nighly of the same Density with it; since all Accretion and Nutrition is from such. Accordingly we see, that when the *Epidermis* is taken off of the Body, it appears transparent enough for what we have assigned, especially its external *Lamina*. This may be further perceived, by holding the Hands of some Persons of thin Skins, and much shrivel'd, in a certain Light; when you may perceive the Colour which this Membrane reflects, which is of a silver White, like all other pellucid *Lamelle*; very different from the Colour which it transmits from the Parts under it; of which Colour likewise the Scales of the *Epidermis* appear, when rubbed off on black Cloth, or when scaled off in a

(a) Opt. l. 2. Par. 3. Prop. III.

Leprosy; a remarkable Instance of which Dr. *Turner* affords us (a): Altho' it cannot be denied, but that the Cuticle may reflect some small Portion of the Rays of Light; which, however, seem to have but little Share in occasioning the Colour of the Body, to what those Colours have, which are transmitted thro' it, from the other less diaphanous Membranes under it.

PROPOSITION II.

The Skins of Negroes are of a thicker Substance, and denser Texture, than those of white People, and transmit no Colour thro' them.

For the Truth of the first Part of this Proposition, we need only appeal to our Senses, and examine the Skins of Negroes when separated from the Body; when not only the *Cutis*, but even the *Epidermis*, will appear to be much thicker and tougher, *cæteris paribus*, than in white People. But, because the Substance and Texture, especially of the *Epidermis*, is not a little alter'd in anatomical Preparations, and that in such a Measure as to alter the Texture perhaps, on which the Colour depends, by Boiling, Soaking, Peeling, &c. let us examine the Skins of Negroes on their Body; where they will appear, from the following Considerations, to have all the Properties assigned: 1. In Bleeding, or otherwise Cutting their Skins, they feel more tough and thick, than in white People. 2. When the *Epidermis* is sepa-

(a) *De Morb. Cutan.* p. m. IV.

rated by *Cantharides*, or Fire, it is much tougher and thicker, *ceteris paribus*, and more difficult to raise, in black than white People. 3. Negroes are never subject to be sun-burnt, or have their Skins blistered by any such Degree of Heat, as Whites are; but, if we consider, that a black Body retains more Heat than a white one, or any other Colour, it will be very plain, that their Skins must be thicker or denser, *i. e.* more cartilaginous or callous, to ward off this Violence of the Sun's Beams. 4. Altho' their Skins, in some particular Subjects, should not be so very thick in Substance, yet in Winter, when they are dry, and not covered with that greasy Sweat which transudes thro' them in Summer, their Skins feel more coarse, hard, and rigid; as they do in ardent Fevers, with a dry Skin. 5. Their Exemption from some cutaneous Diseases, as the Itch, prickly Heat or *Effere*, which no adult Negroes are troubled with, but those of fine and thin Skins are most subject to, shew the Thickness or Callosity of their Skins, which are not easily affected from slight Causes. 6. But not only the Thickness, but likewise the Opacity of their Skins, will appear, from their never looking red in Blushing, or ardent Fevers with internal Inflammations, nor in the Measles, or Small pox; where, altho' the Blood must be forcibly impelled into the subcutaneous Vessels, yet it does not appear thro' the *Epidermis*. The like may be said of their Veins; which, altho' large and shallow, yet do not appear blue, till the Skin is cut. 7. In the Jaundice, *Anasarca*, &c. the Skin of Negroes never shews the Colour of the Parts under it; altho' visible enough in the Eyes: Of which I lately saw a more convincing

Proof

Proof in some Negroes labouring under a bilious Fever, in whom the *Serum* of the Blood, when let, was of a deep bilious Yellow, but no yellow Colour appeared on the Skin, altho' plain enough to be seen in the Eyes.

Corollary. From hence might be deduced one plain Cause of the Blackness of Negroes; for, if the Colour of the Skin depends on what it transmits, and the Skins of Negroes transmit no Colour thro' them, they must, for that Reason, appear black; according to the known Doctrine of Light and Colours, That, where-ever there is a Privation of Light or Colour, there, of course, ensues Darkness or Blackness. But, as most solid Bodies, which are not pellucid, do generally reflect some Colour, which we know no black Body does, we shall next inquire into the particular Make of their Skins, by which they are rendered incapable to reflect, as well as to transmit, the Rays of Light.

PROPOSITION III.

The Part of the Skin which appears black in Negroes, is the Corpus reticularis Cutis, and external Lamella of the Epidermis: And all other Parts are of the same Colour in Them with those of white People, except the Fibres which pass between those Two Parts.

For a Proof of this Proposition, we must examine the Structure of the Skins of Negroes more narrowly, which may be done after Blistering with *Cantharides*, or after a Scald or Burn; when their Skins have appeared to me in the following Manner: The Cuticle,

cle, which is separated, appears nighly of the same Colour on the Outside, as before such Separation from the Body; but, on the inner Side, is almost as white as the same Part in white People. This Cuticle is almost always, in Blistering with *Cantharides*, divided into two *Lamellæ*; especially on the Thighs, where it is as thick almost as both the Skin and Scarf-skin of white People: The Surfaces, by which these two Parts or *Lamellæ* of the *Epidermis* cohere, are partly white, and partly black; for you may see many black Fibres pervading the inner *Lamella*, and perforating the upper one, which appear like so many black Spots on these two Surfaces, when separated from one another; but these black Spots do not appear on the inner Surface of this inner *Lamella*; these Fibres being, as it were, contracted within the two *Lamellæ*, upon the external Surface of this inner one. The inner Surface of the outer *Lamella* of the *Epidermis*, or at least of the outermost of the two into which it is divided by *Cantharides*, appears to be a whitish Membrane, like the other Membranes of the human Body; except the foremention'd black Spots, which appear on this likewise, and the Colour it receives from its external black Surface, which appears, in some measure, thro' the inner Surface, and makes the Whiteness on it appear very superficial. This outer *Lamella* is thicker and tougher, and not so pellucid, as in Whites.

By scraping these *Lamellæ* of the Cuticle of Negroes, they may be made more white, and these black Spots scraped off, by which the under *Lamella* will become as white as any Membrane almost of white People; and several white *Striæ* may be scraped

scraped off from the outer *Lamella*, by which both its Surfaces will become more nighly of the same black Colour: From whence the Cuticle would appear to consist of, or be composed of, many different *Lamellæ*, and those of different Colours, so that the external one only is black; which Blackness is easily scraped off from the Membranes, by any thing that will abrade the *Fibrillæ*; but it is not to be removed by only soaking or wringing out the Cuticle in any common *Menstruum*, which might dissolve and extract any Juices in it; from whence, by the by, this Blackness would appear to proceed from these *Fibrillæ* and Scales, and not from any Juices. But, as these minute nervous *Fibrillæ* are distributed thro' and all over the other coarser Membranes, so they very easily render them black, by insinuating themselves into their Interstices (a).

Under the *Epidermis* of Negroes, when separated in a living Subject, by Blistering, appears, as it were, a third Membrane between That and the *Cutis vera*: This is the *Corpus reticulare* MALPIGHII, which differs from the same Part in white People in two Respects; for, in Negroes, it is of a black Colour all over the Body, where they appear black; and whereas, in white People, it is of a soft, pappy, or mucous Substance, and can hardly be separated but in pappy Flakes, in Blacks it is separated very often, by the Force of Epispastics, from both Skin and Cuticle, and may often be peeled off, like a Membrane, from the *Cutis*, as the *Epidermis* is from it; whilst in other

(a) Vide Newton. Opt. p. 222, Edit. Latin.

Places, by a less Force of the Epispastic, it is closely adhering to the *Cutis*, as the *Epidermis* itself often is: This membranous Expansion is of a much thicker Substance, or denser Texture, than the same Part in Whites; and from this seem to proceed the black Fibres, which pervade the *Epidermis*, and end in its external Surface.

The *Cutis* itself, which lies under this black membranous Expansion, and to which it is closely connected, is of a white Colour in Negroes, somewhat like the Skin of many brown-skinn'd white People; but when this black *Corpus reticulare* is upon it, after the *Epidermis* is separated, they appear, when both connected together, of a brown Copper-Colour, somewhat like the Colour of an *Indian* or *Molatto*; some of the Colour of the white Skin below being transmitted thro' this thin black Membrane: Which seems to shew, in what manner the Colour of these *Indians* and *Molattoes* may be occasion'd, by the Colour of the white Membranes under their Cuticles appearing partly and imperfectly thro' them, as the white Skin does thro' this *Corpus reticulare*.

From hence, the Formation of the *Epidermis* seems to be more easily shewn, and more completely deduced, than from any Preparation of it in white People. For the external *Lamella* of it manifestly arises from the *Corpus reticulare*, by the Intervention of the black *Fibrillæ*, which we have shewn to pervade the inner *Lamellæ* of the *Epidermis*; and this *Corpus reticulare* itself arises from the subcutaneous Nerves, so nicely and accurately delineated by *Eustachius*;

Eustachius (a): Each of the Fibres from this *Corpus reticulare* seem to form, or be expanded into, a small Scale, at their Termination on the outer Surface of the Cuticle, in the same manner as other Vessels of the Body, where not inserted into any Part, terminate in a membranous *Aponeurosis*. But these do not seem to be the only Parts of the *Epidermis*, as the white *Lamella* of it are plainly different from the black; for as this black *Lamella* is an Expansion of the nervous *Plexus*, which proceeds from the Nerves of the Skin, so it is very probable, that each Series of exhaling and inhaling Vessels, which, in like manner with its Nerves, proceed from the *Cutis*, and terminate here, may be expanded into a Membrane at their Termination; of which Vessels there seem to be three more Kinds; *viz.* the *Vasa arteriosa* or *exhalantia*, the *venosa* or *inhalantia*, and the *Vasa excretoria*, or sudorific Ducts form the Glands of the Skin; each of which proceed from the *Plexus* of Vessels or Glands, of which the Skin is composed; and, perforating the *Corpus reticulare*, terminate in a thin membranous Expansion; which, from the several *Lamellæ*, or *Strata*, of scaly Membranes, of which these two accurate Anatomists, *Cowper* and *Ryisch*, have observed the *Epidermis* to be composed: So that, as the *Plexus* of Nerves, which form the *Corpus reticulare*, is expanded over the *Plexus* of Veins and Arteries which compose the *Cutis*, to make them sensible, by their exquisite Sense, of any external Injuries; so the membranous Expansion of these Nerves, at

(a) Tab. Anat. XXI. XXII. XXIII.

their final Termination in the outer *Lamella* of the *Epidermis*, is laid over the open Orifices of these Vessels, at their final Terminations, to keep off the Injuries they might be exposed to, by an immediate Contact with the open Air, either in obstructing their Orifices, exsiccating their Substance, or exhaling their liquid Contents too fast, if deprived of such a Cover. From hence it will appear, how far the *Epidermis* may be said to be vascular or not; and that it is very probable, that this outer Coverlet or external *Lamella* of it, is a solid nervous Expansion, enjoying no Sort of Vessels, any more than the ultimate *Fibrilla* of the Nerves themselves can be supposed to do.

PROPOSITION IV.

The Colour of Negroes does not proceed from any black Humour, or fluid Parts contained in their Skins; for there is none such in any Part of their Bodies, more than in white People.

It has been the general received Opinion, since *Malpighi's* Time, that the Cause of the Colour of Negroes is a Juice or Fluid of a black Colour, which lies between the *Epidermis* and *Cutis*, in some aqueous Vessels, which serve to lubricate those Parts; which Opinion I would be willing to submit to, as others seem to have done, as far as the best Authority ought to go; but *Malpighi* seems to propose this, rather as a probable Opinion to be more thoroughly examined, than as an established one to be confided in; as would appear from his own Words, *Ex quo transeunter deduco haud incongruam forte Nigredinis*

Nigredinis Æthiopum Causam, &c. (a): And I must own I was formerly of that Opinion, thinking that the sulphureous oily Parts of their Fluids were more attenuated and exalted by the Heat of the Sun, and so rendered black, as we know happens to Oil when well boiled, and to our Tongues in ardent Fevers. But this Opinion needs only to be well and more thoroughly considered, to be confuted: For, if we consider the ill Qualities, and pernicious Effects to our Bodies, of any such exalted sulphureous Juices, no one will imagine that any Animal can live in Health, with any such Fluids in his Body; since all the Fluids of the Body constantly circulate, and communicate with each other; for such sulphureous Juices seem to be the Cause of black Tongues in acute Diseases, and of the Blackness of Gangrenes in some measure, which we know soon prove fatal, unless removed. Besides, these Juices must be secreted from the Blood, which seems to have no more Disposition to turn black, in black than white People: And, as these black Juices lie in the Skin, it is very probable, that they might often be exhaled, especially in Sweating; and might leave the Skin destitute of its black Colour, in some measure, at such times; which it never is, but appears rather blacker at such times, than any other. And as this Humour must be secreted from the Blood, and constantly exhaled and renewed again, it is very likely, that it would be often obstructed in its Secretion, or altered in Colour, in some morbid Cases, like the other Humours, as well as

(a) *Epist. Anat. Edit. Londin. p. 26.*

evaporated sometimes; which however we never see it to be.

But, however well received this Opinion may be, as being consistent with common Notions, yet it is very unphilosophical to assign any thing as a Cause, which does not appear to exist; and I believe that none will be able to shew the Existence of any such black Humour in the Skins of Negroes; for their Sweat, or the Water in their Blisters, which would probably contain some of this black Humour, was there any such thing, is as clear and white as in white People: Besides that the Existence of any Vessels in the Skin, which are supposed to contain this Humour, is not well agreed to by Anatomists. Mr. *Cowper* says, he never could find any such, altho' carefully sought for (*a*); and none else have ever been able to shew them: For the common Anatomists take the *Corpus reticulare* to be a mucous Substance, as they call it, which serves to lubricate the *Papillæ nervosæ*, and contains this black Humour; but, altho' it is of a soft pappy Substance in Whites, yet it cannot be called a fluid *Mucus*, any more than the Substance of the large Nerves, or of the Brain, from when it arises, and which are of a softer and more mucous Substance than it; besides that, in Negroes, it still more resembles a solid Membrane, being to be torn off like the *Epidermis*; and as it arises from the nervous *Involucra*, or Expansion of nervous Fibres, it probably contains no Fluids, or none but what are most pellucid and clear.

(*a*) Tab. Anat. IV.

Moreover, whatever this supposed black Humour may be, or in whatever it may be contained, it must be opaque, and the Fibres or Vessels of the *Epidermis* must be transparent, to shew this Colour thro' them; as we have shewn, that the Skins of Negroes, but not of Whites, are opaque (PROP. I. II): But it is very probable, that none of the subcutaneous Juices are opaque, they being the ultimate Secretions of the subtlest Fluids of our Bodies, which, instead of being opaque and black, must rather become pellucid and white; *Etenim Corpora omnium opacissima, si Partes ipsorum in summam usque tenuitatem comminuantur, evadunt continuo plane perfecteque pellucida (a)*. And the Skins of Negroes, being more callous or cartilaginous, must contain rather subtler, and more pellucid aqueous Juices, than those of white People.

Furthermore, if there was any such Thing as a black Humour in the Skins of Negroes, no doubt but it might be drawn out by some means or other; but, altho' I have macerated the Skins of Negroes, and particularly the *Epidermis*, in warm Water, which readily dissolves the Juices of the Body, yet I never could extract any black Juices from them, by any such Maceration, or even by a more powerful Expression; no more than Mr. *Littre* (as is related) could do, by more powerful Dissolvents. Nothing seems more likely to extract this supposed black Juice, than the Action of Fire, or *Cantharides*, upon the Vessels which contain it, which abrade and tear

(a) *Newton Opt. lib. II. Part 3. PROP. IV.*

the Vessels and Fibres of both the Cuticle and *Corpus reticulare* from the Skin, but leave them both as black as ever they seem to have been, altho' they would, no doubt, extract whatever Juices they might contain; as we see plainly they do, by the large Blisters, raised by such Applications, from the abraded Vessels spewing out their liquid Contents; in which Blisters there are no Tokens of any black Humours in Negroes more than in whites, as I have often found upon proper Trials; altho' if there was any such black Humour contained in their subcutaneous Vessels, there is no Doubt but it would appear, in some measure, in the Water of their Blisters, as well as the yellow Bile does, when diffused thro' the Blood, and upon the Skin, as I had lately some Opportunities of observing.

But it seems to be a total Overthrow of this Opinion, that the Blackness of the Skin in Negroes should proceed from the *Corpus reticulare*, and *Lamella externa Epidermidis*, as we have proved, *Prop. III.* For I believe that none, who maintain this Opinion, will or can, with any Pretence of Facts, or Shew of Reason, suppose, that these nervous, scaly, and dry Parts contain any such Juices, if they contain any at all, as it is most probable they do not, being the ultimate Expansions of nervous *Fibrillæ*, at their final Terminations; for no other Parts appear black, but these Two; whereas did this Blackness proceed from any coloured Juices, the other Parts or Membranes of the Skin and Cuticle, which seem more fit to receive such coloured Juices, would appear black likewise.

From what has been said, we may see how well their Opinions are grounded, who derive the Cause
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of the Colour of Negroes, from an Addition of the the Bile, or other atrabilious Humour, as they are pleased to talk.

PROPOSITION V.

The Epidermis, especially its external Lamella, is divided into two Parts, by its Pores and Scales, two hundred times less than the Particles of Bodies, on which their Colours depend.

Sir *Isaac Newton* informs us, that the Particles of Bodies, on which their Colours depend, are about 600 times less than those which can be discerned with the naked Eye; *Opt.* lib. II. *Part 3.* PROP. 7. But *Leeuwenhoeck* shews, that a Portion of the *Epidermis*, no bigger than what can be discerned with the naked Eye, is divided into 125000 Pores; which Pores must divide such a Portion of the Skin as can be discerned with the naked Eye, into 125,000 Particles; therefore each of these Parts of the Skin, between its Pores, must be about two hundred times less than those Particles, on which the Colours of Bodies depend; for $\frac{125000}{600} = 208\frac{1}{3}$; not to mention, that such a Portion of the *Epidermis* is further divided into 250 Scales, which must increase the Number of Parts into which it is divided. Nor will any one think, that the Smallness of these Parts and Pores exceeds Credibility, who considers, that they convey the minutest Particles of our last Digestions; and were they even large enough to convey the Particles of many Waters, it is very probable, that all our Fluids might in time evaporate thro' them. Nor is it any thing to our present Purpose, whether these Numbers be ma-

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thematically exact or no; all that I would endeavour to prove, is, that the Parts into which the Cuticle is divided, are less, in some Proportion, than the Particles of Bodies on which their Colours depend.

PROPOSITION VI. *Problem.*

To determine and explain the proximate Cause of the Colour of Negroes, Indians, white People, &c. from the foregoing Propositions.

We have shewn above PROP. I. that the Colour of white People depends upon the Colour which the *Epidermis* transmits, and not on what it reflects: This Pellucidity of Bodies proceeds from the Number of Interstices between the Particles which compose them, and the extreme Smallness of those Particles; for, in order to render a Body of any Colour, or fit to reflect the Rays of Light, its Particles, and the Intervals between them, ought not to be less than a certain Magnitude (*a*); else they become incapable of making any Reflexions, from their common Surfaces, *i. e.* of appearing coloured: But, by PROP. V. the Cuticle is divided into Parts, and Pores or Intervals between these Particles, far less than those on which the Colours of Bodies depend; that is, too small to reflect any Rays of Light from their common Surfaces, or to appear coloured from such reflected Rays: But, as such porous Bodies are always transparent, so the *Epidermis* is transparent enough, to shew any Colour reflected from the Parts

(*a*) Newton *Opt.* Prop. IV

below it: So that we must look upon the *Epidermis* of white People to be a transparent Pellicle, of too subtile or rare a Substance, and too minutely divided, to reflect any Rays of Light from its Surface; but consisting of Numbers of Pores, which readily transmit those Rays, through its thin and rare Substance, by which it shews the Colour of whatever Parts are below it; on which the Colour of white People depends.

But, as there are Numbers of Scales, or several *Strata* of scaly *Lamellæ* in the *Epidermis*, so this Transmission of the Rays of Light, from the subcutaneous Parts, must be imperfect, some of these Rays being intercepted in passing thro' the several *Lamellæ*; and the thicker the Cuticle is, *i. e.* the more there are of these *Lamellæ*, or the denser their Texture, the more the Light will be intercepted in passing them, and the more the Colour of the Skin will degenerate from the pure White of the Membranes below it. This is agreeable to Experience; for Mr. *Cowper* tells us, in his Anatomy, That the Thickness of the Skin proceeds from the Number of the *Strata* or Layers of Scales which compose it: And we may daily observe, that those who have such thick and coarse Skins, are never of so perfect and pure a White, as they who have a thin and fine Skin (as *(a)*-*Cowper* observes). But the Reason why such thick-skinn'd People appear of a yellowish or tawny Colour, will be plain, from *Newton's* Observations (*Opt.* lib. II. p. 1. *Obs.* 9. and 20.) ; where he shews a faint yellowish

(a) *Cowp. Anat.* TAB. IV.

Colour to be the one that proceeds from an imperfect Transmission of a White; for no one can say, but that both the internal Membranes and Humours of such swarthy People are of the same Colour in time of Health with those of the perfectest white Skins, as well as they are in Negroes. And this seems to be the Cause of the pale Yellow of dead Bodies, whose Skins are not perspirable, and, consequently not so transparent, as in a living Subject.

From this Account of the Cause of the Difference in Colour among those People that are white, we may account for the Cause of the Colour of *Indians*, and other tawny People, who seem to differ from one another in Colour, and from white People only in Degree, as they have more or less of this tawny Yellow proceeding from the imperfect Transmission of a White in their Colours: Thus if we proceed from the swarthiest white Person to the palest *Egyptian*, from thence to the fairest *Mussee*, *Molatto*, *Moor*, &c. to the darkest *Indian*, we may plainly see, that they differ from one another only *secundum majus vel minus*, according as they have more or less of the original White in their Colour: And as we have shewn this tawny Colour in white People to proceed from the Thickness or Density of their Skins, obstructing the Transmission of the Rays of Light; so it is very plain, that the same tawny Colour, in these other tawny People, which seems to be of the same Kind, but different in Degree, must proceed from a like Cause, that is, the Thickness or Density of their Skins; and, accordingly, it will be found, that all such People have Skins of a Thickness or Density proportional to the Whiteness or Darkeness of their Colours. The particular

particular Manner in which this Opacity, or imperfect Pellucidity of Bodies is brought about, Sir *Isaac Newton* explains to us (*Opt. ib. PROP. II.*); where he shews, that the Opacity of Bodies depends upon the Multitude of Reflexions that are made in their internal Parts; but it is very plain, that the thicker the Skin is, the more Reflexions the Rays of Light must suffer in passing thro' it, by which they will be extinguished, in proportion to the Number of such Reflexions; that is, the more opaque, or less white, it must appear: So that, altho' the Particles, of which white and dark skinn'd People are composed, may not be very different from one another, as they seem not to be; yet a greater Number of such combined Particles, or more *Strata* of them, in thick Skins, and the Smallness of their Intervals in Skins of a dense Texture, will increase the Number of Reflexions made in their internal Parts, or the Opacity of them; which renders them less white, since their Whiteness proceeds from the Number of the transmitted Rays.

In the same Manner, by which we have accounted for the Colours of tawny People, may we account for the Colour of those that are black: For, if the Skin appears darker and darker colour'd, the more the Rays of Light are intercepted by it, of course it must follow, that when the Rays of Light are intirely intercepted by a Body of the same Structure, (which the Skins of Negroes seem to be) it must be quite black; for Blackness always proceeds from a Suffocation of the Rays of Light, as those versed in the Doctrine of Light and Colours are well acquainted with: But we have shewn above (*PROP. II.*), that
the

the Skins of Negroes transmit no Colour or Rays of Light thro' them, on account of the Thickness of their Substance, and Density of their Texture, in the same manner as they are imperfectly transmitted in some white or tawny People, whose Skins appear to be of the same Structure with those of Negroes, and to differ from them in nothing, but in Degree of Thickness and Density, and in Colour; which different Density may therefore probably be one, if not the only Cause of this Difference of Colour. So that the Thickness and Density of the Skins of Negroes seems to be the grand Cause of their Colour, in the same manner as it is of *Indians*, *Moors*, &c. Which may be further confirmed by the following Considerations: 1. In the Cicatrices of their Ulcers, the thin and tender new-form'd Skin appears whitish, nay, perfectly white, in some, especially on the Shins, or those Places where these Cicatrices are thin; but, where the Skin is thick, or when these Cicatrices turn more thick and callous, they grow blacker in Proportion; as in those Places where the Scars grow thicker than the rest of the Skin, they are likewise blacker. 2. The Colour of the Water, contained in the Blisters of white People, may be plainly seen thro' their Cuticles, especially if tinted yellow, which cannot be perceived in the Blisters of Negroes: A plain Proof, that their Cuticles are not transparent, as those of white People are. 3. Infant-Negroes, whose Skins differ from Adults only in the Thinness and Rarity of their Texture, look whitish, in comparison to adult Negroes; but grow black, as their Skins turn thicker and denser. These Infant Negroes, labouring under an *Icterus*, look of a yellow Colour,

all over their Body; which the Adult do not, except in the Eyes, as I had lately an Opportunity of observing: A plain Proof, that the Colour of the Skin proceeds from the Colour which is transmitted thro' it; and that the Skins of adult Negroes transmit no Colour of any Sort. 4. But that the Thickness of the *Corpus reticulare*, the Part which appears black in Negroes, by PROP. III. may and does make it black, *Malpighi* give us an Instance in the said Part, in the Tongue of a Beef, in which it appears black, on the middle of the Tongue, where it is thick; but is white on the Edges and Checks, where it is very thin (*a*). As for the Manner in which this Blackness or Opacity is occasion'd by a thick or dense Skin, it will appear from what has been said about the Skins of tawny People: And it is very easy to conceive how the Rays of Light are intercepted, in passing thro' the thick and dense Skins of Negroes, which easily pervade the thin and rare Cuticles of Whites.

But, as the Skins of Negroes are of a denser Texture than those of Whites, they will be more apt to refract the Rays of Light; for the denser the Body, the greater the Power of Refracting (*b*); and the greater the Refraction of any Body is, the more apt it will be to absorb the Rays of Light; which is another Property of opaque Bodies, by which they become black: *Porro quo corpora videantur nigra,*

(*a*) *Malpighi de Lingua*, p. 15, 16.
PROP. X.

(*b*) *Newton Opt.*

neceſſe & multi Radii intercipientur, reſtinguantur, & inter ipſa intercitant (a).

Two Properties are generally aſſigned to all black Bodies, to be opaque and porous: Now the Skin is well known to be porous; and we have ſhewn, that the Skins of Negroes are opaque; to theſe we may add a third neceſſary Property of black Bodies, *viz.* the Minuteness of their Particles: For, as Sir *Iſaac Newton* ſhews, *Ad Nigrorem exhibendum, Particulæ adhuc minores eſſe debent omnibus illis, quæ Colores cujuſcunque modi exhibent: Nam Particulæ omnes majuſculæ pluſ reflectunt Luminis, quam ut nigræ poſſint videri (b)*; which Smallness of Particles we have above demonſtrated in the Skin (PROP. V.); and it is probable, that, in Negroes, the Particles of the Skin between the Pores are ſmaller than in Whites; as the Pores themſelves are ſo: From which Smallness of its Particles, the Skins of Negroes cannot reflect the Rays of Light; -- another Cauſe of their being black.

So that, from the Whole, we may conclude, that the proximate Cauſe of the Colour of Negroes is threefold; *viz.* the Opacity of their Skins, proceeding from the Thickneſs and Density of their Texture, which obſtructs the Tranſmiſſion of the Rays of Light, from the white and red Parts below them; together with their greater refractive Power, which abſorbs thoſe Rays; and the Smallness of the Particles of their Skins, which hinder them to reflect any Light. Q. E. I.

(a) *Newton Opt. PROP. V.II.*

(b) *Ibid. PROP. VII.*

SCHOLIUM.

I doubt not, but that those who are used to account for the Colours of all consistent Bodies, from the Reflexion of those Colours from their Surfaces, which is the common Way of accounting for the Colours of solid Substances, without noticing the Colours of pellucid Bodies; and are used to derive the different Colours of the Skin from differently coloured Fluids, appearing thro' its pellucid Vessels, as in most morbid Cases; may not be intirely satisfied, at first, with this Account of the different Colours of human Bodies being occasioned, as I have affirmed, by the more or less perfect Transmision of the Rays of Light thro' their Cuticles; which, from the different Thickness and Density it is observed to be of, is more or less fit to transmit those Rays; the more of which being intercepted, the darker the Skin appears; till, at last, being intirely intercepted by the thickest and densest Skins, as those of Negroes are, it appears, of no Colour, or looks black. But let such consider, that if the Whiteness of the Skin, in Whites, proceeds from the Thinness of its Substance, Rareness of its Texture, the Numbers of its Pores, and Minuteness of its Particles, by which Structure it transmits the Rays of Light; as is very probable, from this and the I. Proposition: If so, I say, there will be no Reason to suppose, but that the Colours of *Molatto's*, *Indians*, and Negroes, proceed from a similar or like Cause, and not from any particular new-induced Texture, by which their Skins may become less able, or intirely incapable, to reflect the Rays of Light; since their Colours seem

to differ from one another only in the Degree of one and the same Colour; and the Structure of the Skin seems to be intirely the same in both, except in the different Thickness or Density of it, which seems more fit to induce a Change of Colour from the different Transmission of the Rays of Light, than from the different Reflexions of it: For the ultimate component *Strata* of Scales, of which the Cuticles of both white and black People are composed, seem to be intirely the same in both, or, at least, but little, if at all, altered in their reflecting Powers, whatever they may be in their Opacity, or Pellucidity, from the different Assemblage and Combinations of them: Add to this, that the Colours of even the fairest Skins look more like a Colour proceeding from transmitted, than reflected Light; being more languid, or not so brilliant, as those Colours that proceed from such reflected Rays: For this Reflexion, even from the *Epidermis* itself, is of a shining silver White, as we have above remarked. Moreover, the denser and thicker the Body is, whose Colour proceeds from reflected Light, the more vivid its Colour will be, such Bodies being most capable of reflecting the greatest Quantity of the Rays of Light; but we have demonstrated above, that the thinner and rarer the Skin is, the more clear and bright its Colour is; which does not therefore, in all Probability, proceed from such reflected Light. I know very well, that the different Smoothness or Roughness of the Surface of Bodies tends much to brighten or obscure their Colours; but the darkest Skins, as well as those of Negroes, seem to be as sleek and smooth on their outer Surfaces, as those of the fairest Colour.

But,

But, as this Cause of the Diversity of Colours, which we have assigned, seems to be the most simple, and easily effected, like the Operations of Nature constantly observable in other Things, so it is most consistent with the Doctrine of Colours in many other respects; for, were not our Colours to proceed from the Parts under the *Epidermis*, which are always of the same Colour in all People of the most different Complexions; but the Skin was to be a solid opaque Body, which reflected our Colours from its Surface, like most other coloured Bodies; we should then, in all Probability, have People of all the different Colours in the Rainbow, and that in one and the same Nation; for the Skin is seldom observed to be of the same Thickness and Density in different Persons of the same Nation: But Sir *Isaac Newton* shews us, that those Bodies, whose Colours proceed from reflected Light, when they alter their Thickness and Density, change their Colours, not to a more or less perfect one of the same Kind, but to one of a different Kind (*a*): Thus a thin Plate of Talc, whose Colour proceeds from the Light reflected from its Surface, alters its Colour, according to its Thickness, to all the different primary Colours; and one of these Plates, of a pale yellow Colour, laid over another one of a blue Colour, turns of a deep Purple (*b*): This would probably be the Case of our Skins, was its Colour to proceed from reflected Light; since there are many different *Strata* of scaly Plates laid over one another in the Skins of different Persons, even

(*a*) *Newton Opt.* p. 195, &c.

(*b*) *Idem ibid.* p. 196.

of the same Nation, as Mr. *Cowper* informs us (*a*): And every one may perceive, that the Skins of different Persons are of different Thicknesses and Densities; and much more those of different Nations and Complexions: But when the Diversity of our Colours proceed from the different Transmissions of the Rays of Light, from one and the same coloured Bodies, such different Thicknesses of our Skins will only make our Colours vary from one another *secundum majus vel minus*, only in the Degree of one and the same Colour; by which alone will Negroes, *Indians*, and white People, or each of a Sort, differ from one another in Colour; and, consequently, their different Colours will proceed from Causes more uniform and alike, agreeable to the exact Symmetry of Nature in the Variations of other Things of the same Kind; so that, however different, and opposite to one another, these two Colours of Black and White may appear to be to the Unskilful, yet they will be found to differ from one another only in Degree; since Whiteness proceeds from a Reflexion or Transmission of the Rays of all Colours; but Blackness is brought on, by an Extinction or Suffocation of those same mixed Rays, which, probably, in the black Bodies, are reflected or transmitted in some small Quantity, as they are in larger or smaller Quantities, in proportion to the Whiteness of Bodies (*b*): And hence it is, that one of these Colours is more easily changed into the other, than to any other Colour; and where any Body loses its white Colour, it of course turns black, without any other Cause concurring, but a bare Loss of its Whiteness (*c*). From

(a) *Anatom.* Tab. IV. (b) *Newton Opt.* ubique. (c) *Iidem ib.*
whence

whence we may justly infer, 1. That there is not so great, unnatural, and unaccountable a Difference between Negroes and white People, on account of their Colours, as to make it impossible for both ever to have been descended from the same Stock, as some People, unskilled in the Doctrine of Light and Colours, are very apt too positively to affirm, and, without any Scruple, to believe, contrary to the Doctrine (as it seems to be) of the Sacred Pages. 2. That the *Epidermis*, besides its other Uses, tends to preterve the Uniformity of the Colours of People throughout the World.

PROPOSITION VII.

The Influence of the Sun, in hot Countries, and the Ways of Life of the Inhabitants in them, are the remote Causes of the Colour of Negroes, Indians, &c. And the Ways of Living, in Use among most Nations of white People, make their Colours whiter, than they were originally, or would be naturally.

My Design in this Essay was, not to treat fully of every thing relating to the Causes or Effects of the Colours of People, but only to inquire into the particular Make and Structure of the Skin, by which it comes to appear of so many and so diverse Colours in the different People of the World; and to explain, from *Newton's* Doctrine of Light and Colours, in what Manner these different Colours are produced from this particular Make and Structure of the Skin; which is, what I take to be, the grand Question relating to the unknown Cause of the Colour of Negroes; which has been often attempted to be determined,

mined, but with little Satisfaction to the Learned : For which Reason I have been more particular and explicit in delivering any Thoughts about it, as I have never known or heard of any such to have been delivered by any others. As for what relates to the remote Causes of the Colours of Negroes, it has been generally supposed ; although not universally believed, that the Power of the Sun in hot Countries is the principal, if not the only, Agent in producing this Effect : But, as the Authors of this Opinion seem not to have understood what Effect or Alteration is produced in the Make of the Skin, in order to render it black, so they have not been able to satisfy any one in this Point, and far less to vindicate their Opinion from many material Objections ; for it would be very difficult, if not impossible, to shew or prove, in what manner the sole Effect of Blackness is occasioned by the Power of the Sun, but not so difficult to shew how it may make the Skin thicker or denser ; which we shall endeavour in the next place to do, by shewing in what Manner the Power of the Sun is able to cause that Thickness and Density of Skin, which we have assigned as the immediate Cause of its black or tawny Colour. But as this Subject is much plainer, and more obvious, than the other, concerning the Make of the Skin, or the immediate Cause by which its Blackness is occasioned, so I shall not dwell long upon it, but only give the principal Heads of these Arguments, which serve to prove this Proposition : Which Arguments are of two Sorts ; *viz.* philosophical and historical ; the first of which I shall chiefly touch upon, being what are least understood, or, at least, hardly to be met with any-where else.

The

The Proof of the first Part of this Proposition will consist, chiefly, in shewing what Effect of the Sun it is which deprives the Skin of its white Colour, rather than what it is which causes it be black; for, to prove the Cause of Blackness, is the same as to prove a Negative; Blackness being a Negative with regard to Colour. The Skin then is deprived of its white Colour, by the Force and Influence of the Sun, these four Ways:

1. By being rendered opaque, from a Dissipation of its more aqueous and pellucid Juices. The known Effect of the Sun's Heat, and which will render all Bodies opaque: *Nam corpora ea, quæ sunt maxime pellucida, poterunt, occultorum suorum meatuum evacuatione, satis opaca evadere (a).*

2. By a Concretion of its Vessels and Glandules, from this Dissipation of their aqueous Contents, which renders the Skin both thicker and denser, or more callous or rigid. For the Skin being designed as a Defence to the other subcutaneous Parts, as the *Epidermis* is to the *Cutis*, they both wonderfully accommodate themselves to the Nature and Force of external Injuries, so as to become capable to defend the Body from them; as we see in Smiths, &c. constantly used to handle hot and hard Things, who have the Skin of their Hands become so thick and hard or cartilaginous by it, as to be able in time to handle even hot Irons: And thus it is, in a great measure, with the Skins of Negroes, *Indians*, &c. constantly exposed, and generally naked, to the scorching Heat of the Sun in a perpetual Summer.

(a) Newton Opt. 16. PROP. III.

3. By a new Accretion of many new Membranes, which render it thick and opaque. For the Sun-beams act as a vibrating Force, or external Friction, upon the Skin, which derives fresh Supplies of Juices to it; by which new Membranes, or *Lamelle*, are formed, in the same manner as the *Epidermis* is renewed when abraded, which is very soon and easily done. This is the Sense of a very great Philosopher; *Calor solis homines quibusdam in regionibus nigricante colore tingit, ut in Æthiopia, Guinea, &c. Non esse illud ignis effectum ostendunt vitrarii, continuo ad ignem occupati. Ratio, fortasse, quod ignes in sanguinem & spiritus agat ut exhalent, hominesque sic reddet pallidos & subfuscus: benignior autem solis calor sanguinem duntaxat in corporis extimas partes prolicat, concoquitque eum potius quam eliquat (a).* Which Derivation and Concoction of the Humours on the Surface of the Body must occasion a Thicknets of their Skins, as well as of their Lips, and other Muscles, especially of their Face.

4. By increasing those Parts or Principles, in the Composition of the *Epidermis*, which have the greatest refractive Powers. As the terrestrial, and fixed saline; but, especially, the tenacious sulphureous, which refract and absorb Light more strongly than any other Substances (*b*); whilst the more transparent and pellucid Principles, as the aqueous, spirituous, and volatile saline, are evaporated by the Heat, which causes the other more fixed Principles to be accumulated in

(a) Bacon *Hist. Natur Cent. IV. 399.* (b) Newton *Opt. PROP. X.*

greater Quantities, and combined in larger Collections; and these Particles, being likewise more comminuted by the Sun, will on that account be black, as happens to Oil when well boiled.

From what we have said above about the immediate Causes of the Colours of the Skin, it will appear, that these several Effects of the Sun's Heat contribute to make it of a darker Colour; and no one will doubt, I believe, but that all of them, conspiring together, may make it quite black.

To these, perhaps, might be added another Effect of the Sun's Power, a peculiar *Necrosis* of the *Epidermis*, occasioned by the forcible Vibrations, Contractions, and Exsiccations of its Fibres by the Sunbeams, which cause it to turn black, as these, or the other Parts, do by the Heat of an Inflammation or a Fever, in Gangrenes, black Tongues, &c. From whence only the nervous Parts of the Skin come to be black, and more hard and callous, and less pellucid, than the rest; and the Skins of Negroes, besides their Callosity, become more insensible than those of Whites.

But as there are many Degrees of Whitencess and Blackness in the Colours of the People in the World, depending upon the different Densities and Thicknesses of their respective Cuticles, as we have above shewed, it may not be improper, in the next place, to inquire into the more peculiar Causes of this Diversity, which will be found to be such as increase or diminish the Power of the Sun's Heat, or its Influence on the Body; by which the only material Objection that has been brought against this Proposition may be answered; *viz.* that the Sun's is not

the Cause of Negroes, because several Nations of People, in the same Latitude with the Negroes in *Africa*, are not made black by it.

The Causes of this Diversity may be referred to two Heads; *viz.* 1. The Nature and Temper of the Country. 2. The Ways of Living in it. Under the first may be included the following Particulars:

1. The Nature of the Soil, and Situation of the Country, with regard to Mountains, Waters, &c. which very much alter the Power of the Sun's Heat; for the differing Degrees of Heat and Cold, in different Places, depend, in a great measure, upon the Accidents of the Neighbourhood of high Mountains, whose Height exceedingly chills the Air brought by the Winds over them; and of the Nature of the Soil, which variously retains the Heat, particularly the sandy; which, in *Africa*, *Arabia*, and generally where such sandy Deserts are found, do make the Heat of the Summers incredible to those who have not felt them; as the learned Dr. *Halley* has remarked. Whence it will appear, that the Heat or Influence of the Sun is not always the same in the same Latitudes, as they imagine who start this Objection to this Proposition; but that in *Africa*, where the People are black, the Soil is as intemperately hot as the Climate, occasioned by the scorching Heat of its Sands, according to the just Account of *Lucan*,

— *per calidas Libyæ sitientis arenas;*

agreeable to the Accounts of all Travellers and Historians, especially those who talk of its inland Parts, where People first began to turn black. This Heat of the Soil must much increase the Heat of the Sun, and its Power upon the Body: And if the Sun is the Cause of

Black-

Blackness, must make the People blacker in such Places than any-where else ; which we see to be true of the Negroes in *Africa*, who are much blacker than the *Indians* of *Asia*, or *America*, who live in the same Climate, but inhabit more temperate Countries. This Power of the Sun will be much increased in such sandy Soils,

2. By the Scarcity, if not intire Absence, of large, spreading, succulent Plants; which afford, in other moist and more fertile Soils in hot Countries, agreeable cooling Shades, or a moist cool Atmosphere, from their Exhalations, which take off much of the scorching Heat of the Sun; which *Lucan* observes to be the Case in *Africa*:

Hoc tam segne solum raras tamen exerit Herbas.

3. The Want of Water must much increase the Heat of the Body, if not of the Sun; and conspires to the same Effects, as the more immediate Heat of the Sun itself. This is well known to be the Case in *Africa*, from the many Caravans that perish for Want of Water in 'travelling through its midland Parts (*vide* Geog. Nat. *Leo Hist.* *Africa*; as well as the Account we have of *Cato's* March thro' it, and many other Travellers): Besides, it rains so seldom in many Places of *Africa*, as to make it generally believed, formerly, that it never rained there at all; which must much more exsiccate the Body, and parch the Skin more powerfully, in these sandy Regions, where no Rain ever falls, but at a certain Season or two in the Year, than in more temperate Regions, altho' in the same Latitude.

2. The Ways of Living in many hot Countries, particularly in *Africa*, do very much contribute to

increase the Influence of the Sun upon the Body, or to thicken and harden the Skin, upon which its Blackness depends. These Customs are,

1. The Custom of going naked among most of the Nations of *Africa*, especially those that are black, both in former Days, as well as at present:

2. Living not only without Cloaths, but also without Houses, in a very barbarous and rude manner, little better than the wild Beasts; as the *Casars* do at this Day all over *Africa*; and was the Custom of the *Nomades*, *Troglodytæ*, *Numidians*, and many other barbarous Nations of old (a).

3. The Custom of wandering up and down in these sandy Deserts, in the scorching Heat of the Sun, stark-naked, with no House or cool Shade to retire to, nor Water to refresh themselves with, or cool their Bodies in:

*Nulla domus; plaustri habitant; migrare per arva
Mos, & errantes circumvectare penates.*

4. The Custom of most People in hot Countries of Anointing their Bodies with some greasy and unctuous Epithems, to defend their Skins from the scorching Heat of the Sun, will be found likewise to increase the Darkness of their Colours.

On the contrary, the Customs and Ways of Life in Use among the *Europeans*, and other Nations of fair Complexions, contribute to render their Skins whiter than they otherwise would be, or than they were, in all Probability, originally. These Customs seem to be, an almost constant Confinement, or rather Imprisonment, from the open Air; warm and soft Cloaths,

(a) Lud. Hist. Æthiop. lib. 1. cap. 14. Plin. Hist. &c.

Cloaths; warm Beds; Sitting by Fires; the Custom of Bathing much in Use formerly; a more succulent and nourishing Diet; Excess in strong Liquors; frequent Sipping of warm thin Liquors; and, in general, more luxurious and effeminate Lives; all which, with the Absence of the Sun, or Defences from it, tend to soften, moisten, and relax, the Fibres of the Body, and to render the Fluids more thin and watery; and, consequently, the Membranes composed of them, such as the Skin is, must be more clear and transparent; on which, we have shewn, its Whiteness depends; and, accordingly, we constantly see, that People of such Constitutions, or Ways of Life among us, are always the whitest. We might, indeed, consider the Effects of Cold upon the Skin in these northern Climes, where the People are white, were it not that those, who are the fairest among them, are the least exposed to it, and seldom or never feel its Effects; but the Whiteness of their Complexions seems rather to be occasioned by muffling themselves up against the Cold, than from being exposed to its Influence: For, as the *Cuticula* is a Sort of Cloathing to the other Membranes of the Body, and, by preserving the Whiteness of them, serves, besides its numerous other Uses, to keep up an Uniformity and Harmony in the Colours of People; so there is no Doubt, but that the Cloaths wherewith we cover it, preserve its Whiteness, or render it whiter, as every Fair-one knows: So that the different Customs of different Nations, in this respect, will tend very much, besides other Causes, to make that Alteration and Diversity so observable in their Complexions. So that it seems to be but a small Objection, if any at all, to this Proposition,

That the Natives of *Canada*, altho' but a cold and northern Clime, are of a swarthy Colour, whilst others, in the same Latitude in *Europe*, are white ; for the Customs and Ways of Life of these last seem very much to increase, if not occasion, the Whiteness of their Colours ; whereas the hard Lives, and savage Customs, of these *Canada Indians*, especially their going stark-naked all over (*a*), seem to have no Tendency to soften their Skins, or refine their Complexions ; not to mention their Custom of intermixing with the captive Women of southern Nations. But as the *Canada Indians* are the most northern, so they are the palest, of all *Indians*.

Hence it will appear, that the Power of the Sun's Heat in hot Countries, and its more immediate Application to the Body, or the Increase of its Force, by the Nature of the Soil, or Ways of Life, is the remote Cause of the Blackness, and the different Degrees of Blackness, of the Inhabitants of the Torrid Zone: Whereas the luxurious Customs, and the effeminate Lives, of the several Nations of white People, in the northern Climes, are the remote Causes of their respective fair Complexions. *Q. E. D.*

Altho' I have gone much further in this Epistle, than I expected or intended, or my Time would well permit, or the Nature of an Epistle would well bear ; for which Reason I have passed over what others may have imagined to be the Cause of the Colour of Negroes, and have abridged every thing as much as I well could ; yet I cannot but take notice, that as the Knowledge of any Cause is always conducive to
investigate,

(*a*) La Hontan. *Voyage*, vol I. lett. 16. vol. II. cap. 1.

investigate, and account for, many Effects depending on, or proceeding from, these Causes; so this Account of the Structure of the Skins, and Colour of Negroes, and other tawny People, if duly and attentively considered, will lead us to the Knowledge of many intricate *Phænomena*, in Nature and Diseases, either unknown, or not so easily accountable for before; whose Consequences, as they are of the greatest Concern to us, so I am unwilling to pass them over intirely in this Place; altho' a particular Discussion of each would require so much more Room, as to make the Tail of this Discourse bigger than the Body. I shall, therefore, only give you the principal Heads of what may be rationally deduced from the foregoing Propositions, as so many Corollaries from them, reserving the particular Discussion of each to another Opportunity; which as I have already framed to myself, from many convincing Observations, which I have made here in *Virginia*, so I shall present you with them, if you find these my Reasonings and Observations either agreeable to the Rules of sound Philosophy, or of public Utility.

Coroll. I. White Spots on the Skins of Negroes are as common, and proceed from the same Causes with red Spots on white People; *viz.* a Distention, Dilatation, and consequent Rarity or Pellucidity, of the *Vascula* of the *Epidermis*: From whence the Physical Causes of the total Whiteness of some Negroes, at their Birth, may be accounted for (a).

Coroll.

(a) *Vide* Hist. Caricææ apud Heliodor. of which I have seen an Instance in Virginia.

Coroll. II. The Hair of Negroes becomes short, stiff, and frizzled, from the Exsiccation of its Substance, and its excrementitious Moisture, by the Heat of the Sun; together with the Thickness and Density of the *Pericranium*, which hinders it to be further protruded.

Coroll. III. Many morbid Discolorations of the Body proceed rather from a preternatural Thickness and Density of the Membranes of the Skin, than from any Humours lodged in them, as is commonly supposed; and may be accounted for in the same manner, as the different Complexions in Time of Health.

Coroll. IV. The Bodies of Whites are more perspirable, than those of Negroes, but perspire less in hot Weather, and more in cold.

Coroll. V. White People are most healthy in cold, and black or tawny People in hot Countries; each being subject to Disorders, on a Removal to these respective Climes. ---- The Causes of the Diseases of white People in hot Countries are often opposite and contrary to such as proceed merely from Heat, which exalts the Fluids, exsiccates the Solids, and quickens the Circulation, occasioning severe acute Diseases; but the thin and rare Skins, and large Pores of white People, make them subject to too large cutaneous Evacuations of the most subtil and active Fluids; by which the Body is infecbled, and comes to be in an imbibing State, both on its external and internal Surfaces; and too readily imbibes the Humidity of the Air and Aliment, without a previous Digestion; causing a cold and humid, rather than a hot and dry, State of the Body;

Body; from whence proceed their lingering acute, and obstinately chronical, Maladies, more frequent in hot Countries than the former, especially among the Whites. ----- Negroes, notwithstanding their hardier Usage, are more apt to have their Perspiration obstructed in cold Weather, and contract Fevers from thence; whereas, in hot Weather, their thicker Hides serve as a Coat, to keep off the Power of the Sun, and preserve the Body against the Moisture of the Air, so remarkably great, and very pernicious, in all hot Countries, especially at certain Seasons, which are always sickly.----Hence, white People should be best cloathed in hot Weather, and Blacks in cold; a Thing much neglected in *Virginia*, tho' the Cause of one half of the untimely Deaths of both Sorts of People in it.

Coroll. VI. The perspirable Matter of black or tawny People is more subtil and volatile in its Nature; and more acrid, penetrating, and offensive, in its Effects; and more of the Nature, and more apt to degenerate to a contagious *Miasma*, than the milder *Effluvia* of Whites.---The Contagion of pestilential Fevers proceeds from a Subtilization and Volatilization of the perspirable Humours, by the Effects of a preceding Fever, as often, if not more often, than from any external Putrefaction, or mineral Exhalation.---Hence this Acrimony of the perspirable Humours of black and tawny People makes them subject to malignant and pestilential Fevers, from the same Causes which breed only putrid benign Fevers among Whites; and in them these Fevers are more apt to turn contagious, as they themselves are to be infected with such Contagion. --- From hence seem to have proceeded the first Seeds of the

Measles and Small-Pox, with the *African* or true Plague. --- From hence likewise proceeds the rank Smell, or peculiar *Fætor*, of dark-skinn'd People.

Coroll. VII. This Acrimony of the perspirable Humours, with the Thickness and Density of the Skins of black and tawny People, or Imperspirability of their Bodies, makes them subject to many severe cutaneous Diseases, accompanied with a Contagion, which white People never feel, but by Infection from them; and then these Diseases appear in other Shapes, with milder Symptoms, than in the dark skinn'd People which breed them. --- These Diseases, which I have observed among them, may be referred to the *Elephantiasis Græcorum*, or *Lepra Arabum*, two Species of which are called, the *Yaws*, and the *Joint-Evil*; with some others, not named, appearing in obstinate subcutaneous Ulcers. --- But the *Elephantiasis Arabum*, to which the Negroes are likewise subject, is not a cutaneous Distemper, as has been thought, but a peculiar Kind of Cachexy, accompanied with an atrabilious Cachochymy, as in those afflicted with the Hæmorrhoids; that being much the same Distemper in the Legs, as this is in the Hæmorrhoidal Veins. --- The peculiar Diseases of white People analogous to these of the Blacks, and which the Blacks never have, are the *Lepra Græcorum*, at least with furious Desquamations, the Itch, Scurvy, Eklere, and some smaller ones of that Kind. --- This cutaneous Malady of the Negroes, called the *Yaws*, laid the first Foundation of the *Lues Venerea*; which became to differ from it only by the Part affected,

affected, and the particular Manner of receiving the Infection, after being transplanted into another colder Clime, on People of a different Complexion; the virulent Acrimony of the cutaneous Contagion being inviscated, and consequently mitigated, by the *Semen* which received it; the subtler Parts of the Contagion being likewise exhaled in the white People, on account of the Perspirability of their Bodies, although the Distemper was drove more on the internal Organs, upon account of the Coldness of the Climate; and so appeared to partake less of a true cutaneous Malady, after this *Lues Venerea* was first propagated to *Europe*. Hence it is, originally, a cutaneous Malady, only to be cured as such; the Venom which attends it, and gives Rise to it, being to be evacuated, most surely and effectually, by the Pores of the Skin, as it was originally bred by the acrid *Effluvia* which pass thro' them. --- Hence the Nature, Origin, Progress, Alterations, and different Success of divers Methods of Cure of this *Lues*, may be accounted for; and the most rational Methods of Cure deduced.

Coroll. VIII. From what has been said about the Cause of the Colour of black and white People, we may justly conclude, that they might very naturally be both descended from one and the same Parents, as we are otherwise better assured from Scripture, that they are (*a*); which may remove the Scruples of some nice Philosophers on this Matter, who cannot or will not believe even the Scriptures,

(*a*) Genes. III. 20. IX. 19.

Scriptures, unless it be so far as they can be made agreeable to their Philosophy: For the different Colours of People have been demonstrated to be only the necessary Effects, and natural Consequences, of their respective Climes, and Ways of Life; as we may further learn from Experience, that they are the most suitable for the Preservation of Health, and the Ease and Convenience of Mankind in these Climes, and Ways of Living: So that the black Colour of the Negroes of *Africa*, instead of being a Curse denounced on them, on account of their Forefather *Ham*, as some have idly imagined, is rather a Blessing, rendering their Lives, in that intemperate Region, more tolerable, and less painful: Whereas, on the other hand, the white People, who look on themselves as the primitive Race of Men, from a certain Superiority of Worth, either supposed or assumed, seem to have the least Pretensions to it of any, either from History or Philosophy; for they seem to have degenerated more from the primitive and original Complexion of Mankind, in *Noah* and his Sons, than even the *Indians* and Negroes; and that to the worst Extreme, the most delicate, tender, and sickly. -- For there is no Doubt, but that *Noah* and his Sons were of a Complexion suitable to the Climate where they resided, as well as all the rest of Mankind; which is the Colour of the southern *Tartars* of *Asia*, or northern *Chinese*, at this Day perhaps, which is a dark swarthy, a Medium betwixt Black and White: From which primitive Colour the *Europeans* degenerated as much on
 one

one hand, as the *Africans* did on the other; the *Asiatics* (unless, perhaps, where mixed with the whiter *Europeans*) with most of the *Americans*, retaining the primitive and original Complexion. --- The grand Obstacle to the Belief of this Relation between white and black People is, that, on comparing them together, their Colours seem to be so opposite and contrary, that it seems impossible that one should ever have been descended from the other. But, besides the Falsity of this supposed direct Contrariety of their Colours, they being only different, altho' extreme, Degrees of the same Sort of Colour, as we have above proved; besides this, I say, that is not a right State of the Question; we do not affirm, that either Blacks or Whites were originally descended from one another, but that both were descended from People of an intermediate tawny Colour; whose Posterity became more and more tawny, *i. e.* black, in the southern Regions, and less so, or white, in the northern Climes: Whilst those who remained in the middle Regions, where the first Men resided, continued of their primitive tawny Complexions; which we see confirmed by Matter of Fact, in all the different People in the World. --- Agreeable to this, we see that the Heat of the Sun will tan, as the Saying is, the fairest Skin, of a dark swarthy, even at this Day; in which there is some Degree of Blackness; or, at least, this may well be said to be a Tendency to their primitive swarthy Complexions; *Rubescere cum nigredine quadam inceptit,*
says

say *Sennertus*. (a). So that if the Heat of the Sun will turn a white Skin swarthy, as nobody in hot Countries can doubt, the same Cause might turn the swarthy and tawny black ; for the Effect seems to be the same in one as in the other, and may therefore be produced by one and the same Cause. --- As for the black People recovering, in the same manner, their primitive swarthy Colours of their Forefathers, by removing from their intemperate scorching Regions, it must be observed, that there is a great Difference in the different Ways of changing Colours to one another : Thus Dyers can very easily dye any white Cloth black, but cannot so easily discharge that Black, and bring it to its first Colour : And thus, altho' the Skins of white, or even swarthy People, are easily affected by the greater Power of the Sun's Beams than what they have been used to, and thereby become black ; yet they are thereby rendered so thick and hard, or tough and callous, as not to be so easily affected, or readily wrought upon, to render them again of their original swarthy or pale Colour, by any of those Causes, as the Absence of the Sun, Coldness of the Climate, or Ways of Life in it, which we have supposed to be the Causes of the fair Complexions of the *Europeans* ; altho', I believe, it has never been tried, what Effect these luxurious Customs, or soft and effeminate Lives, which we have supposed to be the Causes of Mankind's turning to so tender and delicate Complexions as the *Europeans*

(a) *Prax. Med.* lib. v. part 3. cap. 1.

ans have, and to be the Cause of all Whiteness in the Complexions of Men, or Changes from a dark to a fairer Complexion, might have upon the Colour of Negroes; but this we are assured of, that they are not of so deep a Black, in cold northern, as in the hotter southerly Regions.---- Besides, we want not some convincing Instances, from the Gleanings of the few Historians I was furnished with here, to shew that such Changes have happened in the Memory of Men, and within the Compass of those Records we have of Time; for we could not suppose it to have happened all at once: Thus *Herodotus* tells us (a), That the *Colchi* were formerly black, with frizzled Hair; which (he says) he relates rather as a Thing well known before, than a bare Report; but there is no Sign of any Blackness in the Complexions of their Descendants, they being rather, especially about *Circassia*, reckoned some of the fairest People in the World at this Day.---- Captain *Smith* tells us, that, even in *Virginia*, an *Englishman*, by living only three Years among the *Indians*, became “so like an *Indian*, in Habit and “Complexion, that he knew him not but by his “Tongue (b):” And what might his Children have turned to in a Succession of many Generations, by these same Ways of Life, which had so altered him in three Years?---- The *Moors* and *Lybians*, being drove out of *Africa*, upon the *Turkish* Conquest, retired to the Land of the *Negroes* (c);
but

(a) Euterpe, 104.
Hist.: *Afric.* par. 1. sect. 3.

(b) *Hist.* *Virginia*, p. 116.

(c) Leo

but are no more to be found there of their original tawny Colour. The King of *Gualata* is supposed to be lineally descended from these tawny *Moors*, but is even blacker than the original Negroes (a). The *Habessines*, who came from *Arabia* originally (b), are no longer of their swarthy Complexion, but have got the black Complexion of the *Ethiopians*, whose Country they possess (c). The *Mosemleeks* of *Canada*, who wear Cloaths, and are more civilized than the other Savages their Neighbours, who go stark naked, are so much more refined in their Complexions by this Usage, as to be taken for *Spaniards*, and not *Indians* (d). Nay, the *Spaniards* themselves, who have inhabited *America* under the Torrid Zone, for any Time, are become as dark coloured as our native *Indians* of *Virginia*, as I have been an Eye-witness: And were they not to intermarry with the *Europeans*, but lead the same rude and barbarous Lives with the *Indians*, it is very probable, that, in a Succession of many Generations, they would become as dark in Complexion.

(a) Moore's *Travels*, 214.
c. 1. (c) *Idem*, l. 1. c. 14.
lett. 16. vol. 1.

(b) Ludolph. *Hist. Æthiop.* l. 1.
(d) La Hontan. *Nouv. Voyage*,

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