

ington, D. C.), who has long been interested in the education of deaf-mutes, but who has had little experience in teaching them, has said before one of the learned societies of Washington:

"Nature has been kind to the deaf child; man, cruel. Nature has inflicted upon the deaf child but one defect, imperfect hearing; man's neglect has made him dumb and forced him to invent a language which has separated him from the hearing world." "Let us then," says the learned writer, "remove the afflictions that we ourselves have caused." And after some eminently reasonable suggestions he adds: "And last, but not least, let us banish the sign language from our schools."

Nature has indeed been kind to the deaf child, in that she has left him capable of using as freely as his hearing brother the gestural and the graphic means of communicating thought; in that she has made it natural and easy for him to employ a method of expression in the use of which he is at no disadvantage as compared with his hearing brother, and which is beyond all dispute the *only* means of communication which can be to the deaf what speech is to the hearing as a vehicle of thought. And this "language of action," which philologists agree is the foundation of all human intercommunication, which is the acknowledged vernacular of the deaf, the distinguished theorist, and not a few others with him, would "banish from our schools." Of such an act of "kindness" proposed by certain teachers of the deaf on both sides of the Atlantic, one of the most eminent and successful oral teachers of deaf-mutes in Germany says: "If this system were put into execution, the moral life, the intellectual development of the deaf and dumb would be inhumanly hampered."

The founder of deaf-mute instruction in America, who is to be ranked among the most successful teachers of the deaf in the world, says in an article on "The Natural Language of Signs," written some years after he had completed his work for the deaf, and when he had had time to review his methods with calmness:

"My object is to show the intrinsic value and, indeed, indispensable necessity of the use of natural signs in the education of the deaf and dumb. . . . In attempting this, I wish I had time to go somewhat at length into the genius of this natural language of signs; to compare it with merely oral language, and to show, as I think I could, its decided superiority over the latter, so far as respects its peculiar adaptation to the mind of childhood and early youth."

"In what relates to the expression of passion and emotion, and of all the finer and stronger sentiments of the heart, this language is eminently appropriate and copious."

"So far as objects, motions, or actions addressed to the senses are concerned, this language, in its improved state, is superior in its accuracy and force of delineation to that in which words spelt on the fingers, spoken, written, or printed are employed."

This claim of the superior accuracy and precision of sign language, as compared with words, may perhaps excite surprise at first thought. But it is believed that its reasonableness will appear when it is remembered that the meanings attached to words are almost wholly arbitrary, very few giving the slightest hint of their signification in their shape or sound; while nearly every gesture used in sign language carries with it a plain suggestion of its meaning, and in very many instances gives a vivid and easily recognized portrayal of the idea to be conveyed.

Since experience has proved that sign language is natural to the deaf, that it is acquired and made use of by them more easily than speech is by the hearing, that it furnishes a full and adequate means for communicating thought and feeling, often surpassing speech in vividness and exactness, it is not strange that teachers of the largest experience and broadest view unite in approving its use in the education of the deaf.

At this point the question will naturally arise in many minds: "Does the sign language give the deaf in these respects *all* that speech affords to the hearing?"

The experience and observation of the writer lead him

to answer the question with a decided affirmative. On many occasions it has been his privilege to interpret through signs to the deaf, addresses given in speech; he has addressed assemblages of deaf persons many times using signs for the original expression of thought; he has seen hundreds of lectures and public debates given originally in signs; he has seen conventions of deaf-mutes in which no word was spoken, and yet all the forms of parliamentary proceedings were observed, and the most excited and earnest discussions carried on; he has seen the ordinances of religion administered, and the full services of the church carried on in signs; and all this with the assurance growing out of his own complete understanding of the language, a knowledge of which dates back to his earliest childhood, that for all the purposes above enumerated gestural expression is in no respect inferior, and is in many respects superior, to articulate speech as a means of communicating ideas.

But the greatest value of the sign language to the deaf, when the whole period of their lives is taken into account, is to be found in the facility it affords for free and unconstrained social intercourse. And in this, as in the matter of public addresses, nothing has been discovered that *can* fully take its place.

Graduates of schools, from which the attempt has been made to "banish signs," have repeatedly testified that they could in no way attain to such pleasure in social intercourse as through the use of sign language, ability to employ which they readily acquire by mingling with those more favored deaf-mutes who have become familiar with it earlier in life.

"But," say those who urge that the use of signs is an injury to the deaf, "they can use that language only with their fellow-unfortunates, or with the very few others who learn it for their sake, and their use of signs tends to make them clannish, thus narrowing the sphere of their lives, and leading them to employ in excess a language other than the vernacular of their country."

It is admitted that, in the education of the deaf, injudicious teachers may allow, or even encourage, too free a use of the sign language in the schools,—that such teachers may suffer their pupils to go out from under their influence without being impressed with the importance of making special and persistent efforts to overcome the *tendency* to clannishness which is natural to the deaf, no matter what method of instruction is employed.

It is not disputed that in teaching the deaf, signs may be so employed as to affect unfavorably the acquisition by the pupil of verbal language, whether in its written or spoken forms.

But nothing is more certain, as proven by the experience of nearly three-fourths of a century in this country, than that the unfavorable results which some have charged upon the use of the sign language, are attributable in all cases to its *abuse* by injudicious, incompetent, or inexperienced teachers. Since 1817, when the first permanent school for deaf-mutes in this country was established, more than forty thousand children have been educated in a hundred schools now in successful operation, in all of which the sign language has been made use of. A majority of these persons are living to-day, and some of them may be found in every city, probably in every county of the land.

Among these, thousands could be named who, while associating freely with their fellow deaf-mutes, and deriving both profit and pleasure from such association, mingle readily with persons who hear; who are not clannish to any degree that would subject them to just criticism; who use the vernacular of the country with freedom and reasonable accuracy; who maintain themselves respectably and comfortably by their own labor; who are, in short, good and intelligent citizens, adding strength, wealth, and character to the communities in which they reside.

**II. THE COMBINED SYSTEM OF INSTRUCTING DEAF-MUTES.**—It is a matter of singular coincidence that schools for the deaf should have been first established in the three leading nations of Europe at about the same

period, and as the result of entirely independent effort. This occurred very near the middle of the last century.

The Abbé de l'Épée inaugurated in France what will be presently described as the manual method. Samuel Heinicke was the founder in Germany, as Thomas Braidwood was in Great Britain, of the oral method.

The promoters of these two methods were each earnest in urging the superiority of his own over the other, and for a full century the deaf-mute schools of the world were either manual or oral, with little thought in the mind of any one that there might be found a golden mean between the two extremes. Within the past twenty years, however, it has been proved possible, by many teachers of no little prominence in Europe and America, to appropriate the elements of greatest value in the two methods so long in conflict, and to secure, under what has been termed the combined system, all that is of advantage in the education of the deaf.

With such favor have the claims of the combined system been received in this country that on December 1st last (1899), out of 57 public institutions existing in the United States, 45 were being conducted in accordance with this system, as against 7 oral and 5 manual schools. In the 45 combined schools there were 9,863 pupils; in the 7 oral schools 685 pupils, and in the 5 manual schools 212 pupils. During the last ten years the number of pupils in the public oral schools has diminished, while there has been an increase of 40 per cent. in the number of pupils in the public combined schools.

The principal considerations which commend this system may be presented in a few words.

The experience of a century and a half of practical instruction of the deaf has established no conclusion more clearly than that it is impossible to teach all deaf-mutes to speak. Some are found to be lacking more or less in mental capacity; some have only a weak and inefficient imitative faculty; with others an infirmity of vision is discovered; others again have little quickness of tactile perception. And it is far from being true, as the eminent scientist to whom reference has been made has affirmed, that "nature has inflicted upon the deaf child but one defect—imperfect hearing."

In former times these doubly or trebly defective children were summarily dismissed from oral schools, with the unjust and inhuman condemnation that they were imbeciles. And even at the present they are often quietly dropped from such schools under one pretext or another, because the oral teachers are perfectly well aware that they cannot be educated under their method.

The essential defect in the oral method is, then, that it practically rejects a large proportion of the deaf as incapable of education,—that it fails with those who stand in greatest need of a helping hand.

The radical deficiency of the manual method is that it makes no provision for imparting the extremely valuable accomplishments of articulation and lip-reading to the large percentage of the deaf that is certainly capable of acquiring these great gifts.

The doors of the combined-system schools are wide open to *all* the deaf—to the weaker as well as to those more richly endowed with capacity for improvement. In these schools no method or appliance is rejected that can be shown to be of practical help to any number, however small, of the great class of the deaf.

The achievement of imparting speech to one who has it not comes so near to being a miracle that one is dazzled by the brilliancy of the triumph, and is apt to feel that everything else in the education of the deaf must be subservient to this. Parents and friends of the deaf need to be placed on their guard against this grave error, and to be advised that those schools and systems best deserve their confidence and support that seek to give the broadest and most valuable education possible to *all* the deaf.

Within the past decade the educated deaf-mutes in Europe and America have been demanding the general adoption of a combined system in schools for their class. This attitude on their part is, perhaps, most noteworthy in Germany, for in that country the oral method has been

practised almost exclusively since the establishment of the first school for deaf-mutes more than a century and a half ago.

A petition signed by more than eight hundred deaf-mutes, all graduates of oral schools, was presented to the Government, setting forth the insufficiency of the oral method in many cases, and praying that a combined system might be generally introduced.

Many conventions of educated deaf-mutes in Europe and America have adopted, unanimously, resolutions strongly approving the combined system, but the most notable of these gatherings was one in Paris in August, 1900. The French Government invited the deaf-mutes of the world, with their hearing friends and teachers, to join in a "congress for the study of questions of education and assistance of deaf-mutes." This invitation was accepted by about two hundred deaf-mutes and one hundred hearing persons. The deliberations of the congress were carried on in two sections, each adopting resolutions as to methods of instruction. The hearing section voted in favor of the pure oral method, with opposing votes from the Swedish, Danish, German, Swiss, and American delegates.

The section of deaf-mutes voted unanimously in favor of a combined system. A large majority of the leaders among these deaf-mutes had been educated in pure oral schools. Nearly all these men are personally known to the writer of this article, who attended the Paris congress.

These orally educated deaf-mutes are men of much more than ordinary intelligence, and their testimony as to the insufficiency of the method under which they were educated should be given the greatest possible weight.

Edward M. Gallaudet.

**DEAFNESS.**—As blindness is the result of an alteration in any of the media through which light is transmitted, so deafness is the result of an abnormal change in the condition of any of the media through which sound is conducted.

What deafness is may be best understood when we comprehend what hearing is. To understand the philosophy of hearing, the converse of which is deafness, it is necessary first to consider the organ, or the machinery, by means of which hearing is effected. The auditory apparatus, exclusive of the sensorium, presents a series of agencies for the reception, conduction, and perception of the sonorous vibrations, which agencies stand in such nice relation to each other that if the function performed by one be interrupted, the operation of the whole is at once suspended.

The auricle concentrates the sound waves and directs them to the external auditory canal which, by reason of its peculiar conformation and the contained air, serves both to intensify the force of the sound waves and to regulate their impact against the drumhead. The impulsion thus received is conveyed to the foot plate of the stirrup (in the oval window) through the intervening ossicula auditus which span the cavum tympani. This impulsion, transmitted now to the labyrinth, operates in turn upon the labyrinthine fluid which delivers the oscillation to the expansion of the auditory nerve in the cochlea. Thus, we discover that the organ of hearing consists of an apparatus for the reception or collection of sound waves, another for their conduction, and a third which determines their final disposition, constituting the natural divisions of an *external*, a *middle*, and an *internal* ear.

Deafness, then, may be defined to be an interference with the auditory function in any of the three parts which are essential to its performance. The interference may lie at the periphery, or it may exist centrally. It may be consequent upon mechanical obstruction or referable to pathological changes.

An essential condition to normal hearing, and the one most liable to derangement, is a vibratile drumhead. This presupposes an unobstructed external canal and a pervious Eustachian tube, as an equal pressure of air on both sides of the membrane and an unaltered structure are indispensable to its vibratory function.

The diseases which most commonly impair the efficiency of the membrana tympani, and so affect the hearing, are those which have their origin in colds and are denominated catarrhal. These disorders, affecting first the naso-pharyngeal mucous membrane, find in the pharyngeal mouth of the Eustachian tube a point of entry to the ear. When the inflammation is limited to the tube the simplest form of deafness results, the degree of deafness being proportional to the intensity of the inflammatory process and the consequent interference with the air supply to the middle ear. The extension of inflammation to the middle ear constitutes an otitis media catarrhalis (non-suppurative inflammation—Roosa). In the acute form this disease may be treated as successfully as acute inflammation, affecting other organs of the body, is treated. Neglect in the early stage permits the disease to become chronic and leads to tissue change, the treatment of which meets with success corresponding to that realized in the treatment of similar conditions in other parts of the body. Compared with other forms of ear disease the relative frequency of this is as one to two and a half.

The next most frequent cause of deafness is found in the suppurative inflammation of the middle ear (otitis media purulenta acuta et chronica), which also has its origin in the pharynx or results as a sequel to rhinitis. The coryza of the exanthemata very commonly has this termination. In view of the destructive character of the process, and considering the anatomical peculiarities of the middle ear and its relations, the gravity of this affection cannot well be overestimated. Its ravages are not always confined to the parts which are primarily involved, but may invade the mastoid antrum, or by secondary invasion give rise to caries, pyæmic disturbance, cerebral abscess, and death.

The following table indicates how much more frequently the cause of deafness is found to be located in the middle ear than in the external ear or the labyrinth:

Reporter.	Number of cases.	External ear.	Middle ear.	Internal ear.
Blake .....	1,632	466	1,128	58
Burnett .....	1,187	279	868	40
Spencer .....	1,263	243	978	42

It is thus seen that the ear affections which have their origin in inflammations of the naso-pharyngeal mucous membrane constitute the vast majority of all the diseases of the ear. This is of the greatest significance. It should lead to a more careful study of the diseases of the nose.

As would be naturally inferred, the constitutional treatment becomes also a very important factor in the treatment of deafness having this origin.

The interferences with the hearing that may exist in the external auditory canal are briefly best classified into mechanical obstructions, and those which arise from inflammatory action. Under the former class are to be placed foreign bodies, accumulations of cerumen, exostoses, and obstructive deformities; under the latter the inflammatory diseases of the meatus.

Diseases of the internal ear are rare. They are of primary or secondary inflammatory nature. Structural changes may be induced as a consequence of tympanic disorders, or they may result from the effect of toxic diseases or arterial disturbances.

Deafness may be unilateral or bilateral. Circumstances of exposure or individual habit or accident determine the diseased process to one side or to both. This must be the explanation, as is claimed by some writers, if one ear is found to be affected more frequently than the other.

For determining the extent to which the hearing is impaired, the voice, in pronunciation of vowel sounds, and the watch are the most reliable tests. For detecting whether aerial conduction is obstructed the tuning-fork may be employed. The vibration of the fork being com-

municated through the tissues of the head, the affected ear will be the one which is sensitive to the sound.

The greater liability of children to those diseases of the ear which give rise to high degrees of deafness, and which render them liable to deaf-mutism, appeals urgently to the medical profession for a more general and accurate knowledge of this subject. Deaf-mutes are dumb for the reason that, being deprived of hearing, they are incapacitated for the acquisition of language. The causes of acquired deafness exist largely in such diseases as smallpox, measles, typhus, convulsions, paralysis, hydrocephalus and other affections of the brain, and scarlatina, which more frequently than any other disease leaves the patient deaf. Hereditary transmission may be cited as another cause of deafness. Acquired deafness which is of such a degree as to lead to dumbness stands in relation to congenital deafness as forty per centum to sixty per centum. *H. N. Spencer.*

**DEARBORN SPRING.**—Windsor County, Vermont.  
POST-OFFICE.—Woodstock.

This spring, formerly known as the "Old Sanderson Spring," is located in Woodstock about three miles from the famous Woodstock Inn. A fine level road leads to within three-quarters of a mile of the spring, a good hill road covering the remainder of the distance. The spring was discovered about 1830, and soon gained a considerable reputation among the neighboring farmers for its good effects in dyspepsia and skin diseases. The water was analyzed about 1850 by one of the professors in the Woodstock Medical School. The analysis has been lost, but it is said that, among other ingredients, magnesia, iron, and sulphur were found. It is said to resemble the Poland Springs water of Maine. In 1890 the springs passed into new hands, and the owner had it excavated to the bed-rock, thoroughly cleaned and stoned up to within four feet of the surface, and then tiled and carefully protected from the surface water. The tiling was extended upward through a tight floor and a building erected over the spring, with easy facilities for raising the water. The location is now enclosed in a beautiful park, with avenues leading to the spring. Its elevation is 900 feet above Woodstock Park and about 1,600 feet above sea level. The atmosphere is pure and invigorating, and a number of fine views may be had from the park surrounding the spring. The water of the spring maintains an even temperature throughout the year, which fact would indicate that it proceeds from a great depth. It is icy cold when the temperature of the surrounding air stands at 90° F. in the shade. *James K. Crook.*

**DEATH CERTIFICATION.**—The objects secured by a well-devised system of death certification are manifold and may be enumerated as follows:

1. Questions relating to property rights are often settled by a single reference to the record of a death.
  2. The official certificate of a death is usually required in each case of claim for *life insurance*.
  3. Death certificates settle many disputed questions in regard to *pensions*.
  4. They are of great value in searching for records of *genealogy*.
  5. A death certificate frequently furnishes valuable aid in the *detection of crime*.
  6. And by no means the least in importance. Each individual certificate is a contribution *causa scientia*. Taken collectively they are of great importance to physicians, and especially to health officers, in the study of disease, since they furnish valuable information in regard to its causes, its prevalence, and its geographical distribution.
- The following items should be recorded in each certificate, so far as it is possible to obtain them:  
The name of the deceased; the date of birth; the date of death; the sex of the deceased; the age of the deceased.  
The color of the deceased.  
The occupation of the deceased.

The conjugal condition (single, widowed, married, or divorced).

- The residence.
- The place of birth.
- The place of death.
- The names and place of birth of the parents.
- The disease or cause of death.
- The place of burial.

To these it is customary to add in some countries the maiden name of the mother, and if the deceased was a married or divorced woman, or a widow, her maiden name, and that of her husband. In cities the name of the street and number should also be stated. It is also customary in some countries to state the sect or religious denomination of the deceased. It also increases the value of a certificate to state both primary and secondary causes of death when this is possible. The duration of the last illness is sometimes added.

*Law Relating to Death Certification.*—The provisions of the laws of different States and countries relative to death certificates are quite similar, the differences relating to minor points. That of England was enacted in 1836 and amended in 1874. Under the latter act, personal information of every death must be given to the registrar of the district, within five days of its occurrence, by the nearest relatives of the deceased, present at the death, or in attendance during the last illness. The penalty for neglect is 40s.

A registered medical practitioner during the last illness must give a certificate of the cause of death to the best of his knowledge and belief. He is liable to a penalty of 40s. for neglect, or £10, or imprisonment for giving a false certificate.

Deaths are also certified by coroners. No record is made of still-births in England, either as births or as deaths.

The indefinite character of the information secured by the laws relating to death certificates is due to several causes, namely, the carelessness and ignorance of the persons certifying, the absence of medical attendants during the last illness, and the indefinite character of the disease itself. In order to secure an improvement in existing conditions, a committee of the House of Commons was convened in 1893, and after listening to conclusive evidence made the following recommendations:

1. That in no case should a death be registered without production of a certificate of the cause of death signed by a registered medical practitioner or by a coroner after inquest, or in Scotland by a procurator fiscal.
2. That in each sanitary district a registered medical practitioner should be appointed as public medical certifier of the cause of death in cases in which a certificate from a medical practitioner in attendance is not forthcoming.
3. That a medical practitioner in attendance should be required, before giving a certificate of death, personally to inspect the body; but if, on the ground of distance or for other sufficient reason, he is unable to make this inspection himself, he should obtain and attach to the certificate of the cause of death a certificate signed by two persons, neighbors of the deceased, verifying the fact of death.
4. That medical practitioners should be required to send certificates of death to the registrar, instead of sending them to the representatives of the deceased.
5. That a form of a certificate of death should be prescribed, and that in giving a certificate a medical practitioner should be required to use such form.
6. That it should be a penal offence to bury or otherwise dispose of a body, except in time of epidemic, without an order from the registrar stating the place and mode of disposal, which order, after it has been acted upon, should be returned to the registrar who issued it.
7. That it should be made an offence to retain a dead body unburied or otherwise legally disposed of beyond a period not exceeding eight days, except by permission of a magistrate.

8. That the practice of burial in pits or common graves should be discontinued.

9. That still-births which have reached the stage of development of seven months should be registered upon the certificate of a registered medical practitioner, and that it should not be permitted to bury or otherwise dispose of the still-birth until an order for burial has been issued by the registrar.

10. That, subject always to the discretion of the Crown Office, the result of precognitions taken by procurators fiscal in Scotland, or the precognitions themselves, should be communicated to the representatives of the deceased when application is made for the same.<sup>2</sup>

In Austria the burial of a corpse before death is officially registered is forbidden. Deaths must be immediately notified to the authorities. Each commune nominates a *Beschauer* who must be either a physician or a surgeon, whose duty it is to examine whether the person is really dead, whether there is evidence of violent death, or whether death was caused by an infectious disease. If there is suspicion that the death is only apparent, measures must at once be taken to restore animation, and a certificate must not be given in such case till decomposition has begun. If the deceased has had medical care, the attending physician must make a certificate of death and send it to the registrar.

In Belgium no burial can take place before the death has been verified by a divisional physician, after a complete and careful examination of the body. This verification and the identification of the deceased must be certified in accordance with a given scheme. For those who die at birth, the certificate must state whether death occurred before, during, or after delivery, and in the latter case, how long the infant lived after its birth.

In Denmark every death is reported to the parish clerk, and to the clergyman of the parish where it occurred, and is included in the parish register, whether the deceased belonged to the parish or not. No burial can take place before a medical man, or an official qualified to inspect corpses, has issued a certificate.

The following items are called for by the death certificates of Berlin:

1. Full name, sex, and condition of deceased. If a child, the names and condition of the parents. If the mother has an occupation, it should be stated.
2. Residence of deceased. In what story, and whether in front or rear part of house. If in a public institution, the last residence of the deceased.
3. Age of deceased. Date of birth.
4. Day and hour of death.
5. Personal signature of physician or surgeon who had attended the deceased, or inspected the body.
6. Whether the deceased was personally known to the physician.
7. What certain signs of death were observed.
8. Disease or cause of death.
9. Whether any marks of violence were found on the body.
10. Whether the cause of death was an infectious disease.
11. Whether any, and what measures are advisable for preventing the spread of infection.
12. Whether measures for resuscitation were employed in any case when they were indicated.
13. Religious belief of deceased.
14. Remarks.†

Certificates of death are now required by law in each of the New England States, in New York, New Jersey, Delaware, Michigan, Minnesota, and Indiana.

They are also required in nearly all, if not in all, of the large cities of the United States.

In several of the largest cities it is a common practice to issue blank certificates, bound in books of one hundred

\* Report of Select Committee on Death Certification (British Parliament), London, 1893.  
† "Generabericht über das Medizinal- und Sanitätswesen der Stadt Berlin."

or more, for the use of physicians. Upon the cover is printed a set of instructions having reference to the subject of causes of death and the best methods of stating such causes. In the State of Michigan special attention has been given in recent years to the subject of registration, and a decided advance has been made in the appointment of an intelligent physician whose duty it is to supervise the collection and publication of vital statistics throughout the State, and therefore to act in the capacity of a registrar-general for the State. The following certificate of death has been recently adopted in Michigan, and is a very good model:

MICHIGAN DEPARTMENT OF STATE LANSING VITAL STATISTICS DIVISION. CERTIFICATE AND RECORD OF DEATH. [The Registrar should number each certificate received at once, in space below, beginning with "No. 1" for each year.] REGISTERED NO. County, Township, Village, City, Location, Ward, No., St., Full Name, Date of Death, Hospital, institution or transient, Late or home residence, How long an inmate or resident, Single, married, widowed or divorced, Sex, Color, Age, Years, Months, Days, Date of birth, Year of birth, Month, Day, Occupation, if over 10 years of age, Birthplace, Name of father, Maiden name of mother, Date of burial or removal, Signature of undertaker, Place of burial or removal, Address of undertaker, CERTIFICATE OF REPORTER, The personal and family particulars herein given relative to deceased are true to the best of my knowledge and belief. (Signed), (Address).

MARGIN RESERVED FOR BINDING. Write Plainly with Unfading Ink—This is a Permanent Record.

MEDICAL CERTIFICATE OF CAUSE OF DEATH.

I HEREBY CERTIFY that I attended deceased from 1..... to 1..... that I last saw him alive on 1....., that died on 1..... about o'clock, .....M., and that to the best of my knowledge and belief the CAUSE OF DEATH WAS AS HEREUNDER written: DISEASE CAUSING DEATH, Immediate cause of death, Contributory causes or complications, if any, Post-mortem, Place where DISEASE CAUSING DEATH WAS contracted, if other than place of death. \*In case of a Violent Death, state (1) mode of injury and whether accidental, suicidal or homicidal; (2) what was the nature of the injury and the immediate cause of death; (3) contributory causes or conditions, e. g., septicæmia. Also whether operation was performed, etc. In deaths from tuberculosis, cancer, etc., always specify what organ or part of the body was affected. In septicæmia, give cause, especially if puerperal. Witness my hand this ..... day of ..... I..... (Signature of physician, health officer, or coroner) M.D. (Address)

Upon the back of this certificate instructions to the undertaker are printed, together with an extract from the registration laws of the State. Samuel W. Abbott.

DEATH, MODES OF.—Life, whether systemic or molecular, depends upon the proper performance of the functions of circulation and respiration; so death, whether the result of disease, of violence, or of senile decay, is due ultimately to the cessation of these functions.

The causes which result in the permanent suspension of circulation and respiration operate directly upon their mechanism, or remotely through the nerve centres which regulate their action. So important indeed to the proper continuance of these functions is the maintenance of an uninterrupted action of the nerve centres of organic life that it is customary to adopt the classification of Bichat and to speak of death beginning at the heart, death beginning at the lungs, and death beginning at the head. For practical purposes this is sufficiently accurate, and it must be admitted that any attempt at a more definite classification is merely theoretical. The phenomena attending each of these modes

of dissolution are at least sufficiently distinct to merit separate consideration. CESSATION OF THE CIRCULATION may be sudden or gradual. The former is witnessed in deaths from syncope and shock; the latter, in those from asthenia. The chief force in the maintenance of the circulation is the normal difference in pressure of the blood in the arteries and veins. Any influence, therefore, that overcomes this difference will cause the circulation to stop. As the maintenance of this blood pressure is due chiefly to the

action of the heart, the lesions that produce a fatal interruption of it are found for the most part in that organ. They may be found also in the vessels.

In the Heart.—When, from the occurrence of any organic or structural lesion, the heart is rendered no longer capable of propelling its contents into the arteries, the circulation is obliterated and death ensues. The movements of the heart may be suddenly and permanently arrested also by either direct central impulses, as by a gunshot injury, a blow upon the head, or such violent emotion as of fright, joy, or grief; by such direct or reflex impressions as those resulting from a blow upon the lower chest or epigastrium, or from the rupture of abscesses, cysts, or the gravid uterus; by the action of corrosive poisons on the mucous membrane of the stomach, or even by the ingestion of cold liquids in excess or when the body is in an overheated condition. Crile's recent experimental research leads him to the conclusion that collapse or death from violence applied upon the lower chest or abdomen is due mainly to the loss of rhythmic contraction from the mechanical irritation of such violence exerted on the heart muscle itself; that the solar plexus may be disregarded as a factor in it, and that the vagal terminal mechanism in and near the heart may contribute to it in a minor degree. Syncope may be transient, however, as in fainting. There is then a momentary cessation of the heart's action, producing an anæmia of the cerebral centres, resulting in a brief period of unconsciousness and apparent death. In a fatal syncope the individual suddenly turns pale, a cold sweat manifests itself, he becomes dizzy, the pupils dilate, vision becomes dim, the pulse slow, irregular, flickering, and in an instant life is gone. Or, the individual may suddenly become pale, make two or three convulsive gasps and drop dead. When the death is a little less sudden, as in fatal cases of hemorrhage, or when the perforation of an intestinal ulcer takes place, we may observe great restlessness, tossing to and fro, labored respirations, muttering delirium, and, as the scene closes, single or repeated convulsions.

In the Vessels.—When the cause of a sudden failure of the circulation is situated in the blood-vessels, it generally proves to be a rupture of their coats and the rapid reduction of blood pressure by the resulting hemorrhage. A condition closely allied to this sometimes results from an extreme dilatation of the blood-vessels of a single region. The most notable example of this is seen in the state of collapse that follows severe blows upon the abdomen, in which case the abdominal vessels are so distended as virtually to remove the greater part of the blood from the general circulation, and the heart soon ceases to beat from a lack of its normal stimulus. The individual is then said to die of shock. Shock differs from syncope in that the victim may for some time retain his consciousness; there may, however, be associated with shock a syncope due to the reflex inhibition of the heart, in which instance we have combined the symptoms of each. Shock, like syncope, may be transient, the vitality being gradually regained after a longer or shorter period of great depression.

A GRADUAL FAILURE OF THE CIRCULATION is the usual termination of a large number of diseases, particularly those of a chronic character. The heart ceases then on account of a failure of its own contractile power. This may result from degenerations of the muscular fibres, produced by continued high temperature, senile, fatty, or atrophic changes, the action of the micro-organisms of the infectious diseases, or of the poisons which they develop, or from such toxic sedatives as aconite, digitalis, and tobacco. In this category are classed wasting deaths from cholera, acute peritonitis, and such wasting affections as phthisis, diabetes, and cancer, as well as inanition and exposure to intense cold. In this mode of death, the most prominent symptoms are great muscular debility and a feeble, rapid pulse. The intellect may remain clear to the last; but this, as well as the presence or absence of many other symptoms,

must depend largely on the character of the disease upon which the death ensues.

CESSATION OF THE RESPIRATION.—Death from this cause is known as death by apnoea or asphyxia, and may be sudden or gradual.

Sudden failure of the respiration is due to a number of influences operating within or without the respiratory organs. The former class includes all obstructions and occlusions of these organs and all paralyses of their muscles as a result of injury or disease, local or central in character. Causes external to the respiratory organs include all obstructions by foreign bodies or by pressure upon any part of the respiratory passage, as in suffocation, strangulation by hanging or drowning, and the action of noxious gases. The phenomena attending this mode of death are, violent efforts at respiration, followed, we are told, by sensations of pleasure and a brief period of remarkable clearness of intellect. The expiratory efforts become violent, unconsciousness and convulsions, or a few irregular twitchings of the muscles supervene, the face becomes swollen and cyanotic, the eyeballs protrude, then follows a period of relaxation, interrupted by occasional deep inspirations which finally become spasmodic gasps, and last of all, the heart stops.

A gradually fatal apnoea is a common result of disease. It is produced by any morbid process which gradually obliterates the lumen of the respiratory passages, e. g., papillomata and other neoplasms of the larynx, œdema of its mucous membrane, false membranes of the trachea and bronchi, œdema of the lungs, and the pneumonic exudation. Failure of the respiration is occasionally the prominent symptom in death from phthisis (catarrhal pneumonia), and it may result from the pressure of large abdominal tumors or ascites.

Individuals dying in this manner exhibit much the same series of symptoms as those whose death is more sudden, but the struggle is less pronounced. DEATH FROM CENTRAL PARALYSIS.—Paralysis of the vital nerve centres, or "death beginning at the head," operates by causing a failure of the circulation or respiration. Diseases, whether primary or secondary, and injuries located in the cerebrum or the cerebellum, may result fatally through extension of the inflammation to the pons or medulla or through the production of abnormal pressure upon them. Deaths from electric shock, lightning stroke, and electrocution belong to this class. Such poisons as the toxins, ptomaines, and leucomains, and certain drugs, especially the narcotics, impress, as a rule, both cerebral and spinal centres and, when in sufficient quantity, ultimately overcome respiration and circulation. The most prominent symptom indicative of approaching death from this cause is unconsciousness, or coma, when death is not instantaneous. All reflex movements soon cease; the respiration becomes stertorous, gradually more slow and labored, and at last stops, tranquilly, or after convulsive manifestations.

Finally, it should be remembered that the instances in which a death can be clearly traced to the failure of a single group of organs is the exception and not the rule. On the contrary, it will generally be observed that with the ebbing of life, the failure of one system follows so closely upon that of another as to render it extremely difficult to determine which of the vital functions is the last to cease. Death beginning at the lungs may be delayed by the employment of artificial respiration, death beginning at the head may for a time yield to the influence of appropriate remedies; but when the heart has been stilled no human power can restore it to action. James M. French.

DEATH, PHYSIOLOGICAL THEORIES OF.—Living things, in the forms most familiar to us, at least, all grow old and die. We infer that this fate is universal with something of the same certainty with which we prophesy that a stone thrown into the air at any spot whatsoever will fall back to the earth's surface. On the other hand,