

ciduous teeth exist, and at five and one-half or six years of age no separation of the deciduous incisors has taken place, we are certain that the development of the arch of permanent teeth has been arrested and that there will be irregularity of the front teeth, because the permanent teeth, being larger than the deciduous teeth, need a larger arch in which to erupt. If there is no spreading apart of the deciduous teeth to form that larger arch then the permanent teeth must inevitably be crowded and jumbled whenever they make their appearance through the gum, and that is an indication of nasal stenosis; this in its turn is an indication of lack in power to develop (Figs. 1 and 2).

A child should not be called on to do more than one thing at a time; the conservation of energy in every direction is to be desired; therefore, it is not wise to attempt to place on any child the burden of overcoming unaided the conditions just described, of insufficient air spaces, accompanied by insufficient room for dental development. Teeth, if seriously irregular, can never regulate themselves, and noses insufficiently developed always lead to worse evils as time goes by.

Slight wire arches a little larger in circumference than the dental arches of the child should be placed on the undeveloped arches of deciduous teeth and be allowed to expand until the proper size of arch or even a trifle larger than is necessary for the normal development of the permanent teeth is procured. This operation should be entirely painless and should occupy but a few weeks in its accomplishment, but when completed it will be found that the nasal stenosis has at the same time been largely or altogether corrected, and that the growth of all that part of the face lying between the commissure of the lips and the eyes has been promoted. Breathing becomes easier, the mouth closes naturally in sleep, the tongue once more presses against the roof of the mouth, enlarging the dental and palatine arch and permitting the simultaneous development of upper and lower dental arches under the influence of the tongue, which is their natural guide.

63 West Forty-eighth Street.

## THE MUTUAL DEVELOPMENT OF UPPER AIR TRACT, JAWS, TEETH AND FACE,

AND THEIR ECONOMIC IMPORTANCE TO THE HUMAN RACE.\*

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Orthopedic surgery occupies an important and constantly widening position in the field of reconstruction and correction. The "dental orthopedist" has only just begun to attract attention, and orthopedics of the nose, one might say, has scarcely as yet come into existence; but there are indications that it will outstrip all other branches of corrective surgery, because it directly affects the whole organism and the mental capacity instead of the less important locomotor functions.

I will endeavor in this article to show the importance of the normal development of the upper air tract and teeth, the dangers following imperfect development, and, in so far as possible, the causes and means of prevention of developmental irregularities. As a primary postulate, one may state that the nose is the axis on which the structure of the face depends for its develop-

ment and that any variation in this axis produces some pathologic result more or less evident to the individual as his general body development continues.

### MOUTH BREATHING.

The first and most important in our series of pathologic events is mandatory mouth breathing, due primarily either to nasal obstruction or to habit mouth breathing, which results secondarily in nasal occlusion. Habit mouth breathing may follow acute mandatory mouth breathing, or may result from the habit of constant talking seen in some children, which requires them to have their mouths always open. Or, again, it may come from deficient muscular development of the jaws and mouth, dependent on artificial feeding, under which condition the child does not make proper use of these structures.

During mouth breathing the tongue does not rest firmly against the hard palate as it normally should, pressing against the alveolar arches, but lies loose in the mouth. The lateral thrust which the tongue exerts on the alveolar arches under normal conditions is lost, and the weight of the face and facial muscles tends to check the lateral developments of the superior maxillary bones



Fig. 1.—A case of extreme nasal stenosis with nasal breathing. Prognathous type.

and dental arch proportionately to the antero-posterior development.

The superior maxillary bones contracted by abnormal development and conditions dependent on mouth breathing necessitate arrest of the development of the nasal fossæ chiefly in the horizontal plane on the transverse diameter, but also in the vertical plane. The nasal structure is especially susceptible to pathologic variations like all organs which are undergoing retrograde metamorphosis. The superior alveolar arch is contracted in proportion to the arrested development of the superior maxilla. The teeth, however, remain of normal size and number and must be crowded into a shorter line, forcing many out of position (Figs. 1, 2 and 3).

The results are of two varieties. The superior teeth are displaced forward, especially the incisors; or the superior teeth, the incisors especially, are locked behind the inferior, and the anterior displacement of the superior teeth is checked, forcing them into double alignment. The lower jaw meanwhile approaches more nearly its normal development, thus placing the upper incisor teeth in an abnormal position relative to the lower. The under set overlap the upper instead of being overlapped

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by them. All of these malpositions and malformations combine to make an abnormally narrow dental arch and imperfect dental occlusion.

There are two forms of mouth breathing. The first is due to nasal occlusion and is characterized by the adenoid jaw or retreating chin, which recedes and falls behind the upper, and consequently the upper teeth lock in an anterior position in relation to the under, which are drawn downward and backward by muscular action in the efforts to keep the mouth open for breathing. If nasal breathing is regained in this form without dental regulation the pressure of the closed lips pushes the edges of the upper middle incisors backward and forms the "rabbit" mouth. The second form of mouth breathing is characterized by the prognathous or tonsil jaw. If there is faucial obstruction added to the mouth breathing from nasopharyngeal causes, the lower jaw is then drawn downward and forward by muscular action, in order to clear the mouth and fauces, and the lower jaw lies in an anterior position and the inferior incisors oc-

perior incisors accompanied more or less by lateral and vertical asymmetry, with distortion of the profile due to the falling jaw and the defective contour of the nose, are too well known to require further comment. These facial changes result in deterioration of the expression below the racial or hereditary standard, giving the face a vacant or degenerate expression.

It is hard to estimate fully the economic importance of the misplacement of the teeth and the resultant changes in the upper air tract. They are summed up in lessened physical and mental capacity and resistance; that is to say, they fall below the normal phylogenetic standard.

Insufficiency in lung expansion and in blood oxygenation must necessarily accompany mouth breathing, because this condition requires a continued more or less conscious muscular effort to keep the buccal orifice and fauces clear enough to allow sufficient flow of air to supply not the wants but only just enough to maintain life. Consequently during sleep this supply must be



Fig. 2.—Nasal occlusion with irregular teeth characterized by anterior displacement of the lower teeth. Prognathous and deficient development of the superior maxillæ.

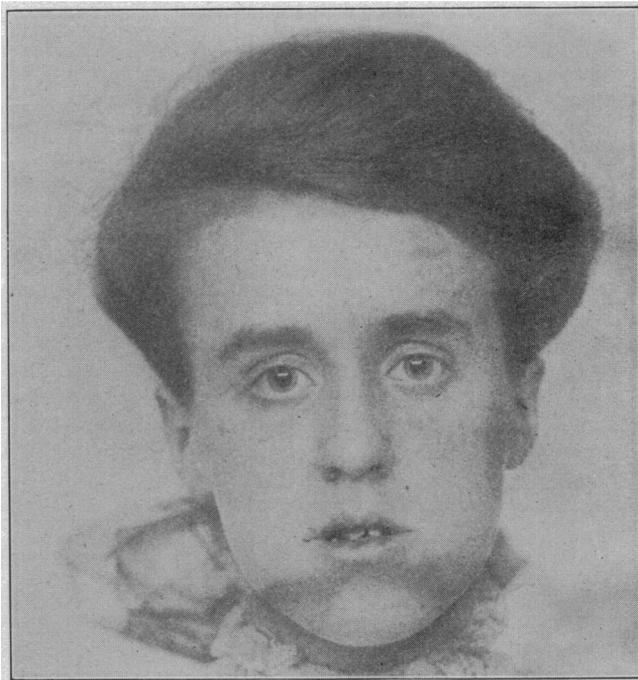


Fig. 3.—Same as Fig. 2, showing prognathous type of mouth breather.

cupying an anterior position in relation to the upper, causing wapper-jaw.

When the superior teeth are thus displaced it is impossible for natural development ever to overcome the deformity. With the irregularity of the teeth and the uneven bite, closure of the jaws can not give a firm muscular fulcrum or support which moral character seems curiously enough to require to make it steadfast. The teeth lock in whatever position they first meet. If they chance to be irregular at the start they lock in that position and no spontaneous regulation is possible.

#### FACIAL CONTOUR.

The contour of the face naturally does not come up to the hereditary standard when the superior maxillary bones are abnormally narrow and laterally contracted. The characteristics of this deformity, viz., sinking in of the superior maxillary area, narrowing of the nose, prominence of the lower jaw, or prominence of the su-

more or less diminished to the detriment of the entire organism. The extreme diminution of the air supply is often accompanied by a very annoying (to others) vibration of some part of the mouth or soft palate.

Besides the insufficient quantity of the air supplied by mouth breathing, its quality is more impure and more definite in moisture and warmth than when the air is supplied through the nose. The most important defect in this respect is the greater number of bacteria reaching the fauces, thus causing increased frequency of local and general infection. Among the local infections we may place infection of the mouth, as shown by the greater prevalence of carious teeth in mouth breathing. The fauces are often affected, as is shown by inflammation of the faucial tonsils. In like manner the pharynx is affected, as shown by disease of Luschka's or the pharyngeal tonsil. In other words, the whole lymphoid ring may be involved. The lower air tract is also very likely to be infected, and there is a tendency to coryza, influenza, nasopharyngitis, tonsillitis, laryngitis, bron-

chitis and pneumonia. Among general infections are tuberculosis, diphtheria, the exanthemata, typhoid fever, cerebrospinal meningitis, and acute articular rheumatism resulting from toxemia consequent on infection of the lymphoid ring.

The normal nose sifts the inspired air of mechanical impurities which might cause local irritation. It also serves to check inspiration of irritant gases by warning the individual of their imminent danger. Those individuals who are unable to use the nasal safeguard are more subject to laryngeal, tracheal, bronchial and pulmonary irritation due to inspiration of mechanical or chemical irritants, dust, gases and too dry or too cold air. The English custom of wearing respirators is undoubtedly due to the prevalence of mouth breathing in that country.

Among the conditions dependent on a nose contracted by mouth breathing are defective ears, inducing disturbances, from subjective irritation, provocative of insanity, and deafness with a tendency to suppuration, mastoiditis, meningitis, infective phlebitis, cerebral and cerebellar abscess, pyemia, septicemia and death.

The imperfect development of the air sinuses of the head is another result of arrested growth. This causes impairment of vocal power and quality of voice, with a tendency to headache and sinusitis, which may develop later into meningitis, brain abscess, general sepsis and death.

Impairment or loss of smell is due usually to closure of the upper fossæ of the nose originating from imperfect development of these spaces consequent on mouth breathing, etc. By this loss the individual is deprived of much gustatory pleasure as well as olfactory, since the senses of taste and smell are so intimately associated. All taste may be lost except salt, sweet, sour and bitter, together with the esthetic enjoyment of pleasant odors. There is sometimes also a loss in sexual tone and activity. The unfortunate is exposed to ingestion of poisons or decayed articles of food, which should warn their consumer by their unaccustomed taste or smell.

Ocular defects often are caused or aggravated by intranasal complications and the asymmetry of the facial bones due to the nasal occlusion and irregular teeth.

Together with the imperfect development of the air sinuses and the nasal fossæ there is a tendency to pathologic contact of the surfaces of the mucosa of the nasal cavities and to intranasal pressure. This condition, on account of the cerebral congestion and abnormal irritation that follow, is an important exciting cause of mental inferiority, idiocy, epilepsy or insanity. The ear defects resulting, as we have stated, predisposes to deafness and deaf-mutism, and through their subjective mental irritation, or absence of normal mental stimuli, to insanity. The continuation of the condition producing this state causes a low grade of mental capacity, incapable of self-support, before the advanced states are reached.

Mastication is a most important economic factor for the more civilized portion of the human race. Its deterioration has been observed in Great Britain. Of late years it has displayed itself in the difficulty of securing recruits who had serviceable teeth for the army. Sound teeth for the proper preparation of coarse foods for easy digestion are a necessary requirement for the health and efficiency of an army. As we have previously stated, caries of the teeth is most common in mouth breathers. It can be prevented to a large extent by nasal breathing.

The normal potentiality of a strong jaw, or, in other

words, of perfect dental occlusion is proverbial. We need not dwell on it because of its universal recognition. The character is weakened with a retreating chin. In the wapper-jaw type of dental irregularity there is more strength of character, because the jaw in this form is more amenable to muscular fixation.

#### ETIOLOGY.

The causes of this condition are nasal obstruction, mouth breathing and deficient and irregular development of the superior maxillary bones, probably due to the disturbance of the muscular balance normally furnished by the closed jaw for the greater part of twenty-four hours. Instead of this we have an unbalanced muscular tension and thrust working for the whole twenty-four hours. With the disturbance in the development of the maxillary bones come the irregularity of the teeth and the deficiency and irregularity of the nasal development and face as a whole. Any one of the factors may be the first to start the pathologic chain, but usually the nose is first to blame.

Prophylaxis of the vicious cycle of interdependent links calls attention to the nose and maintenance of nasal breathing from the time of birth.

#### PROGNOSIS.

For spontaneous cure of acute mouth breathing the prognosis is good and is improved by appropriate local and general medical treatment. The prognosis for chronic mandatory mouth breathing is absolutely bad without surgical intervention. With surgical and rhino-orthopedic and orthodontal assistance the prognosis is absolutely good before the twenty-fifth year; after that time it depends on the extent of the arrest in development.

As to dental occlusion and irregularity of the teeth, the prognosis is absolutely bad without orthodontia. With correction, success is assured at apparently any age.

#### TREATMENT.

The treatment varies with the period in the case at which it is first sought. Acute nasal occlusion in infancy simply requires the removal of the occluding mucus and the rest will take care of itself. Colds in the head are the form the occlusion usually takes. They require appropriate treatment. I have heard that the aboriginal grandmothers of the Sandwich Islands were wont to suck clear the noses of their grandchildren. Nasal obstruction caused by adenoid vegetation requires surgical interference. Habit mouth breathing should be corrected before structural occlusion of the nose takes place; a piece of isinglass plaster across the closed lips is the best means of prevention.

After the first dentition is well under way, regulation of the teeth and widening of the arch may be found necessary in order to allow proper development of the alveolar process and perfect closure of the teeth requisite for normal nasal development. After the second dentition, dental correction is still more important for the same reasons.

The premature loss of any of the deciduous teeth is an important accident, because it interferes with the symmetrical development of the jaw and the regular eruption of the permanent teeth. Still more to be deplored is the loss of any of the permanent teeth from caries or other disease, because the absence of any of the teeth causes a corresponding shrinkage of the maxilla and irregularity of the remaining teeth—conditions very difficult to combat.

The restoration of the nose to normal capacity in infancy usually follows the removal of hypertrophied lymphoid tissue and local cleanliness. Whatever treatment is employed to make the nose patent, nasal breathing must be maintained in order to keep the nose clear. In childhood the lymphoid tissue requires removal; possibly the teeth will require regulation in order to foster the growth of the nasal fossæ which will follow such interference. In adolescence the same fact holds good as in childhood, with the addition that possibly nasal obstructions may require removal as well as regulation of the teeth, which at this time has become a necessity. Imperfect occlusion at any age demands orthodontal assistance, because Nature is never able to correct it.

The exact age at which the regulation of the teeth loses its orthopedic value in relation to the nose and ceases to affect the nasal fossæ has not been fairly determined, but it seems reasonable to suppose that up to 25 or possibly 30 years of age it is still useful. The removal of nasal obstructions is, of course, always indicated, but after the age when the dental correction no longer affects the nasal fossæ the only hope for restoration of nasal breathing is the complete removal of all the nasal obstruction. Although orthodontia no longer, at this advanced age, has a direct bearing on the nasal cavities, it still has some relative importance, for in order to maintain nasal breathing which has been surgically produced it is necessary to use the nose for respiration—a difficult task for an individual with irregular teeth and imperfect dental occlusion.

#### HYPOTHETICAL CASES.

CASE 1.—An infant, six weeks old, has coryza; the nose is occluded with mucus and engorged mucous membrane, conditions which yield readily to appropriate treatment. If this state of things is allowed to continue, the child soon becomes a mouth breather from necessity and will probably remain so if the primary nasal occlusion has lasted a few weeks. The anatomic or secondary occlusion of the nose will soon follow. If the nasal occlusion is removed before the habit of mouth breathing is established, there is no further disturbance.

CASE 2.—A child of three years, previously a nose breather "catches cold", has inflammation of the lymphoid ring. The nose is occluded by adenoids. His "cold" is more or less continuous for several months. During this time the child has acquired the habit of mouth breathing. If this condition continues, the superior maxillary bones will be small and irregular, the superior dental arch will be narrow, the nasal fossæ will remain small and become more irregular. When the second teeth arrive, if not before there will be marked dental irregularity, which, as we have said before, locks and prevents the final development of the superior maxillary bones. If the proper surgical treatment is early resorted to and then the habit of nasal breathing properly established, by artificial means if necessary, there is no further trouble unless some future accident befalls the patient.

CASE 3.—Same case as 2. The child has received no treatment sufficient to establish proper nasal breathing. When the second teeth begin to appear from the sixth year on, irregular dentition and contraction of the superior dental arch will be progressively marked. The nasal fossæ will be still narrower, while the irregularity increases. The nasal fossæ will not only be narrow, but will also be shallow and the vault of the palate will be proportionately high. This vaulting of the palatal roof of the mouth is in a sense a compensatory alteration in development, because it allows mouth breathing with less muscular effort, and, consequently, the supply of air is less deficient. The tongue in this condition forms the floor of the vaulted channel.

Should caries seriously impair the first dentition before the appearance of the second, it is a cause for contraction of the superior maxillæ and further irregularity of the teeth, the

effect on the dental occlusion is much the same as in cases of chronic mouth breathing. The relative position of the sixth year molars will be interfered with and the bite will be proportionately defective. Supposing this is not the case and that the irregularity occurs in the anterior portion of the maxillæ, the tendency will be to thrust the superior incisors far forward. Intranasal examination of such a patient, besides the irregular narrowing or shallowing of the nasal fossæ, probably will show a deflection of the septum with a corresponding spur.

Treatment of these conditions is both nasal and dental. Removal of the adenoid obstructions is indicated, of course; also removal of nasal spurs. The deflections of the septum will take care of themselves, provided the superior dental arch is widened at a sufficiently early age, the dental occlusion is rectified, and the mouth allowed to close without voluntary efforts. If the dental arches are sufficiently spread, the nasal fossæ will spread also and the whole facial anatomy will fall into normal lines.

CASE 4.—From puberty on the treatment and its results will vary according to the age of the patient. At a later age if no treatment has been received, the adenoids will probably have disappeared, the defects of the nose and of the teeth alone remaining, and possibly the habit of nasal breathing established, in which case the prominent upper middle incisors will have been pushed backward forming the so-called "rabbit" mouth. If the patient is still sufficiently young for the superior maxillary bones to respond to widening of the dental arch, treatment is indicated as outlined in the previous condition; but if the age has advanced beyond this period, the only hope for remedying the breathing lies in operative reconstruction of the nasal cavities. The alignment of the teeth will no longer have direct effect on the cavities for the mutual interdependence of the nose and teeth gradually lessens and entirely ceases between the twenty-fifth and thirtieth years.

#### CONCLUSIONS.

It is of extreme importance to keep up infantile nasal breathing on account of the many untoward conditions which may follow its loss. The sooner the defect of mouth breathing is rectified the more simple its treatment and the better the results. The importance of nasal breathing is many fold; it is a safeguard against infection, an aid to proper physical and mental activity through a sufficient supply of oxygen, a requisite of moral strength, esthetic outlines, and a protection to the faculties of hearing, speech and smell. But, most important of all, it is fundamentally necessary to perfect oral occlusion and the power to masticate food.

The proper regulation of the teeth is an assistance to the proper development and subsequent function of the upper air tract, and is especially necessary for the perfect restoration of the nasal respiratory function between the fifth and twenty-fifth years.

The developmental relation of irregular teeth and cramped nasal passages is a reciprocal one. The course of treatment to pursue if nasal breathing can be maintained is to straighten the teeth first and operate on the nose later if necessary. If nasal breathing can not be maintained, operate on the air passage sufficiently to allow nasal breathing before regulating the teeth. Then regulate the teeth and, last of all, do the final work of the nose if any further operating is required.

I wish to thank Dr. E. A. Bogue and Dr. Frederick L. Stanton for many ideas and much help on the stomatologic part of this paper and Dr. Stanton for the loan of photographs.

#### DISCUSSION

ON PAPERS OF DRs. BOGUE AND BRYANT.

DR. WILLIAM H. POTTER, Boston, Mass., has been interested in a method of measuring the enlargement of the nasal cavity which is obtained by expanding the dental arch. He thinks

that the best way to determine nasal enlargement is to measure the distance between given portions of the inferior turbinate bones. Before measurements can be taken the mucous membrane covering the turbinates, which is congested in varying degrees, must be shrunk down to the bone.

DR. W. M. DAILEY, New York City, agreed with the ideas expressed in Dr. Bogue's paper. He has noticed a deformity of the deciduous teeth at 2½ and 5 years, causing a marked deformity of the arch. He called attention to the lack of development in the premaxillary bone in the case shown by Dr. Bogue, which had not developed anteriorly and laterally. The occlusion of the deciduous teeth in this case was not normal, for in the normal deciduous occlusion, the deciduous second molar dips down into the space between the deciduous molar, and the first permanent molar, and acts as a guide for the superior first molar to its normal eruption. The normal eruption of the permanent molar comes anteriorly and then posteriorly and the deciduous tooth in this case shows itself of great value and importance. Speaking on Dr. Bryant's paper Dr. Dailey called attention to the fact that there have been a great many points brought out at different times showing lack of mental development in children. The lack of physical development is due to dental defects, which bring about general defects, thereby interfering with the normal constitutional condition of the children. When these children have had these dental defects removed, there is likewise an improvement of the general condition. Another important point, he said, is the breathing. The breathing is due to the peculiar elevation or depression of the thorax, which, if improperly performed, does not allow a sufficient amount of lymph to enter the blood to produce a quality of blood that will offer the proper resistance to disease.

DR. C. A. HAWLEY, Columbus, Ohio, agreed with the others that the conditions shown in mouths with irregular teeth are those of arrest of development. If that is true, he said, and if the spreading of the arch will cause the development of the face of the child to resume its natural course, it will make a great change in the plan of treatment of these cases. It is a big step in advance. It was with some conception of that fact that Dr. Hawley started to measure teeth and tried the plan, even at the early age of 6 or 7 years; it was to gain some conception of the future denture that he started to measure teeth, to furnish, if possible, the means of knowing what the future denture should be.

DR. E. A. BOGUE, New York City, agreed with Dr. Hawley that just as soon as the public is made to appreciate the seriousness of the condition and that a remedy for it is at hand we may hope for a large advantage in the development of children, because we can remove obstructions and let Nature go on and do her work. As to Dr. Dailey's statement that the premaxillary was not developed properly, Dr. Bogue felt that Dr. Dailey either called attention to the wrong model, or else he was mistaken. He agreed with Dr. Dailey, however, that the premaxillary bone lacks in development. Dr. Mosier of Boston, he said, recently brought forward the results of his work for the last two or three years in regard to the development of the premaxillary bones, and when he had got through with his description of the process of development, Dr. Mosier had to acknowledge that he knew of no remedy that met with his approval for the diminution in the size of the nasal orifice, due, as he thought, to the non-development of the permanent teeth in the premaxillary bone. Dr. Bogue thought it was with a little surprise that Dr. Mosier found that dentists were slightly ahead of him, and that very slight mechanical assistance would have enabled him to get over that obstruction. In regard to deciduous teeth not being developed, Dr. Bogue stated that that is true. They do affect the development of the permanent teeth. Children have been called stupid when physical defects have prevented them from exercising their proper normal functions. Dr. Cronin, at the head of the health department examination of school children in New York City, sent out seventy-five physicians to make careful physical examinations of the children, and then to apply, so far as in their power now lies, means for correcting the physical defects that exist. The advantages from this work

are almost incalculable. Dr. Bogue commented favorably on Dr. Bryant's remark that instability of character follows instability of dental articulation, and he followed that by saying that the upper jaw was subject to fixation.

DR. ROBERT T. OLIVER, West Point, N. Y., asked Dr. Bogue if he considers development of the jaw a specific factor in the establishment of individual character.

DR. BOGUE replied that he could not answer the question.

DR. W. SOHIER BRYANT, New York City, is convinced that the regulation of the teeth and at a very early age, is the most important step in surgery of the teeth, nose and face that has been developed of late years.

DR. BOGUE asked the gentlemen who are interested in orthodontia to fix some of these apparatuses in the mouths of feeble-minded children and report the results of expansion of the arches for this class of patients.

## Special Article

### TRAVEL NOTES FROM SOUTH AMERICA.

NICHOLAS SENN, M.D.

CHICAGO.

(Continued from page 118.)

#### XI. VERRUGA PERUANA: OROYA FEVER: CARRION'S DISEASE.

A strange disease, limited to a few of the valleys of the western slope of the Andes Mountains in Peru has had its origin there without ever having become epidemic. This disease has never been known to originate on the coast, notwithstanding that many cases have been brought down from the infected valleys to the hospitals of the coast cities for treatment. It is called Verruga Peruana, because the characteristic macroscopic, pathologic product makes its appearance in the form of warty indurations in the superficial layers of the skin and in the subserous and submucous loose connective tissue of the internal organs and the intermuscular spaces, and because it has never been known to originate in any other country but Peru. It is called Oroya fever, because it has prevailed most frequently and extensively along the line of the Oroya Railroad, where one of the high bridges is called the Verruga Bridge, as it is in a locality notorious for the frequency with which this disease is encountered, so much so that laborers refuse to work there unless they receive double wages. It is finally called Carrion's disease, in honor of Daniel A. Carrion, a medical student of the University of Lima, who, in 1885, inoculated himself with the disease, in order to throw more light on its nature and clinical manifestations, and who, after a brave fight for his life, died Oct. 6, 1885, having sacrificed his youthful and promising life on the altar of science and in the interest of suffering humanity.

The true nature of this strange disease remains a secret to-day. The facts concerning it, as far as they have been revealed up to the year 1898, have been recorded in a masterly manner by Prof. Ernesto Odriozola of the Faculty of Medicine of Lima, in a monograph of 217 pages, entitled "La Maladie de Carrion, ou la Verruga Péruvienne," published in Paris in 1898.

Through the courtesy of Dr. A. L. Barton of Lima and Dr. W. M. Wightman of the Public Health and Marine-Hospital Service, I was given an opportunity to see three cases of this disease in the Guadalupe Hospital at Callao. The first patient was a Peruvian strongly tintured with Indian blood, who was born and had always lived in one of the mountain valleys where the disease prevails. He was a laborer, about 35 years of age, who was always well until three months ago, when he was taken ill with symptoms indicative of verruga. He was admitted into the hospital the day before, in a very critical condition. His temperature was 40 C.; mind wandering; pulse small and frequent; tongue dry and coated. The face, arms, hands, fingers, legs, feet and toes on extensor sides, and chest and abdomen were covered with a papillomatous eruption, the papillæ being on an average about the size of a pea. These