cold. Here we come to the question whether there is not a relation between the effect of cold upon a spray of especially exposed leaves upon a plant, and this determinate lesion in animal structure.

The cause of an untimely withering of a definite area, such as a branch of a single plant, may be very similar to that which has occurred here. It is, perhaps, most frequently seen as the result of watering in the sunshine of frosty weather. The plant-circulation is stimulated for the moment, to be checked to destruction in the night. The area affected will coincide with the least vigorous section of the plant, or, in the case of numbers, with the least vigorous specimens, equally exposed to the adverse influence. In much the same way, it is in accordance with clinical observation, that the several tracts of grey matter, or definite brain-centres, may be unequally vigorous in a given individual. This may be due to hereditary conditions of configuration, or of intimate structure, as in cases of limited infantile paralysis involving speech-centres or motor-centres; sometimes to incidental causes of circulation, as in abnormal distribution or varicose conditions, or the irregularities produced by abnormal use, and in epileptiform conditions of unstable equilibrium; and sometimes to disease, as in the completed results of scarlet fever and of specific disease.

The lesson to be derived from the case now recorded is to sift to the bottom all obscure cases, involving disturbance of function. Upon such information alone can be founded rational views of treatment, or, what is more important in such nerve-cases, of management, which should always be mainly directed to the restoration and conservation of general health. These cases recover more or less completely, depending on vigour of constitution. The progress is slow, and the process not easy to understand. In some instances, particularly those of a gouty character, the lesion may be due to capillary embolism, the embolism being derived from gouty irritability of the lining membrane of the veins. In the case before us, it was more probably due to inflammatory action, eventually resulting in a dwindling or shrinkage of vessels. In that case, the circulation might in time become renewed, by anastomosis possibly, to the restoration of functional activity. Warm clothing, the heat of summer, the assimilation of good food, and even the act of partaking of easily digested food (probably by withdrawal of circulation from the nerve-centres to the requirements of the digestive function), have marked effect on persons suffering from such lesions.

Becoming more vigorous in health during this spring, F. D. gradually lost the distressing vertiginous symptoms he had endured since the autumn of 1884. Those experienced during the day were the first to go; and during this hot summer, they are all so far in abeyance. A recent rest and change in the country was of the greatest service to him. As is usual, certain of the precise painful spots where the herpetic eruption has destroyed tissue, remain persistently painful on being touched. There are times when the spots corresponding to nerve-terminations on the other side are painful. But, whatever be the process of recovery, substantial recovery has taken place in this case.

F. D. occasionally now has headache, which he can always refer to the left supratemporal region, as he places his hand to indicate the seat of headache. The original herpetic eruption was on the right shoulder.

The involvement of the function of the auditory nerve, as in the vertiginous symptoms described, and in the irritability caused by loud talking, noises in the street, and the sound of the bath-water in the ears, is difficult to account for in a lesion spending its force on a nerve-centre so distant as the origin of the circumflex nerve. It is interesting to note that, in the process of recovery, these auditory nerve-symptoms were the first to go. The description of them reminds one of the temporary irritability caused by nervous headache. This nervous headache is possibly the most attenuated example of the epileptiform tendency. If so, it is probably due to hyperæmia. The inflammatory lesion of nerve which produces herpes most probably leads to a temporarily persistent hyperæmia affecting an area of central nerve-tissue wider than that on which the inflammation expends the force which leads to organic change.

In view that the insertion of the remarks on elementary pathology may seem fanciful, I should like, in conclusion, once more to refer the reader to Sir James Paget's suggestive paper, particularly to that part of it dealing with the repair of injuries (pp. 613-4 *Op. cit.*)

LONGEVITY.—A local paper states that, in the village of Cranborne, near Salisbury, out of a population of 550, there are two persons aged 89 years, two aged 87, one 86, two 84, one 83, and two 80.

DR. C. LANGE, reader in Pathological Anatomy in the University of Copenhagen, has been promoted to the rank of Professor.

ON THE PERIODS OF ERUPTION OF THE PERMANENT TEETH AS A TEST OF AGE.

By JOHN LIVY, M.D., Bolton.

UNTIL the passing of the Factory and Workshops Act, 1878, the certifying surgeons had no other means of ascertaining the age than those furnished by the eruption or otherwise of the permanent teeth, and the general *physique* of those presenting themselves for examination. Since the Act enforces the production of a birth-certificate, evidence of age from other sources is unnecessary. The subject, however, remains of practical value, and retains its interest from a biological as well as a forensic point of view. The appearance, the number, the character, and disposition of the teeth form one of the most valuable and important guides in determining the classification of mammals. Their relations to the food and habits of the animal, and the facility with which they can be examined, as well as their durability, render them alike interesting and instructive to the naturalist.

The object of this paper, and the subjoined tables, have been simply to ascertain the periods of eruption of the permanent teeth. In order to obtain reliable evidence of age, every case was rejected where the birth-register could not be produced. Some authorities say that the first molars appear at the end of the fourth year, while others give it as late as the seventh year. In the case of children under ten years of age, who are not allowed to work in mills or workshops, advantage was taken of the Education Act, which requires the birth-register of every child on first going to school. For the purpose of this inquiry, about 4,000 children were examined, 2,000 over 10 years of age, seen at various mills and workshops in Bolton, and 2,000 under 10 years of age, attending various schools in the town. The class of children were those of the ordinary working population of Bolton, a town containing over 100,000 inhabitants, and comprised the children of mechanics, cotton-operatives, bleachers, small shopkeepers, labourers, etc. The annexed tables show a considerable range in the periods of eruption.

As a single exception at the same time invalidates, and to some extent supports, a general law, so, when the exceptions are numerous, as will be found to be the case here, a more or less high degree of probability is all that is attainable. There is no law in biology absolute. Nature is variable, and yet there is a certain uniformity. At the same time, it may be affirmed that the eruption of the permanent teeth is the best physiological proof of age that we possess.

The typical number of teeth among placental mammals is, according to Owen, 44, to others 40. Mammals only have a well marked division into four kinds; namely, incisors, canines, premolars, and molars. As is well known, the reduced human dental formula numbers 32.

The first and second premolars in man represent the third and fourth premolars in those animals having four premolars.

In the chimpanzee and the orangs, the second molar comes into position before the premolars. This, I have found, is a very frequent occurrence in the human subject, in both sexes, whilst the third or last molar is acquired before the canines.

When the typical number in diphyodont mammals is reduced, it is the first premolar that is absent, and the third or last molar. The first molar is, therefore, the first of its series, whilst the second premolar is the last of its series, and the fourth of the typical dentition.

The premolars in man have never more than two fangs, generally only one. The first and second molars have two fangs in the lower jaw, sometimes convergent, and occasionally divergent, placed anteriorly and posteriorly. In the upper jaw the molars diminish in size from before backwards. They have three fangs, and occasionally four, two external; the anterior is the longest. As a rule it will be found that the most vigorous and the most wisely fed children have the finest teeth. Indeed, it may be stated, almost axiomatically, the children of Irish parents have, as a rule, the best developed teeth.

In boys between 4 and 5 years of age, the lower first molars come first into place. In boys between 5 and 6 years of age, the first lower molars are acquired first, in the ratio of fourteen to one; at the same age the lower central incisors appear first, in the ratio of three to one. The lower lateral incisors also come first into position at this age. In boys between 6 and 7 years of age, the lower first molars are acquired before the upper first, in the ratio of three to one. The lower central incisors are the first to rise into position, in comparison with the upper central as seventeen to one, whilst the lower lateral incisors invariably first appear. In boys between 7 and 8 years of age, the first lower molars come first into place, in the ratio of five to one. The lower

TABLE A.—Boys.

Number examined.	Age.	Dentition.	Number.	Temporary only.	First Molars.	Incisors.		Premolars.		Canines	Second Molars	Remarks.
						Central.	Lateral.	First.	Second.			
34	4 to 5	Mean	33	T.O.	—	—	—	—	—	—	—	Of this number, only one child, aged four years and seven months, had two lower first molars.
		Highest	1	—	2	—	—	—	—	—	—	
126	5 to 6	Mean	90	T.O.	—	—	—	—	—	—	—	Of this number, 90 had temporary teeth only, 14 had four first molars, one child, aged five years and ten months, had four first molars, three central incisors, and two lower lateral incisors.
		Highest	1	—	4	3	2	—	—	—	—	
172	6 to 7	Mean	40	T.O.	—	—	—	—	—	—	—	The oldest child with temporary only was six years and ten months. Forty of this number had temporary only, 34 had all the first molars, one had four first molars, four lateral, and four central incisors, and also one first premolar. He was six years and six months old. Another had two lower first molars, one upper central incisor, no lateral incisors or first premolars; and two lower second premolars.
		Highest	1	—	4	4	4	1	—	—	—	
222	7 to 8	Lowest	3	T.O.	—	—	—	—	—	—	—	Of this number, three had temporary only, aged respectively seven years three months, seven years six months, seven years 16 months; 56 had four first molars, and two central incisors; 36 had two upper and two lower first molars, two upper and two lower central incisors, and two lower lateral incisors. One child, aged seven years seven months, had first molars central, and lateral incisors complete, and also four first premolars, and one lower second premolar.
		Mean	56	—	4	2	—	—	—	—	—	
		Highest	1	—	4	4	4	4	1	—	—	In this group, one child only, aged eight years and five months, had two lower first molars; 30 had first molars and central incisors complete, and two lower lateral incisors. One child, aged eight years and nine months, had all the first molars, central and lateral incisors, three first premolars, three second premolars, and one canine. Another, aged eight years and eleven months, had first molars, central and lateral incisors complete, two lower first premolars, no second premolars, and two lower canine.
176	8 to 9	Lowest	1	—	2	—	—	—	—	—	—	
		Mean	30	—	4	4	2	—	—	—	—	In this group, 22 had all the first molars and central incisors, and two lower lateral incisors. Two, aged nine years and seven months, had only four first molars, and two lower central incisors, whilst one, aged nine years and nine months, had all his permanent set, except the upper second molars and the dentes sapientes.
		Highest	1	—	4	4	4	3	3	1	—	
154	9 to 10	Lowest	3	—	4	2	—	—	—	—	—	Seven only in this group had first molars, central and lateral incisors complete and two upper premolars. One, aged ten years and one month, had four first molars, three central incisors, and two lower lateral incisors; whilst one child, aged 10 years, had every series complete, except the dentes sapientes.
		Mean	22	—	4	4	2	—	—	—	—	
		Highest	1	—	4	4	4	4	4	4	2	One child in this small group, aged 11 years, had only four first molars and three central incisors, one upper and two lower. Another had all complete as far as the canine, excepting one upper canine.
67	10 to 11	Lowest	1	—	4	3	2	—	—	—	—	
		Mean	7	—	4	4	4	2	—	—	—	
		Highest	1	—	4	4	4	4	4	4	4	
10	11 to 12	Lowest	1	—	4	3	—	—	—	—	—	
		Mean	12	—	4	4	4	4	1	—	—	
		Highest	1	—	4	4	4	4	4	3	—	

central incisors, as seventy-seven to one. The lower lateral incisors invariably appear first. The first premolars, representing the third in the typical number among the mammalia, come, as regards the upper and lower, into position in about equal proportions at this period of life.

In boys, during the ninth year, the first lower molars are invariably the first acquired. The lower central incisors show first, in the ratio of twenty to one. The lower lateral incisors, at this period of life, invariably show first. The upper first premolars show first as three to one. The upper second premolars, the fourth in the typical series, appear first in the ratio of two to one. At this age, the lower canines are invariably first acquired.

In boys between nine and ten years of age, the lower central and lower lateral incisors always cut the gum first. The upper first premolars appear first in the ratio of five to one. The upper second premolars rise into place in the ratio of seven to one. The lower canines and the lower molars invariably appear first at this time of life.

In boys between ten and eleven years of age, the lower central and the lower lateral incisors invariably appear first. The upper first premolars are first acquired in the ratio of three to one. The upper second premolars erupt first in the ratio of four to one. The lower canines invariably appear first. The second molars, upper and lower, appear first in equal proportions at this age.

In boys between eleven and twelve years of age, the second molars, upper and lower, are acquired in equal proportions in the small number examined, too small to attain anything like accuracy. The canines, as in previous ages, present in the lower jaw first.

In girls between the fourth and fifth year, the lower first molars are the first to emerge into position, as in the case of boys of the same age.

In girls between five and six years of age, the first lower molars are first acquired in the ratio of seven to one.

In girls between six and seven years of age, the first lower molars first come into position, in the ratio of eight to one. The lower central

incisors precede the upper central in the ratio of thirty to one, whilst the lower lateral incisors invariably appear first in this group.

In girls between seven and eight years, the first lower molars uniformly present first. The lower central incisors precede their antagonists in the ratio of sixty to one; the lower lateral incisors in the ratio of fifty to one. The first premolars appear first in this group in about equal proportions in each jaw. The same observation applies to the early eruption of the second premolars, and also to the canines at this early period.

In girls in their ninth year, the lower central incisors invariably appear first, and the lower lateral, in the ratio of twenty to one. The upper first premolars appear first in the proportion of five to one, whilst the second upper premolars cut the gum first in the ratio of six to one. At this age, the lower canines are first acquired in the proportion of five to one.

During the tenth year, girls acquire the lower lateral incisors first, in the ratio of eleven to one. The upper first premolars come first into position, in the ratio of two to one. The second premolars show first in equal proportions in each jaw, whilst the lower canines invariably emerge from the gum the first in this group.

In girls between 10 and 11 years, the upper first premolars appear first in the ratio of two to one. The upper second premolars appear first in the ratio of five to one. The canines in this group invariably erupt the first in the lower jaw. The same remark applies to the second molar. In girls in their twelfth year, both the first and second upper premolars first pierce the gums, whilst it is the lower jaw that has precedence in the case of the canines and the second molars. It will be found that the number of variations at each age steadily increases from five to ten or eleven in both sexes. It will also be observed that girls are slightly more advanced in their dentition (six ages out of eight). In 10 ages only, 6 and 7 years, are boys found ahead of girls.

TABLE B.—*Girls.*

Number examined.	Age.	Dentition.	Number.	Temporary only.	First molars.	Incisors.		Premolars.		Canine.	Second Molars.	Remarks.
						Central.	Lateral.	First.	Second.			
35	4 to 5	Mean Highest	33 2	T.O. —	— 1	— —	— —	— —	— —	— —	— —	The mean dentition of this group (33) consists of temporary teeth only. One child, aged four years and seven months, and another aged four years and eleven months, had each one lower first molar.
132	5 to 6	Mean Highest	87 2	T.O. —	— 4	— 2	— —	— —	— —	— —	— —	
172	6 to 7	Lowest Mean Highest	19 87 1	T.O. — —	— 4 4	— 2 4	— — 3	— — —	— — —	— — —	— — —	The mean dentition of this group was four first molars and two central incisors; 10 had temporary only, whilst one child, aged six years and seven months, had four first molars, four central incisors, and three lateral incisors. Six persons in this group had temporary only. One of the six was aged seven years and nine months. The mean dentition (in 50) was four first molars and two lower central incisors, whilst the highest, aged only seven years and two months, had first molars, central and lateral incisors, and the first and second premolars complete, with one lower canine, and two lower second molars.
199	7 to 8	Lowest Mean Highest	6 50 1	T.O. — —	— 4 4	— 2 4	— — 4	— — 4	— — 4	— — 1	— — 2	
170	8 to 9	Lowest Mean Highest	1 28 2	— — —	2 4 4	— 4 4	— 4 4	— — 4	— — 3	— — 4	— — —	In this group one child, aged eight years and four months, had cut only the two lower first molars. The mean dentition (in 28) at this age was the first molars, the central and lateral incisors complete. The most advanced member of this group had all complete as far as the canine, except one upper second premolar, (aged eight years and ten months). One child of this number, aged nine years and three months, had only first molars and two lower central incisors. The mean dentition proved to be first molars, central and lateral incisors complete, three first premolars and one second premolar (in 37). The two most advanced children in this group, aged nine years and nine months, and nine years and eight months, had all complete up to the second molars, excepting one upper molar. Great variation in group.
140	9 to 10	Lowest Mean Highest	1 37 2	— — —	4 4 4	2 4 4	— 4 4	— 3 4	— 1 4	— — 4	— — 3	
38	10 to 11	Lowest Mean Highest	1 11 1	— — —	4 4 4	2 4 4	— 4 4	— — 4	— — 4	— — 4	— — 4	The least advanced dentition in this group was that of a child, aged ten years and six months, with four first molars and two lower central incisors only. The mean dentition, (in 11) was the first molar, the central and lateral incisors complete, whilst the highest had all complete (aged ten years and eleven months), except the dentes sapientie. Considerable variety in group.
16	11 to 12	Lowest Mean Highest	1 2 1	— — —	4 4 4	4 4 4	4 4 4	1 4 4	1 4 4	2 3 3	— — 3	
7	12 to 13	Lowest Mean Highest	1 2 2	— — —	4 4 4	4 4 4	4 4 4	2 4 4	1 4 4	3 4 4	4 2 4	Two persons in this number had all complete as far as the second molars, and the others nearly so.

TABLE C.—*Tabular Statement of Teeth (permanent), as a Test of Age in reference to Factory Children.*

Boys.	Age.								Total.	Girls.	Age.								Total.
	9	10	11	12	13	14	15	16			9	10	11	12	13	14	15	16	
Lateral Incisors . .	2	42	9	4	1	1	—	—	59	Lateral Incisors . .	—	24	8	4	—	—	—	—	36
First Premolars . .	1	76	12	1	—	—	—	—	90	First Premolars . .	—	56	13	2	1	1	—	—	73
Second Premolars . .	—	59	36	5	—	1	—	—	101	Second Premolars . .	—	51	16	2	2	—	—	—	71
Canine	—	18	28	25	8	—	—	—	79	Canine	—	30	34	12	5	—	1	—	82
Second Molars . . .	—	5	42	67	275	184	78	12	663	Second Molars . . .	—	5	44	80	288	240	66	14	746
								Total	992									Total	1008

N.B.—The numbers below each age refer to the appearances of one or more of the series of teeth stated. For example—Of 59 boys with the lateral incisors as their eldest teeth, two were nine years of age, 42 were ten, nine were eleven, &c.

During the course of this inquiry, I could not help observing that caries is extremely common; indeed, it is quite the exception to find a perfect set of teeth, more especially among children over 10 years of age. This is largely due to want of care in the management of the teeth.

I have no doubt that the excessive use of sugar and tea is one of the principal causes of dental caries. Favoured by the temperature of the mouth, saccharine fermentation will terminate in the formation of butyric, lactic, and acetic acids, all of which exert a solvent action on

the enamel. When this latter has given way, the dentine becomes an easy prey to the same process. The tannic acid found in tea exerts a similar chemical effect on the teeth. Small pieces of meat lying between the teeth will likewise contribute to the production of caries. According to some recent experiments, bacteria of a special form are an essential element in the production of dental caries; one more illustration, if it were not unnecessary, to prove the pervading influence of micro-organisms in the ever growing class of enthetic diseases.

TABLE E.

Teeth.	First appearance.													
	Boys—Ages.							Girls—Ages.						
	5	6	7	8	9	10	11	5	6	7	8	9	10	11
Upper Molars	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Lower Molars	Inv.	14-1	3-1	5-1	Inv.	—	—	Inv.	7-1	8-1	Inv.	—	—	—
Upper Central Incisors	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Lower do.	—	3-1	17-1	77-1	20-1	Inv.	Inv.	—	—	30-1	60-1	Inv.	—	—
Upper Lateral Incisors	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Lower do.	—	—	Inv.	Inv.	Inv.	Inv.	Inv.	—	—	Inv.	50-1	20-1	11-1	—
Upper First Premolars	—	—	—	Eq. nos.	3-1	5-1	3-1	—	—	—	Eq. nos.	5-1	2-1	2-1
Lower do.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Upper Second Premolars	—	—	—	—	2-1	7-1	4-1	—	—	—	—	6-1	Eq. nos.	5-1
Lower do.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Upper Canines	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Lower do.	—	—	—	—	Inv.	Inv.	Inv.	—	—	—	—	5-1	Inv.	Inv.
Upper Second Molars	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Lower do.	—	—	—	—	—	Inv.	—	—	—	—	—	—	—	Inv.

Inv. Invariable. Eq. nos. Equal numbers.

N.B.—This table has been made to show the priority of the teeth of the upper and lower jaw in each series. Ex.—In boys of five years the lower molars invariably appear first. In boys of six years the same teeth appear first in the ratio of fourteen to one.

TABLE F.—Number of Variations in each Age.

Boys.			Girls.		
Number.	Year.	Variation.	Number.	Year.	Variation.
34	5th	1	35	5th	3
126	6th	8	122	6th	7
172	7th	21	172	7th	19
222	8th	28	199	8th	34
176	9th	39	170	9th	41
154	10th	44	140	10th	54
67	11th	33	88	11th	53
10	12th	9	16	12th	13

CASE OF DETACHMENT OF THE RETINA, WITH CHOLESTERINE IN THE SUBRETINAL FLUID.

By L. WERNER, M.B., B.Ch.,

House-Surgeon to the National Eye and Ear Infirmary, Dublin.

A. E., a healthy looking lad, aged 8, was admitted to the Infirmary, under the care of Mr. Swanzy, on the 8th of February last, complaining of blindness of the left eye. His family-history was good, with the exception of one brother, who is idiotic; but none of the family have ever suffered from eye-disease. The boy himself had always enjoyed good health up to March, 1884, when he was confined to his bed for three or four days with a bad headache. In July following, while climbing over a ditch, he received a blow from a broken branch on the left eye. The "white" of the eye, it would appear, was torn on the nasal side, and there was a little bleeding. The sight was affected immediately after the injury, but, according to the mother's statement, it recovered in a few days. From this time, nothing wrong was noticed until Christmas, when the boy accidentally discovered that he could not see if the right eye were covered. In January last, Dr. Warnock of Trillick (to whom I am indebted for many points in the history of the case) treated him for a severe pain in the left eyebrow and temple. The eye was neither congested nor painful at the time, but the pupil was somewhat dilated.

The following was the condition on admission. Perception of light was completely wanting; the anterior chamber was shallow; the pupil, which corresponded in size with that of the other eye, did not react to light, although contracting consensually and on convergence. By good daylight, a shining greyish reflection was visible in the interior of the eye. There was no perceptible difference in the intra-ocular tension of the two eyes; but in each it was, if anything,

slightly below the average normal tension. Viewed by focal illumination, the grey appearance of the pupil was seen to be due to an infinite number of minute sparkling crystals, apparently held in suspension by some substance which seemed to float in the vitreous humour when the eye was moved. The separate particles appeared, at first, to have no motion, except that which was imparted to them by the mass in which they were imbedded; but on closer observation, when the eye, after having been moved in various directions, came to rest, some of the crystals could be seen falling slowly towards the inferior part of the globe, while others remained suspended opposite the pupil. When the pupil had been fully dilated by atropine, it was found that the retina was very extensively detached, and that the crystals were situated, not in the vitreous humour, but between the choroid and the retina (that is, in the subretinal fluid), for the latter, although still transparent, could be distinctly seen in front of the sparkling mass. Several of the retinal vessels had a curved arrangement, with their concavity directed forwards, owing to the close apposition of the retina to the posterior surface of the lens. The temporal portion was completely detached, and stretched across, behind the lens, to the inner side of the eye, where it dipped back towards the fundus, the edge of the fold forming a bright line directed from above, downwards and inwards (as seen on a large scale in Fig. 1).

Fig. 1. Showing the retina as seen by focal illumination through the dilated pupil, the eye being rotated upwards and inwards.

The nasal side of the retina was also detached, and similar crystals shone through it, and towards the upper part it presented two narrow folds running antero-posteriorly.

Some of the above details were hidden behind the inner side of the iris; and hence, in order to see them, the eye required to be rotated well inwards, and the light thrown in very obliquely. The fundus was, of course, invisible with the ophthalmoscope, and the