

Croup : case of traumatic hemorrhage following tracheotomy, arising from the imperfect form of the tracheal tubes used, and some remarks on the treatment of croup by inhalation of steam, illustrated by cases / by Lewis A. Sayre.

Contributors

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*D. W. Winslow Junr. with the kindest regards
to Lewis A. Sayre*

CROUP.

CASE OF TRAUMATIC HEMORRHAGE FOLLOWING TRACHEOTOMY,

ARISING FROM THE

Imperfect Form of the Tracheal Tubes Used,

AND SOME REMARKS ON THE

TREATMENT OF CROUP BY INHALATION OF STEAM.

ILLUSTRATED BY CASES.

[Reprint from the Transactions of the Medical Society of the State of New York, 1864.]

✓
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Bellevue Hospital, Medical College.



ALBANY:

VAN BENTHUYSEN'S STEAM PRINTING HOUSE.
1864.

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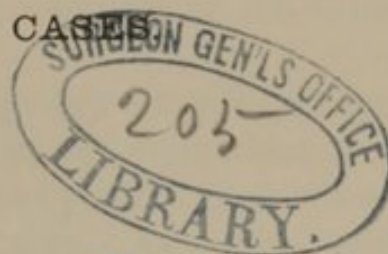
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CASE OF CROUP.

(DEATH BY TRAUMATIC HEMORRHAGE.*)

Dec. 31st, 1863. Called to see Lizzie Taylor, aged ten years, small, delicate, of very even temper and good intelligence; had caught cold about Christmas; had been treated with domestic remedies, with fair success; but last night and this morning her mother thought her symptoms croupy and sought advice; child sits quietly; breathing not hurried, but whispery; cough not stridulous; fauces slightly red, but no sign of deposit; speaks in a whisper; skin soft and moist; pulse frequent.

Jan. 1st, 1864. Found patient improved and down stairs helping to receive company; had a slight exacerbation of cough and difficult breathing at 3 A. M.; but now, except the whisper of the voice, evidently better.

Jan. 2d. Not quite so well; breathing more difficult; whisper more intense, but no croupy noise in coughing or breathing.

Jan 3d. Summoned at 6 A. M.; to find patient much worse; breathing most difficult; asphyxia imminent. As a last resort Dr. Lewis A. Sayre was summoned, and at 10 A. M. performed tracheotomy. The neck of the patient was short and a large vein ran in the very path of the knife; these, with a similar invasion of deeper vessels, protracted the operation. The muscles and portion of thyroid gland exposed were nearly black. The opening was made by taking out a portion of the 1st and 2d cartilaginous rings. On the introduction of the tube the patient soon revived, and her dark blue countenance grew of natural hue. The third or fourth expiration expelled to the distance of six or seven feet several pieces of false membrane, two of which were hollow and nearly half an inch long. She was then placed in a room 90° temp., which was filled with vapor.

* The history of the following case, with the exception of the post mortem, is from the notes of Dr. J. McCune Smith, who had charge of it before I saw her.

Jan. 4th. Patient passed a restless night, having some wind colic; breathes comfortably through the tube; lips red; countenance clear.

Jan 5. Rather restless again at night; breathes well; bowels moved; the expectoration less tough and less red; there is evident passage of air through the *rima glottides*, as the *alæ nasi* move with each inspiration; anorexia, but this is an old habit.

Jan 6th. Less restless at night; slept calmly two hours; rather more discharge from bronchiæ, but of paleish color; *noticed a small piece of false membrane hanging in the orifice of stationary tube*, causing a vibrating noise with each breath movement; removed it by forceps; mentioned this to Dr. Sayre; in cleaning out the same tube he found a drop of red blood on the feather, and exclaimed "I don't like this;" remained with patient until 10½ P.M.; noticed the stationary tube and its orifice for some minutes; they were perfectly clear; less thirsty, but when drinking was apt to be attacked with a slight cough, with mucous expectoration; she has taken some nourishment to-day, coaxed by Dr. Sayre.

January 7.—At half past 8 o'clock summoned hurriedly, as the patient was bleeding; found her dead; a muco-sanguineous froth oozing from the stationary tube, about color of expectoration of second day of operation; the feet were sprinkled with blood; the patient had passed the best night of any since operation; had called (by signs) for the inner tube to be removed; her father removed it and with it came a gush of blood as if she had been cut; on percussion, chest is resonant; on autopsy, lungs exhibit no signs of congestion, nor are the bronchia filled with blood; the stationary tube, on removal, showed the orifice towards lungs clear and nearly clean; the external orifice is filled with a clot of blood."

Post Mortem of Miss Taylor, No. 11 Varick-st., January 7, 1864, 12 o'clock, A. M., assisted by Drs. McCune Smith, Bernacki and Sterling.

Patient perfectly blanched and exsanguinated; rigor mortis not much marked; thorax perfectly resonant upon percussion anteriorly and laterally; liver slightly enlarged; upon removing the adhesive plaster, found lower portion of external incision healed by first intention nearly up to the tube; the stationary tube which had not yet been removed, had a clot of blood hanging into it from the finestra or opening on its upper surface; on com-

pressing the thorax a frothy mucus, slightly stained with blood, was oozed out through the tube; on cutting the adhesive straps and pulling out the tube, a fibrinous clot of 4 or 6 lines in length was pulled out continuous with the clot which projected through the finestral opening on its upper surface, before referred to; as the clot broke on pulling, the outer portion which adhered to the instrument, and was of a dark red color, was drawn off from its central portion, like a glove from a finger. This central portion was much paler than the outer, and remained adherent to the neck, directly in the mesian line of the body; on pulling it with the forceps, it *came out of a hole*, in a vessel of some considerable size, and was followed by a small quantity of liquid blood which flowed for some time.

After sponging the parts very carefully, and until all flow of blood had ceased, this opening in the vessel was distinctly visible, about the size of a large pin's head, almost perfectly circular, and with no disposition to collapse, but remained open, like a gimlet hole in a board.

The sternum was then removed, and the lungs, trachea, larynx and tongue, together with the uvula and posterior wall of the pharynx were removed; a probe was passed in at the opening in the vessel, and passed about half an inch across the neck; another probe passed in at the same opening, passed in the opposite direction in the same vessel; a careful dissection of the parts was then made; and this vessel proved to be a large vein which traversed from right to left across the neck, inclining downwards towards the left, and ran over the top of the tube, and had been lying directly on a portion of this finestral opening, and had been sloughed through by pressure on its edges.

The small flap which Dr. Smith removed the day before death, was the outer coat of the vessel, which had sloughed off, and was hanging in this opening, and then the inner coat bulged or bagged out, or rather into, this finestral opening like an aneurism; and as the inner tube had unfortunately a similar opening, it bagged into it, and the suction of inspiration had a still stronger tendency to draw it into the opening; and as the father removed the inner tube, this sack or bag was clipped off as if between a pair of shears, thus making a hole in the *side* of the vessel, which, not being able to collapse, resulted in the fatal hemorrhage, before any medical assistance could arrive.

There was no adhesion of the pleura; the lungs, together with

the trachea, were exhibited at the Pathological Society the following evening, when Dr. Flint and others who examined them, pronounced them perfectly healthy. The accompanying drawing shows the opening in the trachea, and also the opening in the vein into which the two probes were inserted—each running in an opposite direction. (Fig. 1.)

These drawings represent the tubes that were used, and show the finestra which were too high up on the tubes near their orifice, and part of the opening being outside of the trachea, was covered by the soft parts and traversed by the vein, which lying on its edges, was finally cut through by them. (Fig. 2.)

These drawings represent the change I have made in the tubes by cutting the finestra lower down so as to be entirely within the trachea. (Fig. 3.)

That the death in this case was produced by the hemorrhage, which was caused by the slough in the vein lying on the sharp edges of the openings in the tubes there can be no possible doubt; and as I have examined a number of tracheal tubes at Bellevue Hospital, and at the different instrument makers, and find them all made after the same pattern, I have deemed it of sufficient importance to make the same public for the benefit of the profession.

In connection with this case, I would mention two others upon which I have operated, in the practice of Dr. Johns, of this city, and which show conclusively the importance of *respiring steam*, even after the operation has been performed.

On the 25th July, 1860, I was called at 3 o'clock, A. M. to see Ellen O'Grady on the corner of Broadway and Morris-st., aged three years. She had been ill since the 18th with croup, and when I arrived she was almost moribund from suffocation—face livid, pulse very rapid but indistinct, respiration exceedingly difficult, and attended with the distinct croupy sound. I immediately opened the trachea, assisted by Drs. Johns and Knight; a probang was pushed into the trachea, wet with a 20 grain solution of nitrate of silver, a large quantity of false membrane was coughed up, and the respiration and circulation was immediately restored. Not having any tube with me at the time, a silver wire was passed through the edges of the wound on either side, and secured behind the neck, in order to keep the wound open. The room was directed to be filled with steam, and the child generously nourished.

Fig. 1.

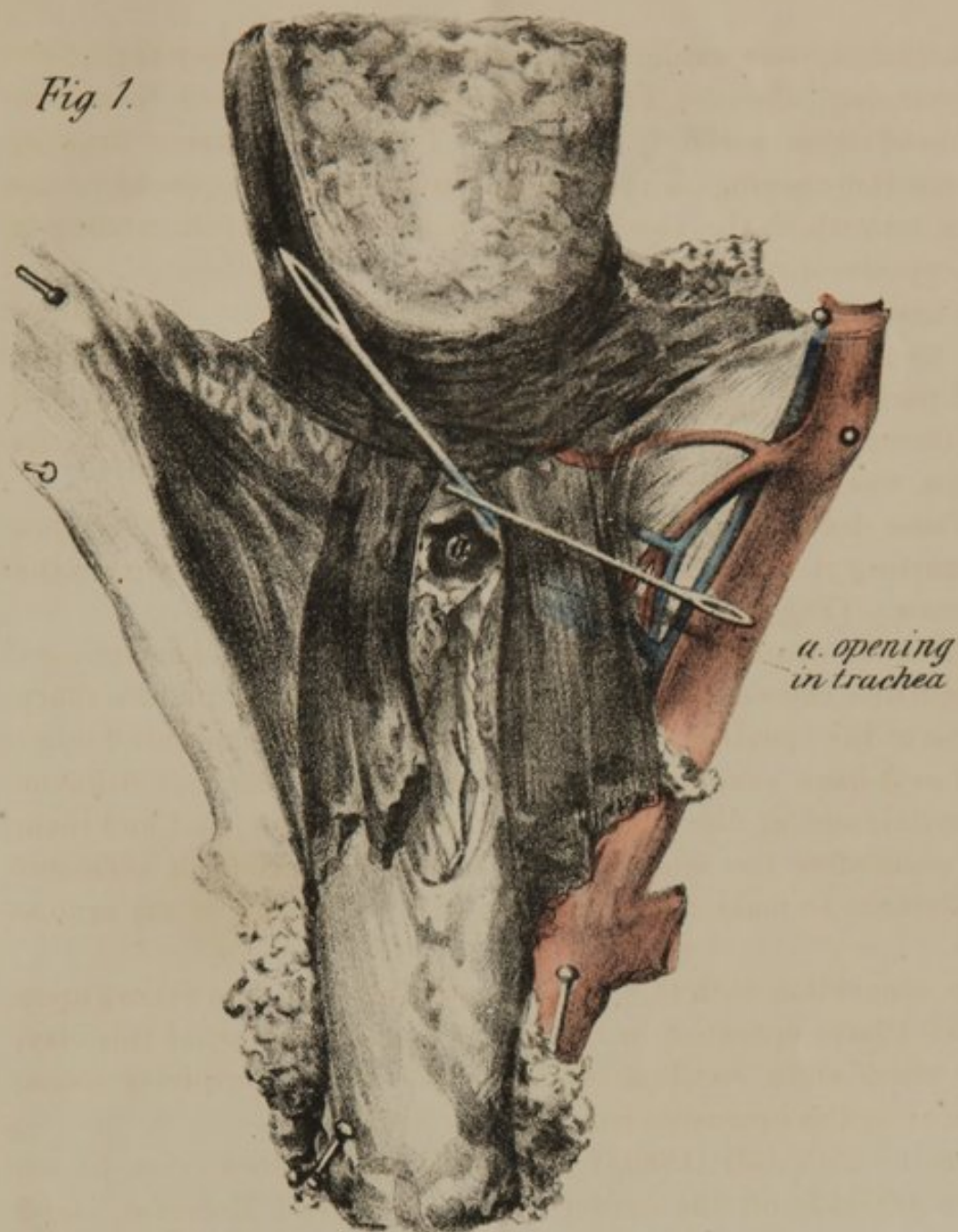


Fig. 2.

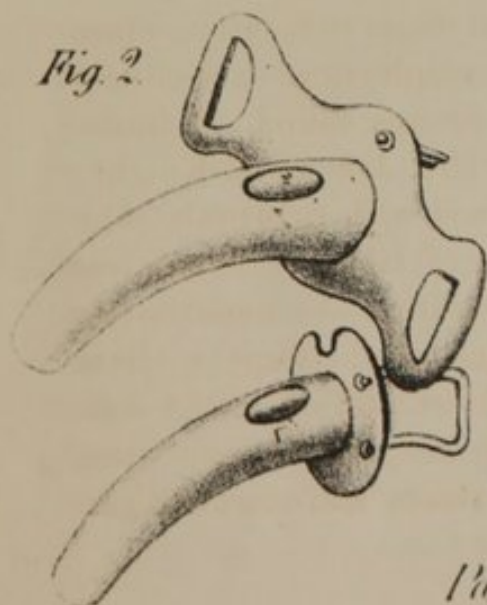
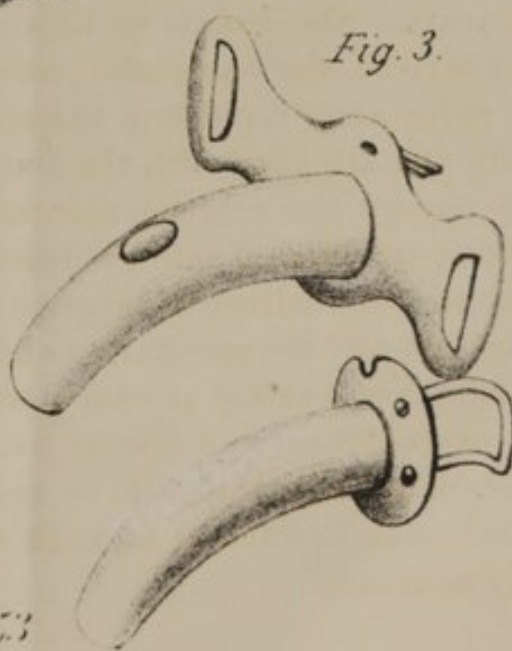


Fig. 3.



The first part of the paper is devoted to a general
discussion of the problem. It is shown that the
problem is of great importance in the theory of
the differential equations of the second order.
The second part of the paper is devoted to a
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The following day I inserted a double tube, on account of the opening constantly filling up with false membrane. I could not prevail upon the father to keep the temperature as *high* or as *moist* as I wished, and the result was that the false membrane continued to be formed.

The following night I was summoned in great haste and found the child dying from suffocation, in fact, she presented the same appearance which she had at the time of the operation. The tube had almost become closed with tough mucous, which could not be wiped out. The windows and doors were all open, and the air was very cold and dry.

I immediately cut the straps and pulled out the tube from the trachæa, and with it a firm coagulum of inspissated mucus, an inch and more in length, which had blocked up the instrument and trachea, and looked like a piece of maccaroni.

The child immediately breathed freely and all the dangerous symptoms passed off. In attempting to wash the tube in *cold* water, it was found impossible to remove the membrane, it seemed so firmly dried fast to it, but upon putting it into *boiling* water, it was immediately dissolved, and the tube cleaned without any trouble.

Now if the *boiling water* will dissolve this tenacious secretion in a tube, after it has become dried there and closed it up. Steam inhaled into the tube, will keep the secretion liquefied, and prevent this adhesion, and enable the patient to cough it off, and thus prevent suffocation.

When the parents became satisfied of this explanation, which was proved by the melancholy experiment they had just witnessed, they very willingly complied with my instructions, and for several days the temperature was kept up to 85° or 90° and the room filled with steam by boiling water on the stove, and by heating bricks and putting them in pails of water in different parts of the room.

The child progressed from this time without an unpleasant symptom, and on the 10th of August was perfectly well.

It is now nearly four years since the operation—she is a stout healthy girl, and her voice is perfectly clear and strong.

CASE SECOND.—On the 15th November, 1863, I was sent for by Dr. Johns to come immediately and perform tracheotomy, on a child of Mrs. Johnson, aged three years, at No. 11, Jay street. It had been ill five days with laryngitis.

careless, & no finish.

When I arrived the Doctor had left, thinking that the case had progressed too far to derive any benefit from an operation. I sent for him to return immediately, and waited half an hour for his arrival. The child failed so rapidly during this time, that upon consultation with Drs. Woodhull and Bernacki, who were with me, it was decided to operate at once, as there was imminent danger in waiting.

I performed the operation without any difficulty, assisted by Drs. Bernacki and Woodhull, without the use of chloroform, and on inserting the tube between the two upper rings of the trachea, a long piece of false membrane was coughed up and expelled some distance. The child immediately revived and became cheerful, the face of a natural color, and in a few minutes went into a natural quiet sleep.

There was a large cooking stove in the room, and I put on it a large kettle, used for boiling clothes, filled it with water, and directed that it should be kept boiling constantly, and the door and windows closed, in order to keep the room full of steam. As Dr. Johns had carefully watched the other case, I had such confidence in his carrying out the plan proposed, that I did not see the child again for three or four days, and on entering the room, which was a small attic one and without a carpet, I was surprised to find a large pool of water on one side of the room and streaks of dampness all over the floor leading to this collection of water, which had settled upon one side of the room on account of the inequality of the floor. Upon inquiring why this water had been left there, I was told by the woman that "she had wiped it up very often, but that it kept running down the walls all the time and she could not keep the floor dry." I had never applied this treatment in a room without a carpet before, and was therefore quite surprised at the amount which had condensed upon the walls and run down upon the floor. This would have been absorbed had there been a carpet, and would not therefore have been observed. I mention this fact to show the necessity of removing the carpet from a room in which we are using steam for so long a time, in order to prevent the unhealthy exhalations which in time would necessarily result from the absorption of so much fluid, for if the carpet is on the floor the dampness is not suspected, whereas, on the bare floor, as in this case, it is necessarily observed and easily wiped up.

The child wore the tube nineteen days,* running about the room most of the time after the fourth day, with nothing on but its night clothes; the temperature being all the time, night and day, from 85° to 90° Fahrenheit.

I have now operated in eight cases of membranous croup, five of which have recovered and are now living.

This last case, with Dr. Smith, had recovered so far as the croup was concerned, and had it not been for the unfortunate traumatic hemorrhage, I have no doubt would have resulted favorably. The two cases that resulted fatally, I have always thought might have terminated more favorably if the treatment suggested had been more efficiently adopted; but I could not impress its importance upon the parents or attending physicians, and therefore it was very imperfectly performed.

I am well aware that respiration of steam, in croup, is nothing novel, but the mode of accomplishing the object is so ineffectual that in the majority of instances, no practical good results from it.

The holding of a sponge saturated with hot water, or a tea-kettle of boiling water, with its spout placed near the child's mouth, whilst it is tossing and rolling in all possible directions, really does very little, if any, good at all.

My object is, therefore, to fill the whole room with steam, and keep the temperature from 85° to 90° all the time, and then the child can assume any position it chooses, and be as restless as possible, and it is compelled to inhale this vapor if it breathes at all. It is of the greatest importance that the temperature be maintained all the time at the point indicated, 85° to 90° Fahrenheit, otherwise the exudation from the mucous membrane in this disease is so viscid and tenacious that it adheres to the trachea and produces suffocation; *whereas at this degré of temperature, with moisture, the exudation is soluble or liquefied, so to speak, and easily expectorated.* When the membrane is once formed, any inhalation below this temperature will result in no practical good, and it is upon the recognition of this fact that all prospect of successful treatment by this method will depend.

By the adoption of this method in the early stages of the disease, the formation of false membrane will be prevented, by keeping the exudation in such a liquid condition that it can be easily

* Temporary illness prevented me from seeing it sooner.

expectorated. But if we do not see the case until the trachea has become nearly closed, and suffocation is imminent, then we may be compelled to perform tracheotomy to give immediate relief, but the treatment must be still kept up, in order to prevent the new formation. Even in the most formidable cases we may sometimes effect a resolution of the disease by the free inhalation of steam, without an operation, as the following case will illustrate :

On the 27th of February, 1860, I was performing a surgical operation in 45th street, assisted by Dr. C. H. Church, U. S. A., when a servant came in the room in a state of very great excitement and stated that Dr. Morris wished us to come in to Judge Burdsall (a few doors off) immediately, as a little child there was dying. On arriving we found the child asphyxiated and nearly suffocated from false membrane in the trachea. I suggested that tracheotomy should be performed immediately, and that there was no time to lose. Dr. M. Morris who was in attendance stated that he had suggested the operation already, and that Dr. Peters had been there at 4 o'clock A. M. to perform the operation, but that the mother would not consent. I tried to reason with the mother, but she would not consent without the advice of her father, who lived near, and who was immediately sent for, and who arrived in about twenty minutes. After a short conversation he convinced her of the propriety of the operation and she gave her consent.

When we went in the room to perform it the child had grown so much worse in these twenty minutes or half hour which had been wasted, that both Drs. Morris and Church opposed the operation as useless, and advised that nothing further should be done.

I suggested the use of steam. Dr. Morris stated that he had tried the vapor from a kettle and also warm baths, but with no good result. I then advised that the *whole room should be filled with steam*, so that every one in it would have to inhale it, and then the child would be compelled to breathe it also; for the child was so very restless, throwing itself about in all directions, that it was impossible to make it inhale vapour in any other way.

An injection of brandy and milk was given, and a cloth saturated in turpentine applied around the chest, and it was concluded that I should return at 2 P. M. to operate, in case the child should be alive.

Dr. Church thought that no treatment would be of any avail; but as there had been two homeopathic physicians in attendance since the visit of Dr. Peters, I suggested that as long as there was life there was hope, and that there was a bare possibility of its recovery, and that if that should be the case, after Dr. Morris had abandoned it, homeopathy would receive the credit of the cure. I therefore urged him to continue in charge, which he did, and discharged the double duty of physician and nurse most faithfully. In fact I am satisfied that the child's life was saved by his vigorous and faithful execution of the plan proposed. I returned according to appointment at 2 P. M., and found the Dr. had made the room like a Russian bath, with steam from the kettle on the stove and by heated bricks and irons in pails of water in various parts of the room. The child was certainly no worse and appeared to breathe a little easier. Dr. Church did not arrive according to appointment; and, as the child was certainly no worse, I suggested that the operation should be postponed until 6 o'clock, when I again saw it, and it was so decidedly better that the operation was again postponed until the following morning. The treatment was to be continued—steam, with the temperature of the room at 90° , injections as before, and nourishment by the mouth if possible. In the morning the child was so much better that all thought of an operation was abandoned, false membrane was coughed off freely, and at the end of five or six days the child had entirely recovered.

The first thing I noticed when I stepped out of the car was the smell of fresh air. It was a relief after being cooped up in the car for so long. I looked around and saw a beautiful landscape with rolling hills and a few scattered houses. The sun was shining brightly, and the birds were singing. I felt like I had entered a new world. I walked for a while, enjoying the view and the fresh air. I saw a few people walking in the distance, but they were far away. I felt a sense of freedom and peace. I had found a quiet place to be alone. I continued to walk, and I saw a small stream flowing through the landscape. The water was clear and cool. I stopped for a moment to drink some water. I felt refreshed and energized. I walked on, and I saw a small village in the distance. The houses were made of mud and had thatched roofs. I felt like I had discovered a hidden gem. I walked towards the village, and I saw a few people standing near the entrance. They looked at me with curiosity. I smiled at them and walked in. The village was small and peaceful. I found a place to sit and rest. I looked up at the sky and saw a few clouds. I felt like I was in a dream. I had found a place where I could be myself. I closed my eyes and took a deep breath. I felt like I had found a new home.

