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VOL. XIII, NO. 5

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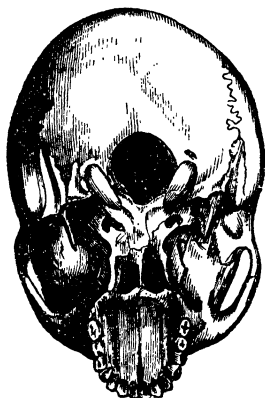
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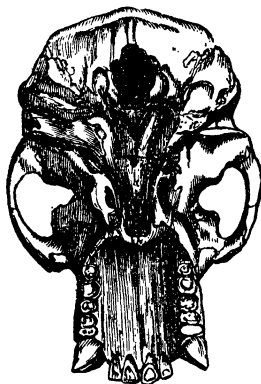
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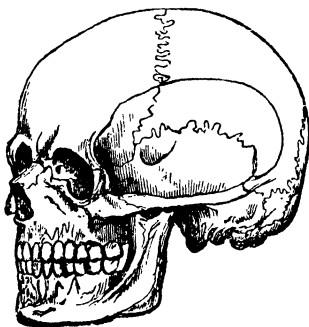
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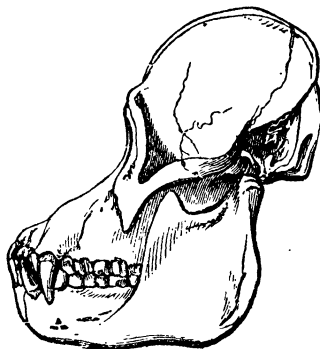
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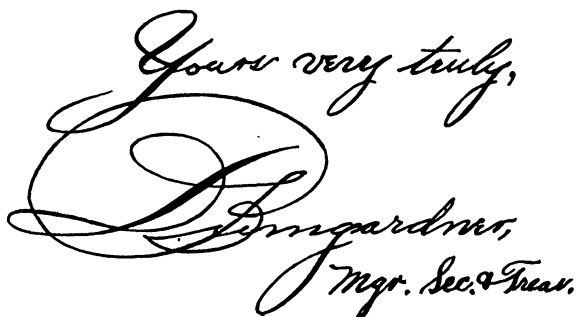
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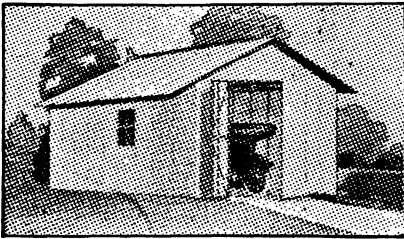
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CONTENTS

|                                                                           |  |             |
|---------------------------------------------------------------------------|--|-------------|
| <b>EDITORIAL--</b>                                                        |  | <b>PAGE</b> |
| Dental Evidence and the Word's Age.....                                   |  | 553         |
| Comment.....                                                              |  | 558         |
| <b>ORIGINAL CONTRIBUTIONS--</b>                                           |  |             |
| Oral Prophylaxis as a Municipal Platform. By Alphonso Irwin, D.D.S.....   |  | 559         |
| A Prayer. By John T. Grant, D.D.S.....                                    |  | 566         |
| Diseased Teeth in the Incidence of Tuberculosis. By Dr. Julio Endelman... |  | 568         |
| New Base for the Toothbrush. By Dr. Funke.....                            |  | 572         |
| <b>INVESTIGATION--</b>                                                    |  |             |
| Dental Caries—Immunity and Susceptibility. By Russell W. Bunting, D.D.Sc. |  | 573         |
| Treatment After the Application of Arsenic. By Claude R. Kruše, D.D.S...  |  | 580         |
| Removing Plaster from a Denture .....                                     |  | 580         |
| To Clean Dentures and Extracted Teeth. By Dr. M. E. Sanders.....          |  | 580         |
| How to Remove Broken Instruments. By E. Schuster .....                    |  | 581         |



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Nov. 15th

Editorial and Comment

1915

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### DENTAL EVIDENCE AND THE WORLD'S AGE

The year 1915 will be remembered by archæologists as the most harvestful as relates to discoveries of human evidence in the world's ancient career. And most all the valuable discoveries have disclosed that the teeth have been the last element of the human fabric to surrender to the god of destruction. Providence sure must have intended them to remain long as post mortem exhibits, even if they are the first to give signs of decay in the living subject. The thought that in the distant future year of A.D. 1,600,000 a gold inlay may be examined and commented upon by some human researcher makes one all the more anxious to do the dental service all the more earnest and conscientious. Our physician is more fortunate; since his medical error can scarcely be pointed out six months after burial, while our good or poor dental work may be subjected to eye or

lense a million years from now. Well, we have the satisfaction of working on that part of the human economy which God treasured the highest, when considered from the viewpoint of enduring the longest.

It is interesting to note that the skulls or teeth which have been exhumed—ancient and extremely aged—do not manifest that imperfect, non-developed and rudimentary form which believers in evolution would like them to show. The jaws are only slightly different—heavier and stronger—than those of this day, and were evidently used more vigorously than those of this period, since many in those distant times believed in eating nuts, cereals, vegetables and meats, while man of today seeks soups and cheap breakfast foods (requiring no mastication), and possibly our enfeebled chins and retreating jaws lack exercise. In any event, the teeth are about the same as at the time of going to press, and the evolutionist is amending the theory that possibly the world is a little older than at first calculated. In short, the evolutionist is disappointed; while he who believes in a direct, definite creation, minus the story of the progressive step and evolutionary tale, has every reason to be elated. Briefly summarizing from various reports and articles dealing with the year's exhumations of skulls and teeth of ancient people of both America and Europe, the following will doubtless be of interest from several angles of research:

“The first ethnological field work of the University of Oklahoma has resulted in interesting discoveries of prehistoric domiciliary and mortuary mounds containing quantities of primitive pottery, fragments of thinly beaten copper, and articles of stone used in hunting, warfare and agriculture. The exploration and excavations were conducted by Prof. Joseph Thoburn, curator of the university museum, assisted by Dr. Irving Perrine, of the department of geology.

“The surface irregularities caused by these mounds or elevations had been observed ever since the settlement of Oklahoma. Not until Prof. Thoburn began his excavations was positive evidence of their true nature known. Curious farmers had gathered articles from the surface of the ground without suspecting their source of origin. The mounds are from twenty-

five to one hundred feet in diameter, and commonly from six inches to four feet in height. Most frequently they are situated in alluvial river bottoms, especially along the Arkansas, with evidences that their builders were an agricultural people.

"The objects found by Prof. Thoburn ranged from the surface down to a depth of three or four feet. There was rarely more than a single pottery vessel beside a skeleton in the mortuary fields, the urn or jar being near the head. All the vessels were empty. The pottery was of ferruginous clay, of slate color, fragile and rather porous. It bears evidence of skill and design in shaping, and several pieces were ornamented with indented tracings. One vessel shows a crudely molded human face, and the handles of another have a superimposed wolf's head of rather striking alertness of expression.

"The adult skull is of peculiarly receding shape, which is said to be characteristic of the skulls of prehistoric people. No man ever had a more splendid set of teeth, every tooth being sound, strong and evenly matched. The skull was smooth and its plates thin. The skull was strikingly small for an adult, but age was proved by the grinding surface of the teeth.

"The details of this ethnological study will be given in a university bulletin to be prepared by Prof. Thoburn and Dr. Perrine."

We are reproducing the skull. Take a good look.

In that splendid periodical, *Every Week*, August 2, 1915, appears an article relative to a recent exhumation in France, and the article is entitled "The Oldest Woman in the World." The story goes in part:

"They found her only a short time ago—the oldest woman in the world. She could not very well object to this descriptive remark, because at least three hundred thousand years (according to the scientists' reckoning) have elapsed since she was born.

"Her home was a hole in the rocks, very picturesquely located above a little stream that brawled over its pebbly bottom a few miles to the northeast of the present-day city of Bordeaux.

"The reason so much interest attaches to the female person

here described is that she is the only very ancient woman whose bones have ever been discovered."

The man discovered in the diggings of London some years ago was a mere "kid" alongside of this ancient human being. The article then continues:

"Such were the characteristics of the 'Neanderthal man,' the 'man of Spy,' and other famous individuals whose remains have been unearthed. Up to date a sufficient number of these representatives of the world's oldest families have been disinterred to establish them as a type primeval. They show us what our remote forebears looked like; and the caves they dwelt in, together with the weapons and utensils they left behind, and the accompanying bones of the animals they ate, afford a vivid idea of the conditions under which they lived.

"The 'oldest woman' seems to have been about 45 years of age. It is evident (judging from the shape of her skull) that she shared the lack of mental development that characterized the folk of her period."

Finally the descriptions winds up:

"Her teeth (their enamel still well preserved) are a good deal worn—possibly from much gnawing of bones.

"The rocky mass containing the osseous remains was taken out in as perfect a condition as possible and shipped to Paris, where scientific experts, with the utmost care, worked the bones out of the enveloping 'matrix.' Pressure had caused the different parts of the skull to overlap; but, fortunately, the greater portion of the cranium was preserved, and in the jaws fourteen teeth, remarkably white, remained."

And to lend more light on this interesting theme Prof. Garrett P. Serviss gives another case:

"When a fact enlists the imagination it gains enormously in force and value. Such a fact is the following: In a quarry in the province of Gerona, Spain, near the northeastern end of the Pyrenees Mountain chain, a human jawbone, with a full set of sixteen lower teeth, was found imbedded in a very hard stratum of travertine rock at a depth of some five yards beneath the surface.

"The jaw was so thoroughly incorporated with the enclos-

ing rock that no attempt was made to cut it out lest it be destroyed in the operation. The jaw, in its solid setting of rock, remains in the private collection of Don Pedro Alsius, who died a few months ago.

"If the jaw had been entirely freed from its matrix, or stony mold, it would appear far less impressive. It is the same way with other fossils. When I see a palæozoic shell that has been freed from its rocky prison I can realize its enormous age only by piling together the figures which represent the probable millions of years that have elapsed since that shell was inhabited by a living creature.

"But when I see the same shell still imbedded in the original rock its antiquity stands visibly before me. It becomes a manifest fact, as solid as the rock itself. And so this human jaw, with its perfect teeth turned to the yellowish color of the travertine matrix, seems, by virtue of its situation as an integral part of that rock, to be almost as old as the world itself."

These latest contributions make one wonder how much older should the skull be to give evidence of "jaw and tooth evolution, the latter appearing as mere kernel-like seeds"?

Nor is this evidence alone from human kind; for we find harmonious dental architecture in all other animals, and the discovery of teeth of the mastodon on the farm at Winamac, Indiana, worthy of mention. The Smithsonian Institute at Washington, D. C., records the following:

"July 31, 1915.—We announce the discovery of one of the largest and most complete skeletons of a mastodon ever uncovered. It was found on the farm of W. D. Pattison, near Winamac, Indiana, and was turned up by a steam shovel. Its age is estimated at 150,000 years. The largest of the teeth measures almost seven inches in length and four inches across, and weighs several pounds."

Sure, there is nothing rudimentary about these human and animal teeth discovered this year. Their age certainly, as well as their positive similarity to those of this day, helps to strengthen our belief that teeth were always teeth and beaks and bills, too, have been so from the beginning.

I believe in development of any particular portion of life,

be it animal or vegetable, and I can conceive of an improvement or progression or retrogression of fundamental or basic organs, tissues and fibers, but have lost my interest in radical evolution as it relates to the human osseous and vascular tissues; and the more I study the topic the more I am convinced that evolution is easiest disproved in the story of the teeth and the beak; and I will take my comfort in the lines "as it was in the beginning, now is and ever shall be," since the storehouse of nature and human laboratories prove it a neighbor of truth.

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### COMMENT

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Well, here is something right off the bat:

"MY DEAR CIGRAND: Inclosed please find my subscription for AMERICAN DENTAL JOURNAL.

"There are *so many nationalities* nowadays I'm for anything '*American.*' Yours truly, ASHLEY M. HEWETT.

"Sept. 27, 1915."

\* \* \*

Dental teachers take notice:

"The National Association of Dental Faculties will meet at the Hotel Radisson, Minneapolis, Minn., Friday and Saturday, January 28-29, 1916. C. C. ALLEN, Secy.

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\* \* \*

The following is a specimen of many similar letters:

"DEAR DR. CIGRAND: Please find check covering my debt in dollars and cents. The moral part of my obligation is far above this, and I may only express same in an humble way, thanking your valuable paper for the fearless and sincere manner in which it treats matters of vital interest to the rank and file practitioner.

"I thoroughly enjoy your editorials and articles pertaining to practical dentistry, and find many a valuable application of them.

"May you and THE AMERICAN DENTAL JOURNAL grow and prosper. I am, your friend, A. RODOSY, D.D.S.

"Aug. 5, 1915."



# ORIGINAL CONTRIBUTIONS

## ORAL PROPHYLAXIS AS A MUNICIPAL PLATFORM

BY ALPHONSO IRWIN, D. D. S., CAMDEN, N. J.

[Your editor is frequently asked to furnish a line of operation and argument for those contemplating the opening of free clinics in cities, and I have made a brief digest of Dr. Irwin's work along this line, and consider his experience worthy of regard. In arranging a talk before club, fraternity or civic organizations these points will be valuable.—EDITOR.]

The need for prophylaxis has existed ever since it was the fashion to wear fig leaves; but scientific proof was lacking until 1683, when Antoni von Leeuwenhoek, the father of microscopy, scraped tartar off someone's teeth and discovered in it those minute creatures which we now classify as micro-organisms. But the city powers of that day were unprepared to understand the significance of the great discovery, and it took the brains of a Lister (in 1875) to grasp and subsequently apply the discovery for the benefit of the human race. The microscope was the forerunner of many ologies, not the least important of which is bacteriology, and prophylaxis is the child of bacteriology. Here, again, we have the axiom of cause and effect repeated. Studies in bacteriology stimulated this movement in prophylaxis, while the effects are shown in 1890 by Behring's development of blood serum therapy and successful efforts to check all forms of disease in their incipiency by adopting adequate preventive measures. Vital statistics for Pennsylvania during last year corroborate this: The typhoid death rate was reduced 67 per cent per 1,000 over the year 1906, a total of 15,938 lives saved; tuberculosis reduced 35.2 per cent in 100,000; diphtheria, 9.2 per cent; measles, 9.7 per cent; whooping cough, 10.9 per cent. Dr. Samuel G. Dixon, state commissioner of health, says: "The results have more than justified the hopes of the most optimistic advocates of preventive medicine. Each year enormous dividends have been paid in lives saved and

illness eliminated. The saving in anguish is beyond computation."

**SOCIAL AGITATION.** The dentist should agitate municipal consideration of this problem through social channels. Interest the fraternal orders, the benevolent societies and the clubs to which we may belong in prophylaxis. Inject liberal doses of prophylaxis serum into the circulation of your friends; administer prophylaxis in popular prescriptions to your patients; mix prophylaxis wisdom with the golf balls at the club, and then drive them home on the links. When the topic of prophylaxis can be brought up for discussion on the diamond, "Play ball!"—and play it for all you are worth.

The fact that 108 city officials can go to school to the University of Wisconsin in order to learn how they administer civic affairs in Wisconsin is an encouraging sign. In municipal affairs we are on the side of the party devoted to reconstruction instead of destruction; we are in this movement for conservation, not coin; we believe in public school extension along vocational lines as the solution of our educational problems, just as we believe that dental clinic extension for prevention is a municipal problem. The municipal authorities are potent agencies in carrying out such ideas, and we would most earnestly solicit their co-operation. Therefore do we ask that the principles of prophylaxis be incorporated in our civics. Nay, more than that, we invoke the aid of civic authorities in establishing free dental clinics where oral prophylaxis may be practically demonstrated.

**CIVICS.** When the average voter casts his ballot at the polls for city officials he labors under the impression that the candidates of his choice will be the most faithful to guard the interests of the citizens and promote the welfare of his city. In some cities this impression is but a pleasing fiction fostered and encouraged by wily politicians prior to elections, but it is possible that some day deluded voters will revolt and oust such officials. We would not imply that the authorities of this republic are dominated by men of such calibre, for we believe that there is a strong leaven of righteousness working in many cities.

**PROFESSIONALS.** In promoting agitation on this subject of prophylaxis the dentist should get the good will and assistance of medical men. The surest way to gain medical co-operation is to prove ourselves worthy of it. Let us avoid friction during consultation, and shun hasty or ill-advised criticism of medical methods. The medical profession is the noblest in the world, and some of the most humane and self-sacrificing characters may be found in the ranks of physicians and surgeons.

It is also indispensable for us to secure the approval of the board of health. Indeed, the friendship and co-operation of



EARLIEST PUBLIC CLINIC

all professional bodies, the board of education and teachers, civic clubs, and so on throughout the list of professionals, are invaluable. No effort should be spared to enlist them all in our cause. Nor should we relax our vigilance in watching the attitude of lawyers and politicians toward this problem.

**PREVENTION.** Some people discuss the health problem under the head of sanitation, but we believe that prevention is the supreme need of today. For if you prevent degeneracy and vice, the white slave traffic and crime, idleness and poverty, starvation and mendicancy, strikes and bankruptcy, oppression and graft, social disease and tuberculosis, the night-soil menace and infectious diseases, then you will ultimately render vaster

services to humanity than if you attempted to cope with these conditions after they have gained a foothold. Prevention should be the slogan of our party, the keynote of our movement, the password into our profession, and the aim and object of agitation. But, above all else, it should be the command of the municipality.

**SCIENCE.** Chief among the scientists the bacteriologist is the best friend we have in producing evidence in favor of oral prophylaxis. He can present myriads of minute organisms as convincing witnesses, whose want of size is more than atoned for by the deadly effects they can bring about by infection and the terrible havoc they can work. All we have to do, therefore, is to prove by the bacteriologist that the mouth and teeth are fertile breeding-ground for such germs as provide devastating epidemics. Although \$14,000,000 was spent in this country last year fighting the white plague, not a dollar was expended upon the mouth, where tubercle bacilli swarm, as the sputum is the most prolific source of infection. Is it not a significant fact that philanthropists have established laboratories for research work concerning every part of the human body *except the mouth*? When we consider that research work is the basis of prophylaxis, surely right here is a grand opening for one of our multi-millionaires.

**FOREIGN MUNICIPALITIES.** Among the 1,700,000,000 people who inhabit this globe there are about 500,000,000 of teachable age. When we look abroad for light we find that in propagating any movement for universal betterment we must deal directly with those of teachable age. Without going into details, we will remind you that the universal experience is that the colleges, dispensaries and large public clinics are utterly unable to cope with this problem, because there are too many people who can not be reached. The percentage of persons needing oral treatment, moreover, is very high, some authorities placing the the figures as high as 98 per cent.

Australia is in the legislative stage; Toronto is the first city in Canada to equip and conduct a clinic for school children; Nova Scotia is now authorized by law "to appoint dentists to

supervise the inspection of school children's teeth"; Halifax was the first town in Canada to institute dental inspection.

In Japan, since 1898, physicians have been required by law to report all defects in school children's teeth; but owing to



"TEACHING AN ALDERMAN PUBLIC SANITATION"

the policy of silence adopted by Japan of late years, we are unable to quote either their methods or proficiency.

To Germany we go to find (in the Wiesbaden system of medical inspection) a pioneer model to copy. And in the same country (at Strasburg) do we find the pioneer model for dental

clinics, devised by Professor Ernst Jessen. The first free-school clinics in Strasburg were established in 1901, but from 1888 until that date Dr. Jessen performed dental work gratis for school children.

Professor Jessen says that 95 per cent of the German school children have defective teeth, and estimates that the cost per child for dental attention by means of the school dental clinics is only one mark (about 25 cents).

The municipal authorities in Germany (126), Great Britain (England 131, Scotland 3, Wales 2) and Sweden (40) are foremost in founding and supporting these clinics. Over 300 schools have dentists who treat the pupils' teeth in these three countries alone, and the number is being steadily augmented. In Germany there are 126 free dental clinics, although they are not all supported by the government, and some are mixed clinics. Besides these countries, we might name Austria, Belgium, Denmark, Finland, France, Hungary, Holland, Italy, Russia, Norway, Portugal, Spain, Switzerland, Australia, Cuba, Japan, Canada, Mexico, Newfoundland and Nova Scotia, all of which are agitating the adoption of this solution of the problem.

SCIENTISTS TELL US. Bacteriologists inform us there are over twenty diseases communicable by oral infection. When public schools are closed on account of diphtheria, whooping cough, scarlet fever, measles, etc., it stands to reason that the city must foot the loss. In addition to the above expense, there is the additional outlay for locating, placarding, quarantining and finally fumigating the premises. The theory that filthy mouths may be an important factor in producing such epidemics can no longer be disproved. In addition, the city has also to build and maintain hospitals for the isolation and treatment of contagious diseases. Oral breeding-grounds certainly contribute their quota toward filling the municipal hospitals.

In a certain city in this country it is estimated that the average cost of educating each public school child (pro rata) per school year of nine months \$15 (Prof. H. E. Jenkins, New York). This same city estimates that a child with defective

teeth requires six months longer in which to complete an eight years' course, owing to absence caused by aching or abscessing teeth. This means a money loss from such pupils of two-thirds of \$15, or \$10 each.

**SEX.** When it comes to a question of sex, it has been our invariable observation that some of the ablest champions we have are ladies, especially those who are mothers of young children. The latter are usually absorbed in the welfare of their offspring, and eagerly grasp every idea and plan calculated to improve their health and add to their happiness.

I carried on a free dental clinic in Camden myself (about 1882) for some time at my own expense. I was a poor boy at the time, and wanted to use what knowledge I had for the benefit of those who had still less knowledge and were even poorer than myself. This clinic I conducted in connection with the Camden dispensary, and my method was to have the doctor or superintendent give the applicant a card properly made out and signed.

**OBJECT LESSON.** A school teacher told me recently that she found the most stimulating method of getting the children to clean their teeth was to show them mounted slides of bacilli which a student in bacteriology presented to her. He had secured the bacilli from the mouths of children; and just so soon as she showed these pupils of hers what had come out of other children's mouths they got very busy with their toothbrushes. That is one suggestion that I think is in line as an object lesson. Moreover, exhibitions of moving pictures, films and all that sort of thing are the greatest help in promoting this movement, and I think we ought to speak a good word for them as educational adjuncts in public and private, whenever we can do so.

---

IOWA STATE BOARD OF DENTAL EXAMINERS

The next meeting of the Iowa State Board of Dental Examiners will be held at Iowa City, Iowa, commencing Monday at 9 A. M., December 6th.

For full information and application blanks apply to

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### A PRAYER

BY JOHN T. GRANT, D.D.S.

[The dental profession has always possessed poetic members, and the poem here published (by Dr. John T. Grant) merits our high appreciation. He belongs to the far west. The extreme west and the golden state may well be proud of his pen.—EDITOR.]

O, hide naught from me which a soul may see;  
 Let me know all life holds to know.  
 And, O, let me feel all the heart can feel,  
 Full measure of woe with my portion of weal,  
 Till I grow all there is to grow.

O, dull not the thorns when my roses bloom,  
 Cloud my blue with many a storm—  
 For I crave life straight from the hand of fate.  
 Would you live the strong you must suffer the great  
 Till the heart has grown kind and warm.

Ere the heart can love all the heart can hold  
 It must ache all the heart can ache.  
 No coward's sleeping-draught would I choose to quaff;  
 But on to the grave with a shout and a laugh  
 While the spirit is wide awake.

And though I would live all there is to live,  
 Let me die all there is to die.  
 For I see the immortal "dust to dust,"  
 And I bare my breast to the bayonet thrust  
 With never a wince nor a cry.

So while I would laugh all there is to laugh,  
 Let me weep all there is to weep.  
 Let me take my chance with the vanguard—advance  
 Without a regret or a backward glance—  
 Though I sleep all there is to sleep.

The editor of the *Pacific Dental Gazette* recently wrote:  
 "Dr. Grant's literary friends who know something of his  
 prose and verse production repeatedly express the hope that



he will eventually devote his entire time to literary work. To which the doctor replies that someone must first perfect a formula for 'cutting out' business—the two pursuits being hopelessly incompatible."

Dr. Grant has retired from the practice of dentistry and has engaged in commercial and banking lines. The following letter to the publishers of the *Pacific Dental Journal* will be appreciated, as he is the Mark Twain of the profession:

"MARTINEZ, California, April 10, 1914.

"*The James W. Edwards Company, San Francisco.*

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"In the words of a friend, realizing at the early age of 5 years where I was, I removed as promptly as possible to California, where, being severely bitten by the California microbe, I have never since been able to get away long at a time. For thirty seven years my home was Woodland, California, where I attended the public schools and Hesperian College (when fishing was poor), and at 17 years, determining (nobody knows why) to corral fame and fortune as a dentist, I became a student with a prominent, competent and successful preceptor, who in the course of nearly two years succeeded in teaching me a part of what he knew. Then I attended the Louisville College of Dentistry, where I graduated June 17, 1891, officiating as valedictorian. Returning to Woodland 'flat broke,' father took me in and brother loaned me some money. I began the practice of my profession, and in twenty years, having made all the money I wanted (to make at dentistry), I retired from practice (encouraged by the deafening applause of my former patrons.)

"JOHN THOMA GRANT."

**DISEASED TEETH IN THE INCIDENCE OF TUBERCULOSIS**

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**BY DR. JULIO ENDELMAN**

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[Dr. Endelman, editor of the *Pacific Dental Gazette*, is a careful writer. His experience, too, is broad. Read this.—EDITOR.]

It is only within recent years that through clinical observations the conclusion was reached that defective teeth and diseased gums are factors in the incidence of tuberculosis. It was then and has since been noted that in not less than 60 per cent of cases of glandular involvement by the bacillus Koch, the mouth of the sufferer contained teeth the seat of caries, roots the seat of abscesses and cysts, and gingival tissues in a continued state of inflammation, as the result of bacterial proliferation.

Considering the world-wide importance of these findings, it might be supposed that immediately upon their publication the care of the mouth and teeth of children and adults would have received a stimulating impetus fully in proportion to the importance of these clinical revelations. That such was not the case—at least not within the following few months, or even years—is readily discerned by the fact that the pioneer publication appeared as early as 1893, at which time Boullard of Limoges traced, from a clinical standpoint, the relationship between oral and dental lesions and tuberculosis, either local or generalized. From 1893 to date observations of a clinical character have from time to time been brought forward in support of the contentions of Boullard, until at last we have come to link diseased teeth and gums with the etiology of the tuberculous infection. This, however, has been done along empiric lines, with substantial proof of actual scientific weight, and very much because of a sense of academic duty, not to say pedantry. It has been known and accepted that a mouth in a state of protracted neglect must in some way influence detrimentally the health of organs not necessarily adjacent to the foci of infection, such as the stomach, intestines and liver; therefore, why not the bronchi and lungs?

These early clinical findings led to a scrutiny of the condi-

tion of the teeth of school children, both at home and abroad, which resulted in the publication of reports so astounding and appalling that the comparatively few investigators in and out of the profession who undertook the work at once, and in a spirit deserving of the highest praise, assumed the self appointed offices of guardians of the public health.

Ritter of Belin found that 90 per cent of the school children of that city had teeth the seat of caries, abscesses and cysts. Netter, another investigator, found that the mouths of 10 per cent of all subjects examined by him at random contained the most active pus-producing bacteria. In the United States it has been estimated that at least 30 per cent of all teeth of children between the ages 5 and 15 are diseased.

It has been assumed—and doubtless correctly—that practically all cervical glandular enlargements are due to the tubercle bacilli, and that the starting point of the infection is either the tonsils or the teeth. Again, tonsillar involvement is practically always associated with diseased teeth; and while we have seen cases of tonsillar inflammation in adults not associated with carious teeth, in children we have yet to see the case of enlarged tonsils in the presence of a reasonably healthy mouth with a full complement of sound dental organs.

As bearing directly upon the subject under discussion, the statistics of Odenthal and Hoppe, quoted by Dorrance of Philadelphia (*vide Dental Cosmos*, vol. lv.) are significant. The former found that “among 987 children examined glandular enlargements were present in 697 (70.7 per cent). Carious teeth were also present in more than one-half of the children. Only 7.7 per cent of the children showed carious teeth without the glandular swellings. He found that when dental caries existed on both sides glandular enlargements were present on both sides. Of the 267 children (28.6 per cent) who had no glandular enlargements only 5 had carious teeth. Hoppe of Leipzig, in an examination of 269 cases, found glandular swellings in 73.9 per cent; in nearly all the cases it was associated with dental caries. The percentage of children with carious teeth and without glandular swellings was 21.5 per cent; 44 per cent had neither carious teeth nor glandular swellings.”

In a recent thesis by Therre (*vide La Provence Dentaire*, 1914, No. 3) three postulates are definitely established:

1. Dental diseases may be the cause of localized tuberculosis, and the teeth the avenue through which the infection penetrates.

2. Dental diseases may be the cause of generalized or pulmonary tuberculosis, and the teeth the avenue through which the infection penetrates.

3. Dental diseases aggravate a pre-existing tuberculous infection, either localized or general.

Therre, in collaboration with Massia, as well as Tellier, have positively established the presence of tubercle bacilli in the ligamental root tissues, the seat of inflammatory processes, and in the paradental debris. Closely associated with the problem of ganglionic tuberculosis is the one relating to the presence of lymphatic channels in the pulp. The presence of distinct lymphatic vessels in the dental pulp had not been demonstrated until recently, although Pierzol in 1897 stated that he was of the opinion that "the clefts within the matrix between the connective tissue fibers represent the lymph spaces, and are in close relation with the adjacent lymphatic channels." The presence of lymphatic vessels, however, is today an incontrovertible fact, as established by the experiments of Kerner with Prussian blue and those of Coustainga and Pinoy in monkeys (*vide Transactions Second Congress of Stomatology and Thesis by Therre*). The experiments of Coustainga afford the first positive proof of the hitherto empirical contention that tubercular involvement of the glandular tissues of the neck originate from foci of tubercular infection within cavities of decay, and the control experiments of Therre and Massia establish that fact beyond any doubt whatsoever. The course of the infection is along the lymphatic vessels of the pulp, as conclusively proven by Coustainga. This investigator drilled cavities in the lower cuspidati of a monkey. He then inoculated the coronal segment of the pulp with bovine tubercle bacilli and sealed them hermetically with an impervious cement. In the lapse of twenty days tubercular adenitis developed in lymphatic nuclei of the neck, and the discharge from these

localized centers of infection, when injected into guinea-pigs, produced a typical tubercular reaction.

The conclusions to be drawn from the foregoing many-sided consideration of the subject are of a degree of importance that could hardly be over-estimated in their relationship to the care of the mouth and its contained organs and tissues. Let the fact stand out as prominently as it possibly can that no other factor plays a more important role in the incidence of tuberculosis than teeth with carious canities, mortified and infected pulps, abscesses upon their roots, and all the sequelæ of these pathologic conditions. It is no longer a case of stating in a cursory way that diseased teeth or gums may be the starting point of a bacillosis, but that they are in by far the largest number of instances the primal etiologic factor of localized and generalized tuberculosis.



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## NEW BASE FOR THE TOOTHBRUSH

BY DR. FUNKE

[Deutsche Monatsschrift für Zahnheilkunde.]

The sterilization of the toothbrush presents difficulties not easily overcome. Boiling, the most efficacious of all methods, is contra-indicated; so is immersion in solutions of tricresol or of formalin, which impart to the brush an unpleasant taste. The usual method of caring for the toothbrush by rinsing it in water after it has been used in brushing the teeth is insufficient and misleading, as shown by the experiments of Harrison (*British Dental Journal*, 1913). Twelve toothbrushes were selected; each of these was used once in the brushing of a denture and was immediately after washed in ten rinsings of water. They were then allowed to stand undisturbed for twelve hours, when the bristles were removed with the aid of aseptic pincers, and the bacteria on them were carefully counted. It was found that the number of bacteria that had accumulated upon the bristles was equivalent to the number usually found in sewer water. Funke proposes to sterilize the brush by keeping it immersed in alcohol at 70 deg. in the intervals between use. All brushes, however, will not withstand the action of alcohol at 70 deg. for some time without injury to the handle. He therefore proposes the adoption of brushes made on a base of vulcanite containing less sulfur than the rubber used in the making of artificial dentures. Such a product is slightly elastic, and withstands satisfactorily the action of alcohol. The concentration of the alcohol should never be of less than 50 deg., or of more than 70 deg., and if used daily should be renewed by a fresh supply every fifteen days.

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## DENTAL CARIES--IMMUNITY AND SUSCEPTIBILITY

BY RUSSELL W. BUNTING, D.D.SC., ANN ARBOR, MICHIGAN

[This researcher has written for the *Cosmos* and other leading journals. Here's a digest of his work. He points out frankly some of his doubts and lends us facts worth while.—EDITOR.]

As members of the dental profession we hear the criticism that we are accentuating the wrong side of our profession; that we are putting our greatest efforts and endeavors in the perfection of our reparative measures, and that we pay but little attention to the question of the cause of the various dental diseases. Our attention is called especially to the fact that we constantly are dealing with the ravages of caries of the teeth, yet at the same time we do not understand the factors which produce caries, nor are we able to eliminate them at will to prevent the recurrence of the disease. In other words, we have not done for this dental disease what Jenner did for smallpox, what Behring did for diphtheria, and what Wright and Haffkine have done for typhoid.

We feel, however, that such a criticism is unfair, and is made by individuals who have no conception of the intricacy of the problem; nor do they in any manner appreciate the character of investigation which has been directed toward this very question.

Each year some new contribution is added to the fund of our knowledge of the subject, bringing us nearer to the true solution of the problem, if such a solution can be found.

### EARLY THEORIES REGARDING DENTAL CARIES

In the earlier periods of our profession the causative factor of tooth destruction in the process of tooth caries was not under-

stood, many theories being held regarding it. There were those who considered caries to be a manifestation of inflammation of the tooth. This theory dates back to very early times—when Hippocrates, in 456 B. C., made the statement that toothache is the result of "the stagnation of depraved juices in the teeth." Later adherents of this theory were such men as John Hunter (1778), Benjamin Bell (1787), Joseph Fox (1816) and Thomas Bell (1831). In more recent times the inflammation theory has been championed and staunchly supported by Heintzman, Boe-

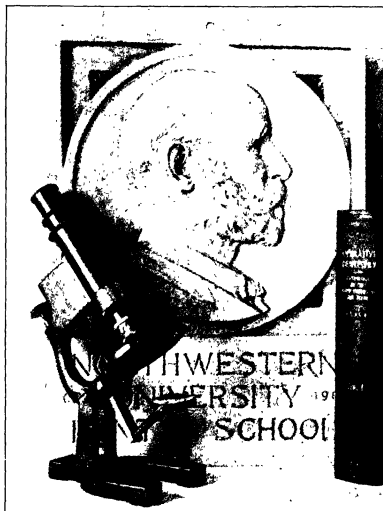


HORACE HAYDEN

decker and Abbott, who in the 80's wrote much in substantiation of the claim that the dentin contains circulatory spaces, and that in these inflammatory and suppurative changes occur which are synonymous with caries. At the same time other notable men, believing that the loss of tooth substance by caries was due to an acid decalcification, maintained that the free acids of the mouth are responsible for the process. Such men as Sir John Tomes, Watt and Jonathan Taft were strong advocates of this theory, and we have a text by E. Magitot, written in 1878, in which he describes the process of caries as being due to the free acids of the mouth.



Leber and Rottenstein, in 1867, called attention to the probable causative association of bacteria with some phases of caries. By staining carious dentin with iodine the dilated dental tubuli were shown to be filled granular bodies, which they recognized as bacteria. At that time no means for the isolation and identification of bacteria were known, and they could carry their investigations no farther. At the World's Medical Congress (1881) Miles and Underwood reported their investigations



of the subject, and stated as their belief that caries is the result of decalcification produced by acids secreted by certain bacteria.

#### CAUSES OF VARIATIONS IN SUSCEPTIBILITY TO CARIES

The variations in susceptibility to caries of certain teeth or sets of teeth must depend upon two factors—first, the internal resistance of these teeth to the carious process, and second, the strength of the external attacking force. The statement is often made that certain teeth are “soft,” and therefore suffer caries. In his researches, in 1895, on the “Physical Characters of the Human Teeth,” Dr. G. V. Black investigated the strength of a large number of teeth, and states as his conclusion that “neither the density of the teeth nor the lime salts they con-

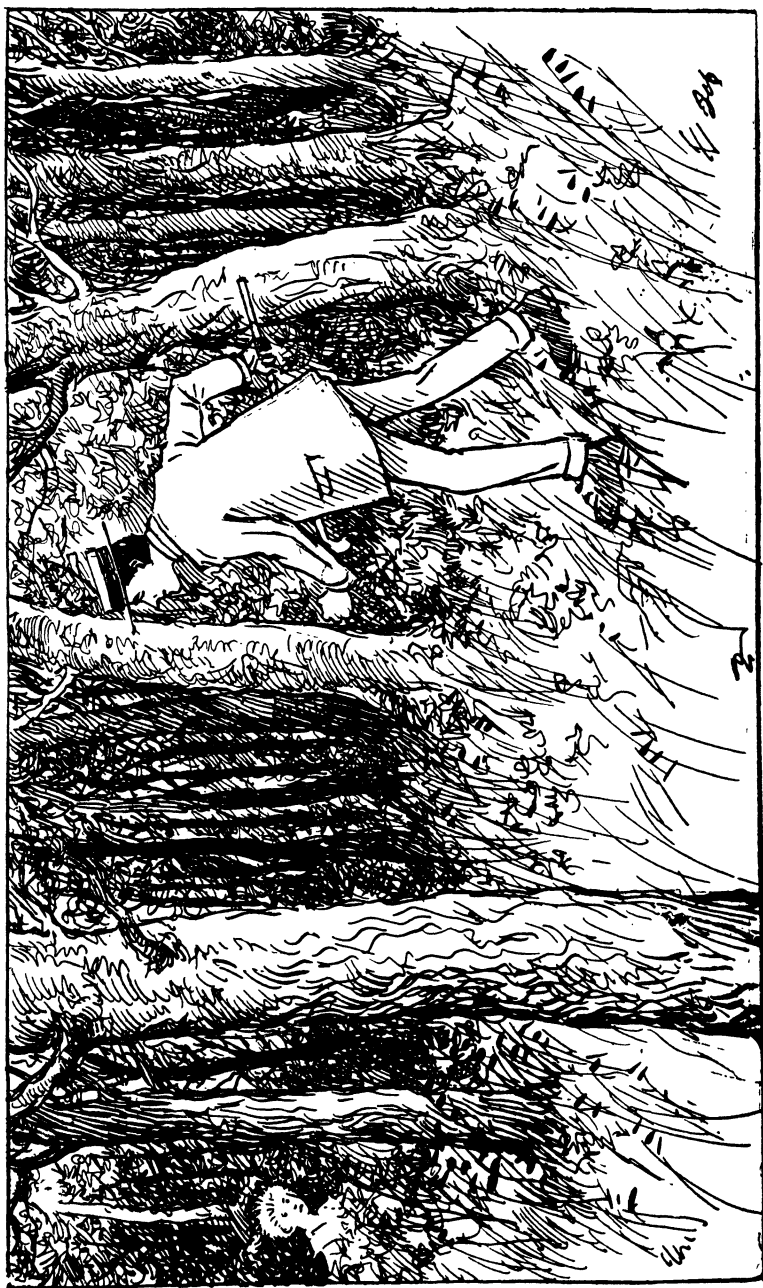
tain has anything to do with the liability of the teeth to suffer from caries." Dr. Miller also attacked this problem experimentally, and found that the dentin of different teeth was decalcified by the acids of caries at differing rates, and that some enamels were more resistant than others. This difference is not great enough, however, to determine immunity. He calls attention to the fact that in the interproximal space caries frequently attacks one tooth more vigorously than the other, or may fail to produce any effect upon one, while the other suffers extensive loss of tissue. In this connection he says: "This resistance depends to a certain extent upon the structure of the tooth; upon the perfection of its external enamel crust, the enamel cuticle, and upon its freedom from fissures, bruises, cracks or weak lines, such as are produced by uncalcified prisms."

Rose in Germany and Fosberg in Sweden have made extensive investigations as to the condition of the teeth of the children. They both state that the children who live in localities in which the soil and water are rich in calcium salts have teeth which are well formed, are hard, and have little caries, while the inhabitants of communities in which the soil and water are poor in calcium salts have poorly formed teeth, which are very prone to caries.

It may be seen, therefore, that the question of how much influence the resistance of the tooth plays in the process of caries is not definitely settled, there being a diversity of views.

Another theory has been advanced lately by Kirk, in which he claims that the plaques are formed of mucin, and that this mucin is precipitated from the saliva by the lactic acid produced by the bacteria.

The office of the plaque seems to be that of protection of the bacteria from dislodgment and the confining of its products against the surface of the tooth. Were it not for some such agent the bacteria would soon be washed away, or the acids which they produced would be diluted by the saliva, so that they would have little or no effect upon the tooth. As stated by Black, 98 per cent of all caries occurs upon three definite locations on the teeth—namely, first, pits or fissures of the occlusal surfaces; second, approximal surfaces, and third, the



"STILL IN THE WOODS, BUT LOOKING FOR TRUTH!"

gingival third of labial or buccal surfaces. This fact is probably due to the limiting action of the plaque.

Bacterial plaques may be located by painting the teeth with a solution of potassium iodid. It will be noticed in the average mouth that plaques are present upon surfaces of the teeth which never decay, and that the mouth of an immune will often have as many plaques as that of the susceptible individual. From this we might infer that lactic acid fermentation does not always occur beneath a plaque. In fact, it is possible that putrefactive, rather than fermentative, changes may take place, in which case the tooth would be protected from caries.

#### FOODS FOR BACTERIAL GROWTH

The foods upon which the bacteria live and form their products are derived from three sources—the saliva, the foods taken into the mouth from without, and the substance of the tooth itself. As shown by Miller, lactic acid fermentation is dependent upon carbohydrate as a food; so that it is the carbohydrate element of the saliva, foods and tooth substance to which we must give our attention.

*Carbohydrates.* The carbohydrates in the saliva, outside of those which are ingested, are very limited. The only possibilities which we can see lie in the mucin and the glycogen, each of which has been the subject of much discussion.

#### GENERAL ACIDITY OF THE MOUTH

The free acids of the mouth, such as fruit acids, acids of vomitus during pregnancy, and acids formed by fermentation of the saliva have been held by some as a causative factor in dental caries. It is very evident that if the total acids of the saliva were able to produce caries in and of themselves, the cavities would not be localized, but would extend over the whole surface of the tooth. The total acidity of the saliva, therefore, can promote caries only in so far as it may help or hinder the growth of the lactic acid organism. In the investigation of this point it was found that the growth of the organisms producing lactic acid was more rapid in alkaline than in acid media. It is true that in acid media there is some acid present at the beginning of the fermentation which will augment the

acid formed, but the growth of the organisms is so much more rapid in the alkaline media that it more than compensates for the difference in a very short time. Hence we see that the free acids of the mouth do not accelerate the progress of the caries. It is possible that in certain cases acids may roughen the surface of the enamel, affording a surface which is more favorable for the attachment of the plaques, and thus inducing the inauguration of caries. After the plaque has formed, and the caries begun, it is thought that the reaction of the media has no effect upon the process.

#### ALEXINS IN THE SALIVA

It has been suggested that there may be in the saliva certain anti-bodies which are similar to those found in the blood, and that these anti-bodies are capable of controlling the growth and activity of the lactic acid bacteria. Many manifestations of caries lead us to suspect that some such agent may be present in the saliva, exerting a control over the process.

Little work has been done in the investigation of this possibility. Miller has stated as his belief that no anti-bodies exist in the saliva which are capable of controlling the bacterial growth, but says that the subject should receive more investigation.

#### CONCLUSIONS

From the foregoing we see that our knowledge of the subject of immunity and susceptibility of the teeth to caries is made up of a heterogeneous collection of facts (pseudo-facts) and theories; so that we can agree with Dr. Kirk, who says that the whole process is still a sealed book.

The manifestations of susceptibility of the teeth in our patients to caries are familiar to all of us. We find that caries of the young runs riot, and that when the age of maturity is reached the teeth are no longer attacked by caries with the same severity. Then in middle aged individuals, who have had no caries for many years, a number of cavities suddenly appear in their teeth. This change in susceptibility may or may not be accompanied by a change in the general health of the individual. These changes from immunity to susceptibility, and *vice versa*, are in their nature so obscure that they remind us

of nothing so much as that general property of the body which determines its resistance against infections. The existence of such a substance in the saliva, with its nature and its source, is yet to be demonstrated.

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### TREATMENT AFTER THE APPLICATION OF ARSENIC

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BY CLAUDE R. KRUSE, D.D.S., TOULUMNE

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After sealing an arsenical treatment in a tooth paint the surrounding gum thoroughly with tincture of iodine. This will counteract any tendency toward sloughing in case any of the arsenic escapes, and also lessen the liability of severe pain, as the counter-irritant effect of the iodine tends to lessen the vascular engorgement of the pulp, thus avoiding so much pressure on the sensory nerve terminals.

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### REMOVING PLASTER FROM A DENTURE

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The last particles of plaster which may adhere to the unpolished surface of a vulcanite plate can be entirely removed without any difficulty by placing the plate, when polished, into a solution of lysol. The stronger the solution the less time required for removal of the last trace.—*Edwards Dental Quarterly*.

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## HOW TO REMOVE BROKEN INSTRUMENTS

BY E. SCHUSTER, LEIPZIG

[In the *Deutsche Monatsschrift fuer Zahnheilkunde* a splendid method appears, and it is worthy of trial.—EDITOR.]

The difficulties of removing the fragment of an instrument from a root canal,—especially if it has become embedded in the apical third,—and the inadequacy of the generally advised means for removal, I would recommend section of the root, guided by the aim of saving as much tooth structure as possible. My method of operation consists in turning over a flap of mucous membrane under local anesthesia, and making a window-like opening in the alveolus with the aid of a fine, sharp chisel; the location of this opening to be determined by the x-ray picture. The root thus exposed is opened in its long axis with a fine rosehead bur, the embedded instrument is quickly exposed to view, and pushed out in the direction of the pulp chamber with stout, curved sounds. In order to avoid an oversight or swallowing of the broken instrument, a pellet of cotton has been previously introduced into the pulp chamber in order to engage the fragment upon removal. The incision in the root is then filled with tin, gold or amalgam, the lumen of the canal being preserved by a sound previously introduced into the canal. If the canal has been opened up to the apical foramen, this sound is superfluous, as an hermetic sealing of the canal is desirable. The field of operation is carefully cleansed and sterilized, and the wound in the mucous membrane closed by a suture. This operation is, of course, most favorably indicated in single-rooted teeth. It has the advantage over resection of the root apex, as recommended by Williger (see *Dental Cosmos*, November, 1912, p. 1289), that the amount of injury inflicted upon the tooth is very small, a slit of 1mm. breadth being sufficient, and that a very small portion only of alveolar bone need be removed, since the broken instrument is removed by way of the pulp chamber.

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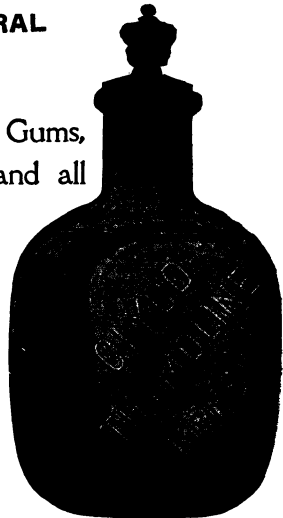
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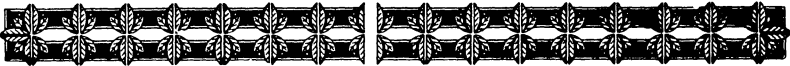
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