

There was a good deal of hæmorrhage from several small arteries, these were stopped by torsion. The whole loss of blood estimated at forty ounces. Several fragments of bone and teeth were removed; the molar bone, (which was broken through without loss of substance,) was replaced; the fragment adhering to the cheek was suffered to remain. The lips were now brought together each by two hare-lip sutures. There were several pretty severe lacerations lateral to the main wound, one of which passed quite through each lip, and prevented the possibility of bringing them into perfect shape again, although the deformity is now inconsiderable. These lateral lacerations required confining by stitches. A stitch was taken at the wing of the left nostril, one over the cheek bone, and another over the temple. The intermediate spaces closed by adhesive straps. The lips and cheek were now further supported by the application of a hare-lip bandage. He was very weak from the loss of blood; fainting whenever raised in bed. Took nourishment by means of a small flexible tube passed between the lips.

The teeth, gums, &c. being lost from the front of the lower jaw, the saliva oozed through the wound in the lower lip for two days, but not afterwards. On the sixth day after the accident, the bandage and stitches were all removed; the wound was found united by the first intention in its whole extent externally, with the exception of about an inch above the wing of the left nostril, and the same extent on the temple, at which places suppuration had commenced. The wound was now dressed by adhesive straps and bandage as before. On the twelfth day from the accident, the wound was entirely healed externally, and the wound in the roof of the mouth was now found nearly closed; but two small pieces of bone were projecting and removed. The large fragment containing the bicuspid tooth was moveable, but on the twentieth day from the accident it had become firmly united to the upper jaw, and the whole of the wound perfectly healed. He now suffers no inconvenience from the injury, except the loss of teeth. His speech is scarcely at all affected.

ART. VIII. *Case of Raccornissement, with Remarks.* By ALEXANDER L. BARON, of Charleston, S. C.

DURING the winter of 1831-2, at which time the Marine Hospital of this city was under our charge, Thomas Butler, a native of New York, a sailor, was admitted into the surgical wards of the institution. The individual was of robust make, aged about fifty years, and

of intemperate habits. On examination it was found, that while intoxicated, he had fallen asleep near a fire, and that such had been his state of insensibility, that a considerable period of time had elapsed, before he had perceived the extent of injury he had received. We found that both of his legs, from the knees downwards, had been severely burnt; inasmuch, that amputation of one, after consultation with gentlemen of eminence, was deemed absolutely necessary, and was accordingly performed as soon as practicable. The other leg, although not so seriously injured, had, nevertheless, sustained considerable destruction of the soft parts; large sloughs had formed, one of which, on the knee, was nearly four inches in diameter. To this leg we adapted the usual treatment. The amputation was performed above the knee, the injury having extended fully up to that point. The stump required a much longer time than usual before it had become completely healed, although every effort was made to induce as speedy a termination of the case as possible. Not only, however, was the duration of the case unusually prolonged; in spite of every precaution and means which was adopted, the stump presented finally an unseemly appearance, was irregularly contracted, even to deformity, and no doubt, if the individual be still alive, figures as a reproach to the operator, and as a voucher of his want of skill and good management, with those who are unaware of the history of the case. As regards the other leg, the ulcerations remained unhealed for a considerable length of time. When this was effected, however, equally extensive and obstinate contraction of the skin was the result, inasmuch, that it was not possible to flex this leg completely on the thigh. The indomitable character of these contractions was evident to all who witnessed the progress of the case, and was the subject of frequent remark by us to the students who visited the institution when under our control. We have refrained from giving the minutiae of the case, inasmuch, as our object is simply to draw attention to the contractions alone alluded to; while we offer the following remarks as an accompaniment, hoping thereby to elicit from the profession stricter inquiry than has hitherto been made on the subject of that peculiar property of animal tissue, styled *raccornissement*, as influencing the progress and ultimate cure of such injuries as result from the action of violent heat, or acids, &c. The case above given, is strikingly corroborative of this influence, although by no means remarkable for any obvious singularity or novelty. Before adverting to it more minutely, we would premise a few observations which are necessary to our elucidation.

The legitimate object and design of physiology, as exhibited in its

investigation and explanation of healthy functional performance, is not the only prominent feature which characterizes it as an important and highly interesting branch of medical science. We are irresistibly led to admire also the almost universal applicability of its fundamental principles to the examination of pathological conditions of the economy; and to this last we are the more forcibly induced to consent, whenever we are called on to make inquiry into the nature and character of various abnormal acts and their results, as compared with established normal acts or functions, and their consequences, occurring in the sound and healthy organs. We shall endeavour to point out this application as referable to that peculiar pathological condition of the external cutaneous system, characterized by indomitable contraction and corrugation of the same, which results from and constitutes one of the most unmanageable sequences of the action of violent heat or acids on the tissues composing this system. In other words, we would show that this formidable condition is, in fact, the consequence of the exercise of, and is capable of being explained by that special physical property of animal tissue, stiled *raccornissement*, or horny hardening of tissue.

BIENET, in speaking of this property, has hinted at its capability of exhibition in *burns*, confining however this exhibition to but one of the forms of the property mentioned by him, viz. the sudden, as the result of the sudden application of heat. He does not, however, allude either minutely or at length to this property as explanatory of, and mainly instrumental in producing those contractions which constitute the subject of these remarks. The term *raccornissement* has been applied by him to that particular hardening resembling horn, or corrugation and contraction, which *dead* parts only undergo on exposure to heat or acids; and the same is familiarly, although imperfectly, exhibited by leather or hide, when the hide has been subjected to the influence of heat, a curling up, not afterwards to be reduced without rupture, taking place. It is only of late years, that the property has been admitted by physiologists as a property at all, and cannot even now be considered as a physical property proper differing from all others, but simply as a *modification of contractility*. Still in common with all the physical properties, it is remarkable for the possession of that distinguishing characteristic which in the books is said to make the difference between the vital and physical properties, viz. the faculty of being exhibited after extinction of life only, the possession of the "*vis mortua*" of HALLER, which is denied to the vital properties proper. It is only with reference to this distinction, that Bichat alludes to the property as capable of being exhibited

in burns. He describes two forms of *raccornissement*, the sudden and the slow; the former of which, he affirms, cannot take place in the hair, *epidermis*, and nails; while the fibrous tissues, tendons, muscles and nerve, are most susceptible of it. He further states, that the slow form of the property *cannot occur during life*; while the sudden *may*, as is seen in burns, or which is equivalent, that the sudden is *compatible with life*, while the slow is *incompatible with life*.

With respect to the opinions, however, of this great authority on this subject, we feel it necessary here to state, that there is strange inconsistency. Bichat defines the property generally, to be that form of contractility which *dead* parts, parts entirely deprived of life, undergo on exposure to heat. Yet he subsequently divides the property, and then, in direct contradiction to this definition, endows the one form with the capacity for its appearance, and exercise *during life or in living parts*; while he deprives the other form of this capacity, in accordance with his definition. The inconsistency is evident, and we see no reason why both forms, as parts of a whole, should not be characterized by the peculiarities of that whole; while we are disposed to think that the inconsistency has arisen from a misconception of the afore-mentioned characteristic, which in the books, is said to make the difference between the physical and vital properties. This difference we have always thought to be too strongly drawn. It should be taken in a more qualified sense. It implies plainly that as an absolute requisite to the appearance and exercise of the one set of properties, life should be totally and entirely extinct; while the presence of life imperfect integrity, is indispensable to the exercise of the other, neither of which cases are wholly correct in fact. The error is the result of imperfect observation and inaccuracy of expression. Under no circumstances, we believe, is life, from whatever cause, simultaneously and instantly destroyed and annihilated. Its extinction is, in all cases gradual; sudden death being really only apparent, and not positive. As to this matter, the experiments of ROLANDO and MAGENDIE, have proved it conclusively. We allude to the removal which these gentlemen effected of the brain, or portions of the brain, and even the entire decapitation of animals; after which, it has been seen, that voluntary motion, and even sensibility were exercised. To the casual observer, sudden extinction of life would, indeed, be the inevitable consequence at least of decapitation. But the fact is not so. The extinction is gradual, and then the vital properties do not, as is commonly supposed, cease to be exercised suddenly; but do continue to be exhibited for a cer-

tain length of time, after the commencement of the extinction of life, or during apparent death; this state of dying continuing, until putrefaction finally arrests its continuance. So also of the physical properties; they in like manner commence their exhibition at the moment of the commencement of dying, and continue until arrested in the same way. Thus both physical and vital properties are in exercise until decomposition puts an end to the same; and it is unnecessary that life should be totally extinct, in order that they may be exhibited. The state in which they exist, although comparatively short, is yet by no means a state of positive death, but a state of comparative or negative existence; and life, or a modification of vitality, still maintained itself in the parts undergoing death. Such being the case, *raccornissement* being neither more nor less than a physical property, must be governed by the same rule or circumstances in its exhibition. Hence it should be defined, that form of contractility which *dying parts* undergo on exposure to heat; and of consequence both, or any number of forms of the same property, are alike subjected to the same rules. In other words, *raccornissement*, whether sudden or slow, may certainly be exhibited during life, or which is the same, *both, and not the sudden form only, are compatible with life.*

A still further error on the part of Bichat, with regard to the non-exhibition of the sudden form of the property in the *hair, epidermis, and nails*, is evidently attributable to the same misconception. He argues the correctness of his opinion as to the cuticle, from what he considered as established beyond doubt, viz. the non-vitality of this membrane. But whatever may be the arguments in support of the non-vitality of the cuticle, certain it is, that the same is at variance with sound physiology. Nay, a glaring inconsistency and contradiction both in terms and ideas, is the consequence of such an opinion. For, if non-vitality means any thing, it plainly means death, not apparent, but positive death; and to say that that which exists, is yet dead, is evidently absurd. So also is it unreasonable to believe that a part which is deprived of vitality should exist, as it does in such intimate union with parts avowedly and undeniably gifted with exalted degrees of vitality, while it at the same time subserves also such important purposes in the economy. Now, we have said that he has endowed the sudden form of *raccornissement* only, with the capacity for exhibition during life; and hence, arguing from the non-vitality of the cuticle, he affirms that the sudden form cannot appear in this membrane. If it he said, that he did not believe that the cuticle was absolutely and totally dead, but still endowed with

a slight portion of vitality, then is the inconsistency already alluded to above, still stronger; since, if his definition of the general property be granted, he is endowing the property or parts of the same, with contradictory capacities. Moreover, if the cuticle be vitalized, then, undoubtedly, the sudden form of the property should be capable of exhibition in the cuticle, since the sudden form, he affirms, is compatible with life.

But what is the truth as to the vitality of the cuticle; for upon this rests the argument we are sustaining? Amongst other reasons for supporting the belief of its partial vitality, we would mention the fact of its being capable of renewal when destroyed by any agency. Now, whether this renewal be a secretion or not, as has been supposed, it must still be dependent on nutrition for its perfect establishment, and nutrition itself being dependent on the existence of the highest integrity of vitality, it is evident that the cuticle must be possessed of vitality, although not in any very great degree, in comparison with other tissues. Again, if the cuticle, as some have it, be a coagulation of the rete-mucosum, as MECKEL supposes, it still seems plain that, inasmuch as the rete-mucosum must be, and is highly vitalized; so must the cuticle throughout be possessed of comparative vitality; otherwise, as it is, as the rete-mucosum the seat of the colour of the skin, as Meckel states, the action of external agencies would constantly destroy the same, which is not the case. Its retention of the colour we would regard as the result of the exercise of its vitality, although that vitality may be only a modification of the same. Again, we have the authority of Bichat himself for the following axiom, viz. that every organ which enjoys contractility, likewise enjoys extensibility. Indeed, he enumerates only these two as physical properties proper. Now, we have also the authority of Meckel for stating that the cuticle does possess extensibility. By virtue then of its possession of extensibility, must it, according to Bichat, possess contractility. The possession of these two physical properties then, implies distinctly, that the cuticle must possess vitality, since the existence of these could never have been determined, unless that vitality had ceased to exist anteriorly to their exhibition. If then, this membrane does possess vitality, not alone the sudden form of *raccornissement*, but also the slow, as well as every other form of the property may occur in the same, since we have shown that both are compatible with life.

As to the hair and nails, we regard them as the cuticle, possessed of certain degrees of vitality also, and therefore capable of giving place to the exhibition of the property. But facts are stronger than

arguments, and we would adduce in evidence of the exhibition of it in the hair, the use of the barber's curling tongs, and the practice of baking hair with a view to curling it, both of which are familiar examples of the property in the results they effect. With regard to the nails, a striking instance offered at a recent fire which occurred in this city, in which a horse and dog were destroyed, whose remains we had an opportunity of examining. The hoofs were split, and each split portion or part scaled off, exhibited the property distinctly. Thus we think that raccornissement may be exhibited in the hair, epidermis, and nails; and we have Bichat's authority, that the fibrous tissues, especially the tendons, muscles, and nerves, are most susceptible of it. Hence, we draw the conclusion, that the external cutaneous system in general, is capable of exhibiting the property; at least, it cannot be denied to the dermis or *cotis vera*; since upon the authority of both MECKEL and OSIANDER, the latter of whom endows it with distinct *muscular* power, this layer of the system is evidently fibrous in its nature, and therefore, according to Bichat, highly susceptible of it.

Thus we arrive at these two facts, which may be considered established, that raccornissement, whether sudden or slow, is compatible with life, and that the external cutaneous system, as a whole, is capable of exhibiting the property.

If then it is true, that the physical properties are, in their exhibition, compatible with life, it of necessity follows, that inasmuch as vitality in all cases must be subjected to the influences of various agencies, capable of modifying the same in various ways, as well as of changing its character as to its degrees of activity, so must the exhibition of these physical properties be correspondingly influenced in their degrees of exhibition, by these same agencies. In proportion as they are exhibited, will the vitality be diminished. As they commence their exhibition upon the commencement of the extinction of life, so as that life becomes progressively diminished, will they be progressively increased in the strength of the same. Raccornissement then, being one of the physical properties, must as these, be subjected in its exhibition, wherever it may take place, to the same rules which govern the physical properties generally. That as regards the external cutaneous system, if an iron, made *not quite* red hot, be applied to the skin, the cuticle or first covering of the same will become hardened; while, if applied *quite red hot*, it will cause the same to become smooth, hard, and crisp, and when applied at the *white heat*, it will entirely remove the cuticle, consuming it. In each of these degrees of heat applied, have we instances of the slow, sudden,

or gradual extinction of vitality, and the consequently gradual exhibition of the physical properties. In other words, we have strongly marked degrees of the property called *raccornissement*.

Now, if the application be made with such rapidity and violence as to destroy parts to a certain extent, it follows, of necessity, that the influence of the destructive agent cannot be confined in its effects to the parts so totally destroyed alone. It must, undoubtedly, extend to a greater or less extent in various directions in the adjacent and subjacent structures. This is evident, we apprehend, from the consideration of the fact, of the possible, nay, absolute transmission of irritations so universally observed. The rule which governs this transmission, is the same which regulates the abstraction or destruction of vitality. Thus, a certain portion of the tissue is totally deprived of vitality, but the adjacent tissues must come equally under the influence of the destructive agent, and their respective vitalities must, of necessity, be more or less impaired or modified, precisely in the same way that a focus of irritation being once established, the transmission of the same must, of necessity, take place in the neighbouring structures, in proportion to their respective susceptibilities; for instance, a portion of the cuticle is totally destroyed. Now, the destruction does not stop here. That portion also, which is immediately subjacent or adjacent, must likewise lose a portion of its vitality, or the same must be modified; for we have no reason to suppose, nor is the fact so, that a portion of the vitality of any one part should be alone affected, that only a certain part of the vitality which pervades the whole cutaneous system, should alone suffer by the agent. Inasmuch as life is a whole, pervading the economy in certain degrees of force and integrity, the destruction of a part must implicate the remainder. Thus, when a portion of the cuticle is totally destroyed, all the subjacent and adjacent portions must, in some degree or other, feel the influence of the destructive agent; and moreover, the loss of their vitality, must of necessity, be inversely at the vicinity of each parts to the focus of destruction; so that those portions of the tissues nearest will, therefore, be deprived of a greater portion of their vitality, than those at a distance, and this also in accordance with the degree of integrity of vitality, which each individually and respectively possesses. Therefore, it is plain, that as *raccornissement* depends, for its more palpable or partial exhibition, upon the positive or partial deprivation of vitality, so, for instance, in the external cutaneous system shall we have more or less decided exhibitions of the same in this system, in proportion to the total or partial deprivation of the vitality of its component parts.

In what manner now are the foregoing remarks applicable to the case whose history we have given? i. e. as far as the contraction, which rendered it remarkable are concerned? We would remark, here, that in every case of burn, contraction must be exhibited as an effect, from simple temporary contraction, even to those formidable contractions, which constitute the hideous deformities which succeed the more highly aggravated forms of the injury; and we cannot otherwise believe than, that these contractions are neither more nor less than exhibitions of *raccornissement*. As regards the case, we know of no other cause to which they can be attributable, proceeding as the injury did, from the action of violent heat. Every feature of *raccornissement* was exhibited. The contractions resisted every effort to reduce them, progressing slowly but certainly during the treatment of the injury, uncontrilled and contrulling every plan of resistance. That they were not similar to contractions which result from wounds was evident. In these last, although upon the termination of the healing process, contractions do occur, and particularly so in uneven, ragged and lacerated wounds; still these are attributable to the want of juxta-position of the torn fibres of the parts, by which the regularity of these contractions are interrupted; while in simple incised wounds, where exact juxta-position can be effected, we have no irregular cicatrix resulting. In such instances the degree of contraction is much less formidable, and moreover reducible, at least by the knife if necessity requires it. But in the contractions from burns, this is next to impossible, as the experience of every surgeon abundantly testifies. We confess that we were not surprised at the appearance of the property in the leg which had not been amputated. In this we expected it, and made use of every means to prevent it as far as possible, unsuccessfully, however, as has been said. In the other leg we were sanguine of non-interruption from the contractions, inasmuch as the operation had been performed above the knee, and at a distance from the extreme point of injury, by which we had hoped to have rendered the operation similar to common cases of amputation, the result of which would have been that usually observed; as well as of placing it beyond the control of the property. But in this we were again disappointed. Thus, although previously satisfied that the influence of the property would be observable in the one, we by no means anticipated its occurrence in the other. It was this occurrence which induced us to remark upon the case at the present length; and confirmed us in our opinion, that contraction as a sequence of burns is to be attributed to *raccornissement*. The operation performed, was the double flap, and when the flaps were approximated, they approached each other so closely, as to present nearly a simple incised wound.

This also induced us to suppose that we should have been favoured with a "beautiful stump." The result, however, proved the reverse, although we selected this mode of operating as most favourable to the anticipated issue.

But in what way are the conclusions we arrived at as to the property generally, applicable here—the first of which was that *raccornissement*, whether sudden or slow, is compatible with life? In the present instance, we had exhibitions of both forms, inasmuch as at no period of the injury, was there ever a total extinction of vitality. The application of heat was both suddenly and violently, as well as slowly made, and moreover was prolonged. Allowing, therefore, that the vitality of the parts was in perfect integrity, the immediate effect of the sudden application must have been that of a decided and considerable extinction of a portion of the vitality; while, on the other hand, the consequent effect of the same application, slowly made, must have been a prolonged and continued extinction of the same vitality. In neither case was the life of the parts totally extinguished, for if so, then would we have had, according to Bichat, an exhibition of the slow form of the property only, since he affirms that this form alone cannot take place during life, which was not the fact. But the vitality of the parts was not in perfect integrity, for the injury occurred in severe winter weather, to which the individual had been exposed, the effect of which in combination with his intemperate habits, must have been that of impairing or decidedly modifying the vitality of the extremities at least. This modification we regard as an efficient cause in assisting the promotion of the exhibition of both forms of the property. The parts were then in a fit condition for the exhibition of the physical properties, and consequently of *raccornissement*, as one of these; since life in them was in a measure extinguished, although still present in comparative integrity. Again the condition of the ulcerations in the leg not operated on indicated the exhibition of both forms. The sloughs here afforded evidence that although a portion of the tissue had ceased its exhibition, since putrefaction had commenced, still life must have been originally present; while other portions continued the exhibition, as has been shown in this, that the contractions took place not alone in this leg, but in the stump, proving also that life existed in these. Now Bichat correctly observes, that putrefaction destroys both forms of the property. The putrefaction, however, had not reached but to a certain extent, and hence the contractions in the adjacent tissues occurred, which proves we think conclusively that both forms were exhibited, or again that both forms are compatible with life, as the case corroborates.

Next as regards the appearance of both forms, in the external cu-

taneous system, which was particularly the seat of injury in the case. Independently of what has been said as to the possibility of the occurrence of both forms in the cuticle, arguing from its vitality, it is plain from the fibrous character of the dermis, that the sudden form at least, may have made its appearance in this membrane; since the fibrous tissues especially are most susceptible of it. But we think that both forms were exhibited in the system, because if the sudden form had not made its appearance in the cuticle, according to Bichat, the slow at any rate, must have done so; otherwise we should have had the extensibility in the cuticle, acting as a counteracting force to the contractility in the dermis, the result of which counteraction would have been but a moderate deformity in the leg operated on, which was the reverse of the truth. Again, this would have been more evident in the stump, which was wholly at a distance from the original seat of the injury; for at this distance any exhibition of contraction would plausibly enough have prevented in the cuticle at least—the dermis would have enjoyed the full play of its contractility, opposed of course by the same extensibility of the cuticle, but in greater force, and the deformity would have been still less, which was far from being the case.

And now as to the degrees of the appearance of this property. Notwithstanding what has been said on this point also, we have evidences that in this case, *raccornissement* was exhibited by degrees decidedly. It is plain that the destruction of vitality could not have been uniform throughout the whole extent of the injury, since in some parts the destruction was greater than in others. In other words, we had radiations of destruction proceeding from a certain focus, and therefore in each of these, must there have been different degrees of the exhibition of the physical properties, and consequently of *raccornissement* also, as one of these, or a modification of these.

We cannot, from these observations, arrive at any other conclusion, than that in this case we have undeniable evidence of the fact, that *raccornissement* was strongly and certainly exhibited in all its forms; as well as that the contractions which rendered it so remarkable, were alone attributable to the exercise of this property in the external cutaneous system, which was the seat of the injury.

We further, if the preceding remarks be correct, determine this general fact also—that *raccornissement* is the only true mode of accounting for the exhibition of those contractions which so universally take place in the severer forms of burns. The similarity alone, which exists between these contractions, their peculiarly distinguishing characteristic, and those which mark the exhibition of the property would

be sufficient to test the accuracy of the fact. In both, the same obstinacy of contraction and rigidity of fibre occurs; in both it is impossible to reduce this rigidity; in both the tendency to recontract is equal; in both we observe the dependence for exhibition on the integrity of vitality, or certain modifications of vitality; and lastly, in both we might consistently say, that we know of no universally successful method, as surgeons and the books abundantly testify, by the agency of which we can force the contractions to yield permanently, except that of decomposition, by which after vitality is totally and irretrievably extinct, the physical properties are ultimately destroyed. At least we have analogy and deduction in aid of our assertion, that this similarity argues the truth of our proposition.

The above remarks have been thrown together without regard to order or regularity of argument, and are therefore not to be viewed in the light of a well connected essay.

Charleston, May 14th, 1835.

ART. IX. *Cases in Midwifery*. By WILLIAM RANKIN, M. D. of Shippensburg.

CASE I. *December 1st, 1831*.—Mrs. B. about three months ago, sent for me to visit her, in consequence of uterine hæmorrhage. I found her discharging considerable quantities of blood from the vagina. Her pulse was hard and full, accompanied with some pain in the uterine region. She was in the sixth month of her gestation. Apprehensive that the uterus was disposed to discharge its contents, and that the woman would must probably suffer an abortion, if the uterine pain and hæmorrhage were not speedily arrested, I drew from her arm as much blood as she could bear, syncope being threatened; had cold applications made to the external parts of generation, as well as over the lower part of the abdomen, and prescribed a styptic pill, composed of sacch. saturni. three grains, and opium, half a grain, to be taken every hour, until the hæmorrhage should moderate, enjoining, at the same time, absolute rest in a recumbent posture, and a strict antiphlogistic regimen. The violence of the discharge soon abated; but during the remaining three months of her gestation, she had almost constantly a slight discharge of blood from the vagina, especially on the least exertion; and on two occasions, during this period, she had nearly as copious hæmorrhage as at the first call for assistance. Intermitting fever was prevalent in her vicinity at the time of the attack of