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THE HISTORY OF PEDIATRICS AND ITS RELATION TO OTHER SCIENCES AND ARTS.*

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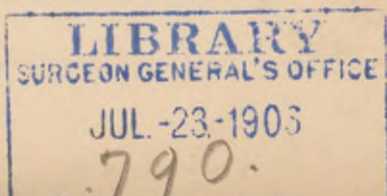
The most human of all the gods ever created by the fancy or the religious cravings of mortal men was Phœbus Apollo. It was he that gave its daily light to the wakening world, flattered the senses of the select with music, filled the songs of the bards and the hearts of their hearers with the rhythm and wonders of poetry, that inspired and reveled with the muses of the Parnassus, cheered the world with the artistic creations of the fertile brains and skilful hands of a Zeuxis and Phidias—he, always he, that inflicted and healed warriors' wounds and sent and cured deadly diseases.

In the imagination of a warm-hearted and unsophisticated people it took a god to embrace and bestow all that is most beneficent and sublime—physical, moral, and mental light and warmth; the sun, the arts, poetry, and the most human and humane of all sciences and arts, namely, medicine.

Ancient gods no longer direct or control our thoughts, feelings, and enjoyments, either physical or intellectual. The kinship and correlation of hypotheses and studies, experience and knowledge are in the keeping of the philosophical mind of man, who is both their creator and beneficiary. To demonstrate this rational affinity of all the sciences and arts, some far-seeing men planned this great Congress. The new departure—in the arrangement for it—should be an example to future general and special scientific gatherings. Indeed, some of its features were adopted by the organization committee of the International Medical Congress which was to take place at St. Louis, but was given up on account of the limited time at the disposal of the great enterprise.

Congresses are held for the purpose of comparing and guarding diversified interests. A free political life requires them for the consulting of the needs of all classes. Scientific congresses

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are convened to gather and collate the varied opinions, experiences and results of many men, and to create or renew in the young and old the enthusiasm of youth. Their number has increased with the modern differentiation of interests and studies. Specialization in medicine is no longer what it was in old Egypt, namely, the outgrowth of the all-pervading spirit of castes and sub-classifications, but as well the consequence as the source of modern medical progress. It is difficult, however, to say where specialization ends and over-specialization begins, or to what extent specialization in medicine is the result of mental and physical limitation, or of the spirit of deepening research; or, on the other hand, of indolence or of greed; or whether, while specialization benefits medical science and art, it lowers the mental horizon of the individual, and either cripples or enhances his usefulness in the service of mankind. For that is what medical science and art are for. José de Letamendi is perhaps correct when he says that a man who knows nothing but medicine does not even know medicine. What shall we expect, then, of one who knows only a small part of medicine and nothing beyond?

Congresses in general have been of two kinds. They are called by specialists for specialists, or they meet for the purpose of removing or relieving the dangers of limitation. This is what explains the great success of international and of national gatherings, such as the German, British, American, and others, and what has given the Congress of American Physicians and Surgeons with its triennial Washington meetings its broadening and chastening influence.

Nor are medical meetings the only attempts at linking together what has a tendency to get disconnected. Look at our literature. The rising interest in the history of medicine as exhibited in Europe and lately also among us, and individual contributions, such as Gomperz's great book on Greek thinkers; or even lesser productions, such as Eymin's *Médecins et Philosophes*, 1904; or the important pictorial works of Charcot, Richet and Holländer, prove the correlation of medicine with history, philosophy and art.

Our special theme is the history of pediatrics and its relations to other specialties, sciences and arts. Now Friedrich Ludwig Meissner's *Grundlage der Literatur der Pädiatrik*, Leipzig, 1850, contains on 246 pages about 7,000 titles of printed monographs written before 1849 on diseases of children, or some subject connected with pedology. Of these, two were published in the fif-

teenth century, sixteen in the sixteenth, twenty-one in the seventeenth, seventy-five in the eighteenth. P. Bagellardus, de aegritudinibus puerorum, 1487, and Bartholomeus Metlinger, "Ein vast nützlich Regiment der jungen Kinder," Augsburg, 1473, opened the printed pediatric literature of Europe. In the sixteenth century, Sebastianus Austrius, de puerorum morbis, Basileae, 1549, and Hieronymus Mercurialis, de morbis puerorum tractatus, 1583, are facile principes; in the eighteenth, Th. Harris, de morbis infantum, Amstelodami, 1715; Loew, de morbis infantum, 1719; M. Andry, l'orthopédie ou l'art de prévenir et corriger dans les enfants les difformités du corps, 1741; Nils Rosen de Rosenstein, 1752; E. Armstrong, An Essay of Diseases most Fatal to Infants, 1768; and M. Underwood, Treatise on the Diseases of Children, 1784; also Hufeland established pediatrics as a clinical entity; while Edward Jenner, 1798, An Inquiry into the Causes and Effects of the Variolæ Vaccinæ, opened the possibilities of a radical prevention of infectious and contagious diseases, the very subject which, a century later, is engaging the best minds and a host of assiduous workers in the service of plague-stricken mankind.

In the United States pediatrics was taught in medical schools, or was expected to be taught, by the professors of obstetrics and the diseases of women and children. The reorganization of the New York Medical College in East Thirteenth Street facilitated the creation, in 1860, of a special clinic for the diseases of the young. Instead of the united gynecologic and obstetric clinics held by Bedford, Gilman, and G. T. Elliott in their respective medical colleges, there was a single clinic for the diseases of the young exclusively. When the Civil War caused the college to close its doors forever, in 1865, I transferred the clinic to the University Medical College, and in 1870 to the College of Physicians and Surgeons. Meanwhile other medical schools imitated the example thus presented. The teachers were classed amongst the clinical professors; only in those schools which are forming part of universities and are no longer proprietary establishments, a few now occupy the honored position of full professors; in a very few the professor of pediatrics is a full member of the "faculty."

In the English colonies of America the earliest treatise on a medical, in part pediatric, subject was a broadside, 12 inches by 17. It was written by the Rev. Thomas Thacher, and bears the date January 21, 1677-8. It was printed and sold by John Foster, of Boston. The title is "A brief rule to guide the common people

of New England how to order themselves and theirs in the Small-Pocks, or measles." A second edition was printed in 1702.

Before and about the same time in which American pediatrics received its first recognition at the hands of the New York Medical College, European literature furnished a new and brilliant special literature. France, which almost exclusively held up the flag of scientific medicine during the first forty years of the eighteenth century, furnished in C. Billard's *Traité des maladies des enfants nouveau-nés*, 1828, and in Rilliet's and Barthez's *Traité clinique et pratique des maladies des enfants*, 1838-43, standard works which were examples of painstaking research and fertile observation. England, which produced in 1801 I. Cheyne's *Essays on the diseases of children*, gave birth to Charles West's classical lectures on the diseases of infants and children in 1848, and F. Churchill's treatise in 1850.

The German language furnished a master-work in Bednar's *die Krankheiten der Neugeborenen und Säuglinge*, 1850-53. A. Vogel and C. Gerhardt, both general clinical teachers, gave each a text book in 1860, Henoch in 1861; and Steffen, in 1865-70, published a series of classical essays.

The number of men interested in the study and teaching of pediatrics grew in proportion to the researches and wants of the profession at large. That is why three large and influential cyclopedias, the works of many authors, found a ready market, namely, C. Gerhardt's *Handbuch der Kinderkrankheiten*, 1877-93; John M. Keating's *Cyclopedia of the Diseases of Children, Medical and Surgical*, 1889-90, and I. Grancher's and I. Comby's *Traité des Maladies des Enfants*, in five volumes, the second edition of which is being printed this very year.

The collective and periodic literature of pediatrics began at a comparatively early time. There was a period toward the end of the eighteenth century when the influence of Albrecht von Haller seemed to start a new life for German medical literature before it lost itself again in the intellectual darkness of Schelling's natural philosophy, from which it took all the powers of French enthusiasm and research, and the epoch-making labors of Skoda, Rokitsansky, and finally Virchow, to resuscitate it. About that early time of Haller, there appeared in Liegnitz, 1793, a collection of interesting treatises on some important diseases of children (*Sammlung interessanter Abhandlungen über etliche wichtige Kinderkrankheiten*). France followed in 1811 with a collection bearing the title: *La Clinique des Hôpitaux des enfants*,

et revue retrospective médico-chirurgicale et hygiénique; publiées sous les auspices et par les médecins et chirurgiens des hôpitaux consacrés aux maladies des enfants. Next in order are five volumes of Franz Joseph von Metzler's *Sammlung auserlesener Abhandlungen über Kinderkrankheiten*, 1833-36; twelve fascioles under the title *Analekten über Kinderkrankheiten oder Sammlung ausgewählter Abhandlungen über die Krankheiten des Kindlichen Alters*; la clinique des Hôpitaux des enfants, Redacteur en chef Vanier, Paris, 1841; and I. Behrend and A. Hildebrandt, *Journal für Kinderkrankheiten*, which appeared regularly from 1843 to 1872. It gave way to the *Jahrbuch für Kinderheilkunde*, which appeared in quick and regular succession from 1858 to the present time. Three series of Austrian journals between 1855 and 1876 consisted of a dozen volumes only. They contain among other important contributions the very valuable essays of Ritter von Rittershayn, who deserved more recognition during his life and more credit after his death, for his honesty, industry and originality, than he attained.

Special pediatric journals have multiplied since. The United States has two, France four, Germany five, Italy two, Spain one. As long as they are taken by the profession we should not speak of overproduction. I attribute their existence to the general conviction that there is no greater need than that of the distribution of knowledge of the prevention and cure of the diseases of the young. The literature of pediatrics seems to prove it. Not 7,000, as before 1850, not even 70,000 titles of books, pamphlets and magazine articles exhaust the number.

Pediatric societies have increased at the same rate. The American Medical Association and the British Medical Association founded each a section twenty-five years ago, the New York Academy of Medicine, in 1886. The American Pediatric Society was founded in 1889, the *Gesellschaft für Kinderheilkunde* connected with the German *Gesellschaft der Aerzte und Naturforscher* in 1883, the English Society for the Study of Disease in Children, in 1900. There are pediatric societies in Philadelphia, in the State of Ohio, in Paris, Kiev, St. Petersburg, and many places, all of them engaged in earnest work which is exhibited in volumes of their own or in the magazines of the profession. If we add the annual reports of hundreds of public institutions, which are so numerous, indeed, that a large volume of S. Hügel, "*Beschreibung sämtlicher Kinderheilanstalten in Europa*," was required as early as 1848 to enumerate them; and an enormous number of

text books of masters, and of such as are anxious to become so, and monographs, and essays, and lectures, and notes preliminary and otherwise, which fill the magazines that most of us take or see, and some of us read—we may form an idea to what extent a topic formerly neglected has taken hold of the conscience and the imagination of the medical public.

Before 1769 there was no institution specially provided for sick children. They were admitted now and then to foundling institutions and general hospitals. In that year Dr. G. Armstrong established a dispensary in London, which was carried on until he died. A similar institution was founded in Vienna by Dr. Marstaller, in 1784. Goelis took charge of it in 1794, L. Politzer developed it, and it is still in existence. Before the French Republic was strangled, it founded the first and largest child's hospital in Europe, the Hôpital des Enfants malades, in 1802. The Nicolai Hospital was established in St. Petersburg, in 1834, by Dr. Friedburg; the St. Anne's Child's Hospital, in Vienna, 1837, by Dr. Ludwig Mauthner; and the Poor Children's Hospital, of Buda-Pesth, in 1839, by Dr. Schöpf, Merz, who afterwards founded and directed the Child's Hospital of Manchester, England.

Since that time the increasing interest in the diseases of children on the part of humanitarians and of physicians and teachers has multiplied children's hospitals. Most of them are small, but they are numerous enough both to exhibit and disseminate the sense of responsibility to the sick and to the necessities of teaching. The United States has been the last country to participate in these endeavors. The mostly proprietary medical schools did not find pediatric teaching to their advantage, and it took the hearts and purses of the public a long time to be opened. The waves of humanitarianism, sometimes directed by a church, and the demands of science have finally overcome previous indolence. There are many general hospitals that gradually opened special children's wards. You find pediatric hospitals in some of the larger cities—New York, Boston, Philadelphia, Albany, St. Louis, and others. It has so happened, however, that real specialties have appealed more to the general sympathy than pediatrics. That is why the number of beds in orthopedic and other special hospitals are mostly favored. Practical teaching has not been extensive. Children's hospitals that should be used for that purpose, and that are directly connected with a medical school, are but few. It has taken the medical faculties, even of universities, too much time to appreciate the necessity of special and well-regulated bed-

side teaching. In some instances lay trustees, guided by their medical advisers, have opened their wards before faculties have consented to open their eyes. At the present time, however, there is hardly a great medical school that does not give amphitheatre or bedside instruction, either in a children's ward of a general hospital or in a special children's or babies' hospital. To a certain extent the teaching of pediatrics in a general hospital has its great advantages. It is not a specialty like that of a special sense or a tissue. For the purpose of study it had to be segregated, but it will never be torn asunder from general medicine. Vogel and Gerhardt were both general clinicians.

The comparative anatomy and physiology, hygiene, etiology, and nosology of pediatrics have been discussed before you by one of the most prominent pediatricists of our era.* It will be my privilege to explain, as far as time will permit, its relation to general medicine, to embryology and teratology, obstetrics, hygiene, and private and public sanitation, to therapeutics, both pharmacal and operative, and to the specialties of otology, ophthalmology, dermatology, and the motor system, to pedagogy, to neurology and psychiatry, forensic medicine and criminology, and to social politics.

Infancy and childhood do not begin with the day of birth. From conception to the termination of fetal life evolution is gradual. The result of the conception depends on parents and ancestors. Nowhere are the laws of heredity more perceptible than in the structure and nature of the child. Physical properties, virtues and sins, and tendencies to disease may not stop even with the third or fourth generation. Hamburger and Osler trace an angioneurosis through six generations, the first case in the series being observed by Benjamin Rush. In many instances, stillbirths, early diseases, atrophy, and undue mortality of the young depend on antenatal happenings. The condition and diet of the mother influences her offspring. The danger of a contracted pelvis, and the necessity of premature delivery may be obviated by the restriction of the diet, or even by appropriate (thyroid and other) medication of the pregnant woman. Experience and experiment tell the same story. The continued practice of preventing conception causes endometritis. Alcoholism causes chronic placentitis, premature confinement, or still-birth. So does chronic phosphorus and lead poisoning. Fortunately, however, the usual medication resorted to during labor is rarely dangerous, for even

* See abstract of address by Prof. Dr. Escherich on page 848 of November number of ARCHIVES OF PEDIATRICS.

morphine or ergot doses given to the parturient woman on proper indications affect the newly-born rarely, and chloroform anesthesia almost never.

Scanty amniotic liquor, by the prevention of free intra-uterine excursions, may cause club-foot; or close contact of the surfaces of the embryo and the membranes give rise to adhesions of the placenta and the head, to filaments and bands whose pressure or traction produces grooving or amputation of limbs, cohesion of toes or fingers, umbilical, meningeal, encephalic, or spinal hernia; not in extra-uterine pregnancy only, where such occurrences are very frequent. Even the majority of harelips and fissured palates have that origin. Arrests of development and fetal inflammation are the headings under which most of the anomalies of the newly-born may be subsumed; congenital diseases of the ear and of the heart may result from either cause or from both. Obstructions of the intestines, the rare closures of the esophagus, the ureter, and the urethra, with hydronephrosis and cystic degeneration of the kidneys are probably more due to excessive cell proliferation in the minute original grooves than to inflammation.

The insufficient closures of normal embryonic fissures or grooves explains many cases of spina bifida, many of encephalocele, most of the split lips and palates, all of porencephalus, bifid uvula and epiglottis, pharyngeal and thyroglossal fistulæ, the communications between the intestinal and urogenital tracts, and the persistency and patency of the urachus.*

Heredity need not show itself in the production of a fully developed disease. It exhibits itself normally either in equality or resemblances, either total or partial, of the body, or some one or more of its external or internal organs. In this way it may affect the nervous, the muscular, the osseous, or other tissues. That is why dystrophies in different forms, obesity, achondroplasia, hyperplasia, or atrophy may be directly inherited, while in other cases the disposition to degeneration only is transmitted.

Hereditary degeneracy is often caused by social influences. The immoral conditions created by our financial system make women select not the strong and hearty and the young husband, but the rich and old, with the result of having less, and less vig-

* J. W. Ballantyne, in his *Manual of Antenatal Pathology and Hygiene*, 1902, has a separate chapter on the relations of antenatal pathology to other branches of study, to general pathology, to the biological sciences, such as anatomy, embryology, physiology, botany, and zoology, and to the medical, including obstetrics, public health, pediatrics, medicine, psychology, dermatology, surgery, orthopedics and medical jurisprudence, finally to gynecology and neonatal pathology.

orous, children. Certain professions, the vocations of soldiers and mariners, and subordinate positions of employees in general, enforce complete or approximate celibacy, with the same result. The nations that submit to the alleged necessity of keeping millions of men in standing armies, are threatened with a degenerated offspring, for not only do they keep the strongest men from timely marriages, but they increase prostitution and venereal diseases, with their dire consequences for men, women, and progeny. Wars lead to the same result in increased proportion, for tens and hundreds of thousands of the sound men are slain or crippled, or demoralized. Those who are inferior and unfit for physical exertions remain behind and procreate an inferior race. Those who believe with Lord Rosebery that an empire is of but little use without an imperial race will always, in the interests of a wholesome civilization, object to the untutored enthusiasm which denounces the "weakling," and the "craven cowardice" of those who believe in the steady evolution of peace and harmony amongst men, and, in sympathy with the physical and moral health of the present and future generation, will prefer the cleanly and washed sportsmanship of an educated youth to that of the mud-streaked and blood-stained manhunter.

A great many diseased conditions cannot be thoroughly understood unless they be studied in the evolving being. Tumors are rarely inherited, but many of them are observed in early life. Lymphoma, sarcoma, also lipoma and carcinoma, and cystic degeneration, are observed at birth, or within a short time after, and seem to favor Cohnheim's theory, according to which many owe their origin to the persistence in an abnormal location of embryonic cells. This theory does not exclude the fact that congenital tumors may remain dormant for years or decades and not destroy the young.

So much on some points connected with *embryology* and *teratology*. The connection with *obstetrical practice* is equally intimate. Three per cent. of all the mature living fetuses are not born into postnatal life this very day. To reduce the mortality even to that figure, it has taken much increase of knowledge and improvement in the art of obstetrics to such an extent that it has become possible by Cesarean section not only to save the fetus of a living, but also of a dead mother, for the fetus in her may survive the dying woman.

But after all, many a baby would be better off, and the world also, if it had died during labor. There are those, and not a few,

who are born asphyxiated on account of interrupted circulation, compression of the impacted head, or meningeal or encephalic hemorrhage, which destroys many that die in the first week of life. Those who are not so taken away may live as the result of protracted asphyxia only to be paralytic, idiotic, or epileptic. Many times in a long life have I urged upon the practitioner to remember that every second added to the duration of asphyxia adds to the dangers either to life or to an impaired human existence. Besides fractures, facial or brachial paralysis, cephalhematoma and hematoma of the sternocleido-mastoid muscle, gonorrheal ophthalmia, with its dangers to sight and even life, may be daily occurrences in an obstetrician's life. All such cases prove the insufficiency of knowledge without art, or of art without knowledge, and the grave responsibility of the practical obstetrician. To lose a newly-born by death causes at least dire bereavement; to cripple his future is not rarely criminal negligence.

Within a few days after birth the obstetrician or the pediatricist has the opportunity of observing all sorts of microbic infections, from tetanus to hemorrhages or gangrene, and the intense forms of syphilis. Not an uncommon disease of the newly-born and the very young is nephritis. It is the consequence, in many cases, of what appears to be a common jaundice, or of uric acid infarction, which is the natural result of the sudden change of metabolism. The diverticula of the colon, as described by Hirschsprung and Osler, and what nearly forty years ago I characterized as congenital constipation, which depends on the exaggeration of the normally excessive length of the sigmoid flexure, belong to the same class. Their dangers may be avoided when they are understood. Of the infectious diseases of the embryo and the fetus, it is principally syphilis that should be considered; amongst the acute forms variola and typhoid are relatively rare.

What I have been permitted to say is enough to prove the intimate interdependence and connection between pediatrics and the diseases of the fetus, with embryology and teratology, obstetrics, and some parts, at least, of social economics.

After birth there are anomalies and diseases which are encountered in the infant and child only. There are also, common to all ages, though mostly found in children, such diseases as exhibit a symptomatology and course peculiar to them. The first class, besides those which are seen in the newly-born, is made up mostly of developmental diseases—scrofula, rachitis, chlorosis. The actual or alleged ailments connected with dentition, most forms of

stomatitis, Bednar's so-called aphthæ, the ulceration of "epithelial pearls" along the raphe, amygdalitis, pharyngitis, adenoid proliferations, latero- and retro-pharyngeal abscesses belong here. Infectious diseases, such as variola, diphtheria, scarlatina, measles, pertussis, and tuberculosis of the glands, bones, joints, and peritoneum have been most successfully studied by pediatricists or those clinicians who paid principal attention to pedology. Meissner prints the titles of more than 200 actual monographs on scarlet fever published in Europe before 1848. Pleurisy and pneumonia of the young have their own symptomatology. Empyema is more frequent and requires much more operative interference. Tracheotomy and intubation are mostly required by the young, both on account of their liability to edema of the larynx and to diphtheria, and of the narrowness of the larynx. Of invagination, 25 per cent. occur under one year, 53 per cent. under ten. Appendicitis, sometimes hereditary and a family disease, would long ago have been recognized as a frequent occurrence in the young if it had not been for the difficulty, mainly encountered in the young, and sometimes impossibility of its diagnosis. That is what we have been taught by Hawkins and by Treves, and lately by McCosh. Operations on glandular abscesses, osteotomies, and other operations on the bones and joints, particularly in tuberculosis, and on malformations, such as have been mentioned, require the skilful hand of the operating physician in a great many instances. Omphalocele, exstrophy of the bladder, undescended testicle, spermatic hydrocele, multiple exostoses, imperforate rectum, atresia of the vagina, or an occasional case of stenosed pylorus, belong to that class, some requiring immediate operation, some permitting of delay. It is principally infancy that demands removals of angioma, which are almost all successful, and of hygroma, mostly unsuccessful, mainly when situated on the neck and resulting from obstruction of the thoracic duct sometimes connected with thrombosis of the jugular vein. Childhood requires correction of kyphosis and scoliosis, and operations for adenoids and hypertrophied tonsils, and furnishes the opportunities for lumbar puncture and for laparotomy in tubercular peritonitis; also suprapubic cystotomy, and mastoid operations. That gum-lancing is no operation indicated or permissible in either the young or adult, and not any more so in the former than in the latter, is easily understood by those who acknowledge its necessity only in the presence of a morbid condition of the gums or teeth, and not when the physiological process of dentition exhibits no anomaly. It scarcely

ever does. Altogether, operating specialists would work and know very much less if a large majority of the cases were not entrusted to them by the pediatricist, who recognizes the principle that those who are best fitted to perform it should be trusted with important medical work. So well is the seriousness and difficulty of operative procedures, as connected with diseases of children, recognized by experts, that 1,500 pages of Gerhardt's handbook are dedicated to external pathology and operations, and that special works, besides many monographs by hundreds of authors, have been written by such masters as Guersant, Forster, Bryant, Giraldès, Holmes, St. Germain, Karewski, Lannelongue, Kirmisson, and Broca.

Ear specialists recognize the fact that *otology* is mostly a specialty of the young. The newly-born exhibit changes in the middle ear which are variously attributed to the presence of epithelial detritus, to the aspiration of foreign material, or to an edema *ex vacuo* occasioned by the separation of formerly adjacent mucous surfaces. Pus is found in the middle ear of 75 per cent. of the still-born, or of dead nurslings. It contains meconium, lanugo, and vernix. Aschoff* examined fifty still-born, or such as had lived less than two hours; twenty-eight of them had pus in the middle ears (55 per cent.). He also examined thirty-five infants that had lived longer than two hours; twenty-four had pus (70 per cent.). Evidently the latter class had been exposed to a microbic invasion. The diagnosis in the living infant is very difficult, mostly impossible, on account of the large size of the Eustachian tube, which, after having admitted the infection, allows the pus to escape into the pharynx and the rest of the alimentary canal. Many of the newly-born that die with unexplained fevers perish from the septic material, or its toxins, absorbed in the middle ear or the intestines. Nor are older children exempt. Gelpert (*Jahrb. f. Kind.*, Vol. xlv., 1897) found a latent otitis media in 75 per cent. of all the inmates of the children's hospitals. Both latent and known otitis is often connected with pneumonia, or with pneumonia and enteritis. In individual cases it may, however, be difficult to decide which of the two or three is the primary, which the secondary affection.

The great vascularity of the middle ear, but still more the accessibility of the funnel-like Eustachian tube in the infant, renders otitis media very frequent. Schwartze's assertion that otitis

* Aschoff, *Zeit. f. Ohrenh.* Vol. xxxi.

media furnishes 22 per cent. of all ear cases in general or special practice is surely correct. Besides, difficult hearing is very frequent in the young, a fact of the greatest import to pedagogy. As early as 1886 Bezold found that of 1,900 school children 25 per cent. had only one-third, and 11 per cent. of the others only one-fifth of normal hearing. The frequent affections of the nose and pharynx in the young explain these facts and exhibit the possibilities of preservation. Finally, the immature condition of the mastoid process and of the floor of the external canal is best appreciated by the practitioner, general or special, who deals with their abscesses.

Whether deafmutism is the result of consanguineous marriage cannot be definitely asserted. It is not often hereditary, quite often it appears to be the result of family alcoholism, it sometimes depends on arrest of development and fetal inflammation, but is more frequently an acquired condition. Not rarely children are affected after they have been able to speak. The majority of cases are caused by cerebral or cerebrospinal inflammation. According to Biedert, 55 per cent. are of that class, 28 per cent. are caused by infectious diseases (cerebrospinal meningitis, scarlatina, typhoid fever, diphtheria, also variola and measles), 3.3 per cent. by injuries, and only 2.5 per cent. are original ear affections. Thus many of the congenital cases, and most of the acquired, are preventable. More and more will our deaf-mute institutions avail themselves of this knowledge, and will learn how to teach their children not only how to read and write, but also how to hear.

Not to the same, but to a great extent, pediatrics and *ophthalmology* join hands. Infectious diseases, such as diphtheria, affect the conjunctiva and sometimes the cornea. Syphilis of the cornea, with or without chronic iritis, is known in the form of parenchymatous or diffuse keratitis. A frequent tumor in the eye of the young is glioma, and frequent symptomatic anomalies are strabismus and nystagmus—both of them the results of a great many and various external or internal causes, with sometimes difficult diagnoses.

The connection of pedology with *dermatology* is more than skin deep; some of the most interesting problems of the latter must be studied on antenatal and postnatal lines. The congenital absence of small or large parts of the surface is probably due to amniotic adhesions; seborrhea and the mild form of lichen, also the furunculosis of infant cachexia and atheroma, to the rapid development, in the second half of intrauterine life, of the sebaceous

follicles; ichthyosis, to the same and to a hypertrophy of the epidermis and the papillæ of the corium, sometimes with dilatation of their blood-vessels and with sclerosis of the connective tissue. Congenital anomalies, such as lipoma, sarcoma, nevus pigmentosus, open all the questions of the embryonal origin of neoplasms; and the eruptions on the infant surface unclosethe specialist the subject of infectious diseases. We recognize in the pemphigus of the palms and soles syphilis; in herpes, gangrene, and in what I have described as chronic neurotic pemphigus, the irritable nervous system; in eczema, constitutional disturbances of the nutrition; in erythema, local irritation or intestinal autoinfection; in isolated or multiple forms, ranging between hyperemia and exudation, the effect of local irritation or the acute or chronic influence of drugs. A dermatologist who knows no embryology or pedology, a pediatricist who knows no dermatology, is anything but a competent and trustworthy medical practitioner.

The diseases of the *muscles* interest the pediatricist, the surgical specialist, the orthopedist, the neurologist, to an equal extent. Many forms of myositis are of infectious origin. Amongst the special forms of muscular atrophy it is the hereditary variety which concerns the first. The spinal neuritic atrophy, the myogenous progressive dystrophy, including the so-called pseudo-hypertrophy, Thomson's congenital myotonia, and (atrophy) the defects of muscles—mainly of the pectoral, but also the trapezius, quadriceps, and others—no matter whether they are primary or myogenous (this probably always when there is a complication with progressive dystrophy), are of special interest to all. I need not do more than mention torticollis in order to prove that neither the special pediatricist, nor the special orthopedist, nor the general surgeon, can raise the claim of ownership.

The relations of pediatrics to *forensic medicine* are very close. Nothing is more apt to demonstrate this than the immense literature in every language on infanticide and all the questions of physiology, physics, and chemistry connected with that subject. The monographs and magazine essays of the last two centuries written on the value or the fallacy of the lung test in the dead newly-born would fill a small library. Much attention has been paid by physicians and by forensic authors to lesions and fractures of the newly-born head, and to anomalies of the female pelvis causing them. Apparent death of the newly-born and the causes of sudden death in all periods of life have been studied to such an extent as to render negative results of police investiga-

tion and of autopsy reports less numerous from year to year. Most sudden deaths receiving the attention of the authorities occur in the young. There were (Wm. Wynn Westcott in *Brit. Med. Journ.*, November 7, 1903) in England and Wales during ten years 15,009 overlain infants; in 1900, 1,774. In Liverpool, out of 960 inquests there were 143 on babies that had died of such suffocation by accident or malice aforethought; in London, in 1900, 615; in 1901, 511; in 1902, 588. In London they had annually 8,000 official inquests, one of fourteen of which was on overlain infants. The etiology of sudden deaths would be far from complete, indeed the most difficult questions could not be solved except by the facilities furnished by the observations on the young. Foreign bodies in the larynx, beans, shoe-buttons, and playthings generally, even ascarides (Bouchut), bones and pieces of meat aspirated during vomiting, acute edema of the glottis, aspiration of a long uvula, or of the retracted tongue, the rupture of a pharyngeal abscess or of a suppurating lymphoid body into the trachea, a sudden swelling of the thymus in the narrow space between the manubrium and vertebral column, which at best measures only 2.2 cm., even a coryza in the narrow nose of a small infant filled or not with adenoids—are causes of sudden death.

The *nervous system* furnishes many such cases. It is true there is no longer a diffuse interstitial encephalitis, such as Jastrowitz would have it, nor is the hypertrophy of the brain so frequent by far as Hüttenbrenner taught, but there are sudden collapses and deaths by falls on the abdomen, by sudden strangulation of large herniæ and other shocks of the splanchnic nerve. There are sudden and unexplained deaths in unnoticed attacks of convulsions, in the first paralytic stage of laryngismus stridulus, in glottic spasms from whatever cause, in the paralysis—or, according to Escherich, laryngospasm—of what since Paltauf has been denominated status lymphaticus, in cerebral anemia, no matter whether it is the result of exhaustion or, as Charles West taught us sixty years ago, from the mere change of position of a pneumonic or otherwise sick baby, when suddenly raised from its bed. Or, death may occur suddenly (a very frequent occurrence) in the heart failure of parenchymatous degeneration of the heart muscle as it occurs in and after diphtheria, influenza, and other infectious diseases, or in the acute sepsis of appendicitis and other intraperitoneal affections, whether recognized or not. For the absorbing power, even of the normal peritoneum, is enormous.

Of a very acute infection ("infectio acutissima"), Wernich spoke as early as 1883.

In gastroenteritis, the terminating bronchopneumonia may destroy life quite suddenly; there is a capillary bronchitis of the very young with no cry, no moan, and no cough, but with sudden death; there are in extreme atrophy fatal emboli into the pulmonary, sometimes renal, more often cerebral, arteries. There are the cases of uremic convulsions, sudden, with sudden death, which are often taken to be merely reflected or "providential," because the frequency of acute nephritis in the newly-born and the infant, with its fever and its uremia, in spite of the publications of Martin and Ruge, Virchow, Orth, Epstein, and my own, is not yet fully appreciated. That is so much the more deplorable as the diagnosis of nephritis at any age is readily made by the examination of the urine, which is so easy to obtain in the young. Other suddenly fatal conditions, such as the acute or chronic sepsis I mentioned before, often quite unsuspected, entering through the umbilicus, the intestine, or the middle ear, are quite frequent.

I have been careful not to mention any cause of death that may just as well be and has been studied in the adult: hemorrhages, the many forms of sepsis of later periods of life, poisons, such as carbolic acid and iodoform, intense cold or heat, insolation, etc., for it is my duty to exhibit the relation to forensic medicine of pediatrics only. Forensic medicine has to guard the interests of all. Nothing in all medicine is more difficult than the discovery of the cause of death. The best knowledge of the advanced practitioner, of the pathologist, of the chemist, of the bacteriologist, of the obstetrician, should be at the service of the people. Every European country understands that and acts on that knowledge. Our own Massachusetts has broken away from the coroner's institution, which was a fit authority for a backwoods municipality, but is so no longer for a cultured people of eighty millions. Now and then, even an expert, or a body of experts, *does not* succeed in discovering the cause of death. What shall we say of a system which *now and then does* discover the hidden cause of a sudden death? When the New York State Legislature half a year ago passed a bill abolishing the no longer competent office of coroner, our good cultured mayor, a gentleman and author, vetoed it for the reason that the new law was not perfect. It was not pronounced perfect by anybody; no law is nor ever was. That is why it appears he prefers something that always was and is, and always will be perfect, namely, the absurd in-

competency and anachronism of the coroner's office. That is perfect. I have not hesitated to express myself strongly and positively, for I have been called upon to speak to you about the relation of pediatrics to other sciences and arts—politics included, than which there is no more profound, practical and indispensable science and art. The greatest historical legislators understood that perfectly well, when they knew how to blend hygiene and religion with their social and political organizations.

One of the greatest questions which concerns at the same time the practical statesman, the humanitarian and the pediatricist, is that of the *excessive mortality* of the young. The Paris Academy of Medicine enumerated in its discussions of 1870 the following amongst its causes: Poverty and illness of the parents, the large number of illegitimate births, inability or unwillingness on the part of mothers to nurse their offspring, artificial feeding with improper material, the ignorance of the parents in regard to the proper food and hygiene, exposure, absence of medical aid, careless selection of nurses, lack of supervision of baby farms, general neglect and infanticide. *If there be* anybody who is not quite certain about the relationship of sciences and arts, he will still be convinced of the correlation and cooperation of ignorance, indolence, viciousness and death, and shocked by the shortcomings of the human society to which we belong. Most of them should be avoided. Forty per cent. of the mortality of infants that die before the end of the first year takes place in the first month. That is mostly preventable. A few years ago the mortality of the infants in the Mott Street barracks of New York City was 325 *per mille*. Much of it is attributable to *faulty diet*.*

Amongst those who believe in the omnipotence of chemical formulæ, there prevails the opinion that a baby deprived of mother's milk may just as readily be brought up on cow's milk; that is easily disproved. In Berlin they found that amongst the cows'-milk fed babies under a year the mortality was six times as great as amongst breast-fed infants. Our own great cities gave us similar, or slightly smaller, proportions, until the excessive mortality of the very young was somewhat reduced by the care bestowed on the milk, introduced both into our palaces and

* Measures taken for the purpose of obtaining wholesome milk are not quite new. Regulations were given in Venice, 1599, for the sale of milk. Milk and its products of diseased animals were forbidden. The Paris municipality of 1792 enjoined the farmers to give their cows healthy food. Coloring and dilution of milk were strictly forbidden, and in 1792 they knew in France how to punish transgressors.

tenements. Milk was examined for bacteria, cleanliness, and chemical reaction. It was sterilized, pasteurized, modified, cooled, but no cow's milk was ever under the laws of nature changed into human milk, and with better milk than the city of New York ever had, its infant mortality was greater this summer than it has been in many years.

That hundreds of thousands of the newly-born and small infants perish every year on account of the absence of their natural food is a fact which is known and which should not exist. Why do we kill those babies or allow them to be killed? Why is it that they have no breast milk? A large number of women work in fields, still more in factories. That is why their infants cannot be nursed, are farmed out, fed artificially, with care or without it, and die. It is the misrule prevailing in our social conditions which compels them to withhold milk from the infant while they are working for what is called bread for themselves and their families. Many of these women, it is true, would not have been able to nurse their newly-born, for their own physical condition was always incompetent. The same may be said of women in all walks of life. Insufficient food, hard work, care, hereditary debility and disease, tuberculosis, alcoholism of the woman's own parents, modified syphilis or nervous diseases in the family—aye, the inability of her own mother to nurse her babies, are ever so many causes why the mother's fountain should run dry. Statistics from large obstetrical institutions (Hegar) prove that only about 50 per cent. of women are capable of nursing their offspring for merely a few weeks. In the presence of such facts what are we to say of the refusal of well-situated and physically competent women to nurse their infants? I do not speak of the "400," I mean the 400,000 who prefer their ease to their duty, their social functions to their maternal obligations, who hire strangers to nurse their babies, or worse yet, who make-believe they believe the claims of the infant food manufacturers, or are tempted by their own physicians to believe that cow's milk casein and cow's milk fat may be changed into woman's casein and fat, that chemistry is physiology, that the live stomach is like a dead laboratory bottle, that the warmth of the human bosom and that of a nursing flask are identical, and that cow's milk is like human milk when it carries the tradesmark "Certified," or "Modified." Physiological chemistry itself teaches that the phosphorus combinations in woman's milk, in the shape of nuclein and lecithin are not contained in cow's milk, and that the large amounts of potas-

sium and sodium salts contained in cow's milk are dead weights rather than nutrients, and particularly the large amount of calcium phosphate occurs in a chemical, not in a physiological combination. Only lately, by no means for the first time, Schlossmann and Moro (*Münch. med. Woch.*, 1903, No. 14), have again proved that the albuminoids of woman's and cow's milk are essentially different, both in their lactalbumin and the globulin, and Escherich and Marfan, that every milk has its own enzymes.

The quantitative and many of the qualitative differences of cow's and human milk have been known a long time. No addition or abstraction of salts, no addition of cow's fat will ever change one into the other. But it appears that every new doctor and every new author begins his own era. There is for most of modern writers no such thing as the history of medicine or of a specialty, or respect of fathers or brothers. In modern books and essays you meet with footnotes and quotations of the productions of yesterday that look so erudite, but also with the new discoveries of old knowledge which you would recognize if the quotation marks had not been forgotten by accident. So it has happened that many learn for the twentieth time that the knowledge of the minimum amount of required food is a wholesome thing, that the amount of animal fat in infant food is easily overstepped, that we have discovered that the Dutch had a clever notion when they fed babies on buttermilk with reduced fat; we are even beginning to learn what our old forefathers practised a hundred years ago, and physiologists taught a third of a century ago—namely, that the newly-born and the very young infant not only tolerate small quantities of cereals but that they improve on it. Indeed, the names of Schiller, Korowin, and Zweifel have been rediscovered. We have also learned—just lately, it appears—what was always known, that morning and night, idleness and work, health and illness, while altering the chemical composition of woman's milk, do not necessarily affect its wholesome character. We are beginning to learn that it is impossible to feed a baby on fanatical chemical formulæ, for they are not prescribed by Nature, which allows latitude within certain limits. We are even beginning to learn that if that were not so there would be no artificially-fed babies alive, and possibly very few participants in the St. Louis Congress of Arts and Sciences.

The inability or reluctance of women to nurse their own infants is a grave matter. From a physical, moral, and sociopolitical point of view there is only one calamity still graver, that

is to refuse to have children at all. It undermines the health of women, makes family life a commercial institute or a desert, depopulates the child world, reduces original Americans to a small minority, and leaves the creation of the future America in the hands of twentieth century foreigners. The human society of the future will have to see to it that no poverty, no cruel labor law, no accident, no luxurious indolence, must interfere with the nursing of infants. I believe in the perfectibility of the physical and moral conditions of the human race. That is why I trust that society will find means to compel able-bodied women to nurse their own infants. Infants are the future citizens of the republic. Let the republic see that no harm accrue from the incompetence or unwillingness to nurse. Antiquity did not know of artificial infant feeding. The first information of its introduction is dated about 1500. Turks, Arabs, Armenians, and Kurds know of no artificial feeding today. It takes modern civilization to expose babies to disease and extinction. I know of no political or social question of greater urgency than that of the prevention of the wholesale murder of our infants caused by the withholding of proper nutriment. May nobody, however, feel that all is accomplished when an infant has finally completed his twelve months. Society and family owe more than life—they owe good health, vital resistance, and security against life-long invalidism.

But even willing mothers may have no milk. We require a stronger, healthier race, and one that physically is not on the down grade. The nursing question is a social and economic problem like so many others, like the childbearing question, that confront modern civilization.

We are building hospitals for the sick of all classes, and insist upon their being superior to the best private residences; asylums for the insane, neuropathics, and drunkards; nurseries and schools for epileptics, cretins and idiots; refuges for the dying consumptives; and sanatoria for incipient tuberculosis. We are bent upon curing and upon preventing. Do we not begin at the wrong end? We allow consumptives and epileptics to marry and to propagate their own curse. We have no punishment for the syphilitic and the gonorrheic who ruins a woman's life and impairs the human race. Man, however, should see that his kind must not suffer. One-half of us should not be destined to watch, and nurse, and support the other half. Human society and the State have to protect themselves by looking out for a healthy, uncontaminated progeny. Laws are required to accomplish this;

such laws as will be hated by the epileptic, consumptive, the syphilitic, and the vicious. No laws ever suited the degenerates against whom they were passed, and it is unfortunate that while health and virtue are as a rule not contagious, disease and vice are so to a high degree.

Modern *therapeutics*, both hygienic and medicinal, has gained much by the close observation of what is permitted or indicated or required in early age. Since it has become more humane (remember it is hardly a century since Pinel took the chains off the insane in their dungeons, and not more than half a century since I was taught to carry my venesection lancet in my vest pocket for ready use) and more scientific, so that whatever is outside of strict biologic methods is no longer "a system," but downright quackery—the terrible increase of the latter as a world-plague is deemed by rational practitioners and the sensible public an appalling anachronism. It appears that the States of the Union are most anxious (and have been partially successful) to rid themselves of it, while some at least of the nations of Europe are greater sufferers than we. According to the latest statistics, there is one quack to every physician in Bavaria and Saxony; ten quacks in Berlin, with its emperor and other accomplishments, to every forty-six physicians. Its general population has increased since 1879 by 61 per cent.; the number of physicians, 170, 2 per cent.; that of the quacks, 1600 per cent.

One of the main indications in infant therapeutics is to fight anemia, which is a constant danger in the diseases of the young, for the amount of blood at that age is only one-nineteenth of the whole body weight, while in the adult it is one-thirteenth. The newly-born is particularly exposed to an acute anemia. His blood weighs from 200 to 250 grams. It is overloaded with hemoglobin which is rapidly eliminated, together with the original excess of iron. This lively metabolism renders the infant very amenable to the influence of bacteria, and the large number of acute, subacute or chronic cases of sepsis is the result. Besides, the principal normal food is milk, which contains but little iron. That is why pediatrics is most apt to inculcate the lessons of appropriate posture, so as not to render the brain suddenly anemic, and of proper feeding and of timely stimulation before collapse tells us we are too late, and of the dangers of inconsiderate depletion. The experience accumulated in pediatric practice has taught general medicine to use small doses only of potassic chlorate; large doses of strychnin and alcohol in sepsis, of mercuric bi-

chlorid in croupous inflammations, of heart stimulants, such as digitalis, when a speedy effect is wanted, of arsenic in nervous diseases, of potassic iodid in meningitis; it has warned practical men of the dangers of chloroform in status lymphaticus;* it has modified hydrotherapeutic and balneological practice, and the theories of hardening and strengthening according to periods of life, and to the conditions of previous general health.

The appreciation of electricity as a remedy has been enhanced by obstetricians, pediatricists and general practitioners. It is but lately that we have been told (P. Strassmann, *Samml. Klin. Vortr.*, 1903, No. 353) that a newly-born and an infant up to the third week are perfectly insensible to very strong electrical currents. The incompetency of mere experimental work, not corrected or guided by practice, cannot find a better illustration, for there is no more powerful remedy for asphyxia and atelectasis than the cautious use of the interrupted or of the broken galvanic current.

The domain of preventive therapeutics expands with the increased knowledge of the causes of disease. That is why immunizing, like curative serums, will play a more beneficent part from year to year, and why the healthy condition of the mucous membrane of the nose, mouth, and pharynx, which I have been advising these forty years as a prevention of diphtheria, has assumed importance in the armamentarium of protection against all sorts of infectious diseases.

Amongst the probabilities of our therapeutical future I also count the prevention of congenital malformations, which, as has been shown, are more numerous than is generally known or presumed, and are often the result of an intrauterine inflammation. In a recent publication F. von Winckel (*Samml. Klin. Vortr.*, 1904, No. 373) emphasizes the fact that the general practitioner or the pathologic anatomist sees only a small number, that indeed the majority is buried out of sight, or is preserved in the specimen jars of the obstetrician. The known number of malformations compared with that of the normal newly-born varies from one to thirty-six, or to one hundred and two or more. They are met with in relatively large numbers on the head, face and neck—al-

* In the meeting of the Society for the Study of Disease in Children, May 27, 1904, Mr. Thompson Walker alluded to the collection of 10 cases with status lymphaticus in which death had occurred at the commencement of chloroform administration, or during it, or immediately after the operation. In addition to the usual changes, a hyperplasia of the arteries had been noted, leading to narrowing of the lumen.

together in 53.2 per cent. of all the 190 cases of malformation observed in Munich during twenty years. A number of them is the result of heredity, of syphilis or other influences. How many are or may be the result of consanguineous marriages will have to be learned. In all such cases the treatment of the parents or the prohibition of injurious marriages should always be insisted upon. The number of those recognized as due to amniotic adhesions or bands is growing from year to year. Kümmerl could prove that of 178 cases, 29 were certainly of that nature. External malformations have long been ascribed to them; proximal malformations, such as auricular appendices, harelip, anencephalia, cyclopia, flattening of the face, anophthalmia, hereditary polydactylia (Ahlfeld and Zander, *Virchow's Archiv.*, 1891), and lymphangioma of the neck, have been found to be caused by amniotic attachments of filaments. Is it too much to believe that the uterus, whose internal changes, syphilitic or others, are known to be very accessible to local and general medication, should be so influenced by previous treatment that malformations and fetal deaths will become less and less frequent?

The problem of the health and hygiene mainly of the older child refers to more than its food. The *school* question is in the foreground of the study of sanitarians, health departments, physicians, and pedagogues. Its importance is best illustrated by the large convention which was organized in Stuttgart, April, 1904, as an International Congress for School Hygiene. Pediatricists, pedagogues, and statesmen formulated their demands and mapped out future discussions. Rational pediatrics would consider the following question:—Is it reasonable to have the same rules and the same daily sessions for children of eight and perhaps of fifteen years, and for adolescents? Certainly not. The younger the child the shorter should be the session, the longer and more frequent the recesses. There should be no lessons in the afternoon, or only mechanical occupations, such as copying, or light gymnastics. There should be no home lessons.

The problem of overburdening was carefully considered by Lorinser in 1836, and by many others since. It deals with the number of subjects taught, the strictness and frequency of official examinations, and should consider the overcrowding of school-rooms. We should try to answer the question whether neuroses are more the result of faulty schooling or of original debility, heredity, underfeeding, lack of sleep, bad domestic conditions, or all these combined. In Berlin schools they have begun to feed

the hungry ones regularly with milk and bread. No compulsory education will educate the starving. The child that showed his first symptom of nervousness when a nursling, the child with pavor nocturnus, or that gets up tired in the morning, or suffers from motor hyperesthesia, pointing or amounting to chorea, unless relieved, instead of being punished by an uninformed or misanthropic or hysterical teacher, gets old or breaks down before the termination of the school term, or of school age. There should be separate classes for the feeble, for those who are mentally strong, or weak, or of medium capacity. All of such questions belong to the domain of the child's physician, the physician in general. The office of school physician is relatively new. Whatever we have done in establishing it in America has been preceded by countries to which we are not in the habit of looking for our models. Bulgaria and Hungary have no schools without physicians. On the other hand, Vienna has none for its 200,000 school children. It is reported that the aldermen refused to appoint one. One of them objected for the reason that the doctor might be tempted to examine the Vienna lassies too closely. His business would be, and is, to look out for the healthfulness of the school building, its lighting, warming, cleanliness, the cleanliness of the children and their health, and that of the teachers. A tubercular teacher is a greater danger to the children than those, who rarely expectorate, to each other. He would take cognizance of the first symptoms of infectious diseases, examine eyes, ears and teeth, and inquire into chronic constitutional diseases, such as rachitis and scrofula in the youngest pupils. He might undertake anthropometrical measurements and benefit science while aiding his wards. He would be helped in all these endeavors by the teachers who must learn to pride themselves on the robust health of their pupils, as they now look for the accumulation of knowledge which may be exhibited in public examinations.

They would soon learn what Christopher demonstrated, that physical development, greater weight, and larger breathing capacity, correspond with increased mental power, joining to this the advice that a physical factor as well as the intellectual one, now entirely relied upon, should be introduced in the grading of pupils. (Charles F. Gardiner and H. W. Hoagland, *Growth and Development of Children in Colorado*—Transactions of the American Climatological Association, 1903.)

Our knowledge of the physiology and pathology of the *nervous system* of all ages would be defective without lessons de-

rived from the fetus and infant. Amongst the newly-born we have often to deal with arrests of development, such as microcephalus, or with that form of fetal meningitis or of syphilitic alterations of blood-vessels which may terminate in chronic hydrocephalus. When the insufficient development of reflex action in the newly-born up to the fifth or sixth week has passed, the very slow development of inhibition during the first half year or more, together with the rapid increase of motor and sensitive irritability explains the frequency of eclampsia and other forms of convulsions. Many of them require, however, an additional disposition, which is afforded either by the normal rapid development of the brain, or the abnormal hyperemia of rachitis. The last twenty-five years have increased our knowledge considerably in many directions. Congenital or premature, complete or partial, ossification of the cranial sutures lead mechanically to idiocy, or paralysis, or epilepsy; it is a consolation, however, to know that the victims of surgical zeal are getting less in number since operators have consented to fear death on the operating table, and thoughtful surgeons have come to the conclusion to leave bad enough alone. In the very young the fragility of the blood-vessels, the lack of coagulability of the blood, the large size of the carotid and vertebral arteries, the frequency of trauma during labor and after birth, the vulnerability of the ear and scalp, contribute to the frequency of nervous diseases, which before the fifth year amounts to a high percentage of all the cases of sickness. Rapid exhaustion leads to intracranial emaciation and thrombosis, the so-called hydroencephaloid of gastroenteritis. The large size and number of the lymph vessels of the nasal and pharyngeal cavities facilitate the invasion into the nerve centres of infections which show themselves as tuberculous meningitis, cerebrospinal meningitis, and poliomyelitis, or more so, poliomyelitis, and as chorea of so-called rheumatic—mostly streptococcic—origin. Nose and throat specialists, as well as anatomists, have contributed to our knowledge on these points—another proof of the intimate dependency of all parts of medicine upon one another. Now all these conditions are not limited to early life, but their numerical preponderance at that time is so great that it is easy to understand that general nosology could not advance without the overwhelming number of well-marked cases amongst children. Amongst them are the very numerous cases of epilepsy. They escape statistical accuracy, for many an epileptic infant or child dies before his condition is observed, or diagnosticated; a great many

cases of petit mal, vertigo, dreamlike states and somnambulism, fainting, habit-chorea, truancy, imbecility, incompetency, or occasionally wild attacks of mania, or the perversity of incendiarism, or in older children religious delirium, even hysteric spells, are overlooked or perhaps noticed or suspected by nobody but the family physician; or, in the cases of the million poor, by nobody. They are cared for or neglected at home, and the seizure is taken to be an eclamptic attack due to bowels, worms, colds, and teeth, exactly like three hundred years ago.

Of equal importance in this disease to the pediatricist, the pedagogue, the psychiatrist, the judge, the statesman, no matter whether in office or a thoughtful citizen, is the influence of heredity. The old figures of Echeverria, which have been substantiated by a great many observers, tell the whole story. One hundred and thirty-six epileptics had 553 children. Of these, 309 remained alive; 78 (25 per cent.) were epileptic; how many of the 231 that died had some form of epilepsy or would have exhibited it nobody can tell. He observed a dozen cases in one family. While in his opinion 29.72 per cent. showed a direct inheritance from epileptic parents, Gowers has a percentage of 35, and Spratling, who has lived among epileptics nearly a dozen years, 66 per cent.

Epilepsy is acknowledged to be one of the causes of imbecility, or genuine idiocy. In very many instances it should be considered as a coordinate result of congenital or acquired changes in the skull, the brain, and its meninges, and particularly the cortex. In a single idiot institution, that of Langenhagen, 15 per cent. to 18 per cent. of the 395—668 inmates were epileptic; in another, Dalldorf, 18.5 per cent. to 24.3 per cent. of 167—344; in a third, Idstein, 36 per cent. of 101 (Binswanger, in Nothnagel, *Syst. Path. u Ther.*, Vol. XII., 1310).

Its main causes are central. External irritations, worms, calculi, genital or nasal reflexes, may be occasional proximate causes. But cauterization of the nares, and still more, circumcision, and clitoridectomy prove more the helplessness or recklessness of the attendant than the possibility of a cure. The individual cases of recovery by the removal of clots, bones, or tumors, are great and comforting results, but if epilepsy and its relations are ever to disappear, it is not the knife of the surgeon, but the apparatus of human foresight and justice that will accomplish it. Most of the causes of epilepsy are preventable. To that class belong syphilis and alcoholism in various generations, rachitis,

tuberculosis and scrofula, many cases of encephalo-meningitis, and most cases of otitis. A question is attributed to a royal layman, "If preventable, why are they not prevented?" If there is a proof of what Socrates and Kant said, namely, that statesmanship cannot thrive without the physician, it is contained in the necessities of epilepsy. Prevention, preventives, and hygienic, medicinal, and surgical aids have to be invoked, unfortunately with slim results so far.

The influence of hereditary syphilis on the diseases of the nervous system has been studied these twenty years, both by neurologists and pediatricists. Its results are either direct—that means characteristically syphilitic—or metasyphilitic—that means merely degenerative. Hoffmann cured a case of syphilitic epilepsy in a girl of nine years in 1712. Plenck describes convulsions and other nervous symptoms depending on hereditary syphilis, and Nils Rosen de Rosenstein describes the same in 1781. The literature of the later part of the eighteenth, and of the first half of the nineteenth century, is silent on that subject, though the cases of affections of the nervous system depending on hereditary syphilis are very frequent (13 per cent. of all the cases, according to Rumpf, *die Syph. Erk. d. Nervens*, 1889). Jullien (*Arch. Gén.*, 1901) reports 206 pregnancies in forty-three syphilitic matrimonies. Of the children, 162 remained alive. Half of them had convulsions or symptoms of meningitis.

According to Nonne (*die Syph. d. Nervens*, 1902) hereditary syphilis differs from the acquired form in this—that several parts of the nervous system are affected simultaneously; and that arteritis, meningitis, gummata, and simple sclerosis occur in combination. Simple cerebral meningitis and apoplexies are very rare. Encephalitis is more frequent. Probably spinal diseases are more frequent, according to Gilles de la Tourette, Gasne, Sachs, and others. Tabes dorsalis is not often found, but may rather depend on an atavistic syphilitic basis; for altogether the nerve syphilis of the second previous generation as a cause of disease in the young is not very rare. (E. Finger, *W. Klin. Woch.*, 13, 1900.)

What we call neuroses are not infrequent in infants and children. Neuralgias are not so common as in the adult, but would be more frequently found if sought for. Even adipositas dolorosa has been observed in childhood. Hysteria is by no means rare, and its mono-symptomatic character, so peculiar to early age, adds to its nosological importance. Its early appearance is of

grave import. Its often hereditary origin makes it a serious problem; under-alimentation or ill-nutrition, rachitis and scrofula, frequently connected with and underlying it, may make it dangerous and a fit subject for the study of educators, psychologists, judges, and all those whose direct office it is to study social and socialistic problems. Hysteria is not quite unknown amongst males, though the large majority are females.

Some of the vaso-motor and trophic disturbances are less, others more frequent, in the young than in the adult. Amongst 129 cases of *akroparesthesia* there is only one of Frankl Hochwart in a girl of twelve years, and one of Cassirer in a girl of sixteen. Scleroderma is met with mostly in mature life, but the cases of Neumann at thirteen days, and those of Cruse, Herxheimer, and of Haushalter and Spillmann, who observed 2 cases in one family, all of them when the infants were only a few weeks old, prove that the same influences which are at work in advanced age, namely, hereditary disposition, neuropathic family influence, low general nutrition, colds, trauma, and so on, may play their role in infant life. Nor are infant erythromelalgias numerous. Henoch saw one in a teething infant, Baginsky in a boy of ten, Heimann one in a girl of thirteen, Graves one in a girl of sixteen; that means 3 or 4 cases below thirteen or sixteen years of age, out of a number of 65 collected by Cassirer in his monograph. (*Die Vasomotorisch-trophischen Neurosen*, Berlin, 1901.) In half a century I have seen but one that occurred in early age, namely, in a boy of twelve, who got well with the loss of two toes. On the other hand, the symmetrical gangrene of Raynaud and the acute circumscribed edema of Milton and Quinke, 1882 (treated of by Collins in 1892), are by no means relatively rare in infancy and childhood. There are a few cases of the former that occurred in the newly-born. Two I have seen myself. There are those which have been observed at six months (Friedel), at nine months (De France), at fifteen months (Bjering), at eighteen months (Dick). In the year 1889 Morgan collected 93 cases, 13 of which occurred from the second to the fifth, 11 between the fifth and tenth, and 15 between the tenth and twentieth years. Amongst the 168 cases collected by Cassirer, 20 occurred below the fifth, 8 between the fifth and tenth, and 25 between the tenth and twentieth years of life. Like most nervous diseases, these cases had either congenital or acquired causes, amongst which a general neuropathic constitution, and the hereditary influence of alcohol, chlorosis, and anemia are considered prominent. Of

acute circumscribed edema, 28 cases are found below nine years of age in Cassirer's collection of 160 cases, one of which at the age of one and a half months is reported by Crozer Griffith, one at three months by Dinckelacker. Again, hereditary influence is found powerful. Osler could trace the disease through five generations.

The connection of pediatrics with *psychiatry* is very intimate. Insane children are much more numerous than the statistics of lunatic asylums would appear to prove, for there are, for obvious reasons, but few insane children in general institutions. It is only those cases which become absolutely unmanageable at home that are entrusted to or forced upon an asylum. The example of the French, who more than fifty years ago had a division in the Bicêtre for mentally disturbed children, has seldom or not at all been imitated. Thus it happens that though not even a minority of the cases of idiocy become known, its statistics are more readily obtained than that of dementia of early life. Some of its physical causes or accompaniments have been mentioned—asphyxia with its consequences, ossification and asymmetrical shape of the cranium, accidents during infancy and childhood, neuroses that may be the beginning or proximate causes of graver trouble. Infectious diseases play an important part in the etiology of intellectual disorders. Althaus collected 400 such cases. They were mainly, influenza 113, rheumatism 96, typhoid fever 87, pneumonia 43, variola 41, cholera 19, scarlatina 16, erysipelas 11. In most of the cases there were predisposing elements, such as heredity and previous diseases, or over-exertion of long duration. The overworked brains of school children were complained of as adjuvant causes of lunacy by Peter Frank as early as 1804. We are as badly off, or worse, a hundred years later.

There is one ailment, however, that appears to hurt children less than it does adolescents or adults, that is masturbation. There are those cases, fortunately few, which depend on cerebral disease and original degeneracy, but in the large majority of instances masturbation, frequent though it be, has not in the very young the same perils that are attended by it later on when the differentiation of sex has been completed and is recognized. Babies under a year, and children under eight or ten will outlive their unfortunate habit, and do not appear to suffer much from its influence. Whatever is said to the contrary is the exaggeration of such as like to revel in horrors. The same exorbitant imagination is exhibited in other statements. What Lombroso and his fol-

lowers have said of the faulty arrangement of the teeth, prognathic skulls, retracted nose, short and attached lobes of the auricle, as distinct symptoms of mental degeneracy, belongs to that class, and need not always be taken as the positive signs of insane criminality. There is so much poetical exaggeration and word painting in them that Lombroso and also Krafft-Ebing are the pets of the prurient lay public. In its midst there must be many who are anxious to believe with Lombroso that brown hair and eyes, brachycephalic heads, and medium size of the body characterize the insane criminal, if only for the purpose of scanning the hair and eyes and heads of their near friends and their mother-in-law's relatives.

It is certainly not true that, as Lombroso will have it, children are cruel, lazy, lying, thievish, just as little as according to him all savages are like carnivorous animals, and essentially criminal, while others are convinced that by nature they are amiable, like Uncas, and virtuous like Chingacook, and have been rendered savage only by the strenuousness of conquering immigrants. Nor is it true that the idiot brain is merely arrested at a stage similar to anthropoid, or even saurian development, for it is less arrest of development than the influence of embryonal or fetal disease, beside amniotic anomalies that cause the irregularities of the encephalon.

Amongst the worst causes of idiocy is cretinism, both the endemic and the sporadic. Every cretin is an idiot, not *vice versa*. The endemic form could be prevented by State interference which would empty the stricken valleys; the sporadic depends on thyroidism, with or without a shortening of the base of the skull, and is partially curable. The idiotism of cretinism causes a fairly uniform set of symptoms; that which depends on other causes exhibits varieties, though not so many as imbecility, which, too, should not be taken to be the result of a single cause. Osseous and cartilaginous anomalies about the nose are pointed out by William Hill, chronic pharyngitis and nasal polypi by Heller, enlarged tonsils by Kafemann in one-third of the cases, some pharyngeal or nasal anomaly in four-fifths by Schmid-Monnard. Adenoids are frequently found as complications. Operations to meet all these anomalies have been performed with improvement of the mental condition in some, of the physical in many more, mainly when the anomalies were complications only. But after all, we should beware of the belief in miracles and in infallible cures. Mainly the tonsils have been puffed up to be the chief causes of many

human troubles and their removal a panacea. According to a modern writer, it prevents tuberculosis, but the prophet is a little too bold, for he adds that, with the exception of himself, there are very few able to accomplish it. Defective or diseased brains are frequent in most conditions. The former class allows even imbeciles to excel in some ways. In that class may be found calculating experts, chess-players, or mechanical draughtsmen.

Imbecile persons may be taught sufficiently to prepare for the simple duties of life. There are, however, many transitions between the complete imbecile, the mild imbecile, and the merely slow and dull. That is why the condition is frequently not appreciated. In his school the imbecile child is slightly or considerably behind his class, and the laughing-stock of the rest. As he is intellectually slow, so he is morally perverse or is made to become so. He knows enough to lie and libel, to run away from school, and from truant to become a vagrant. It is true it will not do to declare the imbecile *per se* identical with the typical criminal, but as many of them are illegitimate, or of defective or alcoholic parents, or maltreated at home, or diseased and deformed, they get, by necessity, into conflict with order and the law. Thompson found 218 congenital imbeciles among 943 penitentiary inmates, Knecht 41 amongst 1,214. When the imbecile is once a prisoner his condition is not liable to be noticed on account of the stupefying monotony of his existence.

What is more to be pitied, the fate of the immature or imbecile half-grown child that naturally acts differently from the normal, or the low condition of the State which, instead of procuring separate schools for the half-witted, or asylums, has nothing to offer but contumely and prison walls, and increasing moral deterioration? This is the stone instead of the bread of the Gospel.

Modern society has commenced, however, to mend old injustices. Every civilized country admits irresponsibility before the law below a certain age, and gradually the mental condition of the criminal is taken into consideration and made the subject of study. But still, thousands of children and adolescents are declared criminal before being matured. The establishment of children's courts is one of the things, imperfect though they be, that make us see the promised land from afar. When crime will be considered an anomaly, either congenital or acquired in childhood, or a disease; when society will cease to insist upon committing a brutality to avenge a brutality; when self-protection will

take the place of revenge, and asylums that of State prisons—then we shall be a human, because humane, society.

CONCLUSIONS.

Pedology is the science of the young. The young are the future makers and owners of the world. Their physical, intellectual and moral condition will decide whether the globe will be more Cossack or more republican, more criminal or more righteous. For their education and training and capabilities, the physician, mainly the pediatricist, as the representative of medical science and art, should become responsible. Medicine is concerned with the new individual before he is born, while he is being born, and after. Heredity and the health of the pregnant mother are the physician's concern. The regulation of labor laws, factory legislation, and the prohibition of marriages of epileptics, syphilitics, and criminals are some of his preventive measures to secure a promising progeny. To him belongs the watchful care of the production and distribution of foods. He has to guard the school period from sanitary and educational points of view, for heart and muscle and brain are of equal value. It is in infancy and childhood, before the dangerous period of puberty sets in, that the character is formed, altruism inculcated, or criminality fostered. If there be in the commonwealth any man or any class of men with great possibilities and responsibilities it is the physician. It is not enough, however, to work at the individual bedside and in a hospital. In the near or dim future, the pediatricist, the physician, is to sit in and control school boards, health departments, and legislatures. He is the legitimate adviser of the judge and the jury, and a seat for the physician in the councils of the republic is what the people have a right to demand. Before all that can be accomplished, however, let the individual physician not forget what he owes to the community now. Mainly to the young men amongst us I should say, do not forget your obligations as citizens. When we are told by Lombroso that there is no room in politics for an honest man, I tell you it is time for the physician to participate in politics, never to miss any of his public duties, and thereby make it what sometimes it is reputed not to be in modern life—honorable. A life spent in the service of mankind, be our sphere large or narrow, is well spent. And never stop working. Great results demand great exertions, possibly sacrifices. After all, whether everything in science and politics that now is our ideal will be accomplished, while we live or after we shall be gone, we shall still leave to our progeny new problems.