This instrument will differ from other large telescopes in the construction of its object-glass, which will be a compound lens of the form used by photographers, and known as the "portrait lens." The focal length of such a lens is very small compared with its diameter, and much fainter stars can be photographed in consequence. The advantage is even greater in photographing nebulæ or other faint surfaces. Moreover, this form of lens will enable each photographic plate to cover an area several times as great as that which is covered by an instrument of the usual form. The time required to photograph the entire sky is reduced in the same proportion. A telescope of the proposed form, having an aperture of eight inches, has been in constant use in Cambridge for the last four years, and is now in Peru photographing the southern stars. It has proved useful for a great variety of researches. Stars have been photographed with it too faint to be visible in the fifteen-inch refractor of the observatory. Its short focal length enables it to photograph as faint stars as any which can be taken with an excellent photographic telescope having an aperture of thirteen inches. The eight-inch telescope will photograph stars about two magnitudes fainter than can be taken with a similar instrument having an aperture of four inches. A corresponding advantage is anticipated from the increase of the aperture to twenty-four inches. Each photograph will be thirteen inches on a side, and will cover a portion of the sky five degrees square, on a scale of one minute to a millimetre. The dimensions will be the same as those of the standard charts of Chacornac and Peters. The entire sky would be depicted upon about two thousand such charts.

It is very important that the best possible location should be found for such an instrument. In Europe and in the eastern portions of the United States, where nine-tenths of the principal observatories of the world are situated, it is cloudy for a large portion of the year. Great advantages are expected from a location, as on some California mountain, where clouds and haze are seldom seen.

This generous gift offers an opportunity for useful work such as seldom occurs. It is expected that the Bruce photographic telescope will exert an important influence upon astronomical science by the large amount of material that it will furnish.

CHARITY AND KNOWLEDGE.[1]

THIRTEEN years ago, during the centennial celebrations of Independence Day, the university founded by Johns Hopkins began its work; and now, as we commemorate a completed century of constitutional life, the hospital, gift of the same donor, throws open its doors. These buildings, on which thought, time, and wealth have been freely spent, are now consecrated to the ministry of mercy and the prolongation of life. Science and charity, knowledge and pity, skill and sympathy, are here installed in the service of mankind.

That large-minded citizen of Maryland, "who, by noble gifts for the advancement of learning and the relief of suffering, has won the gratitude of his city and his country," found two words adequate to his great ideas. "University" and "hospital" were his chosen terms, and he linked them together by this significant phrase: "Bear constantly in mind that it is my wish and purpose that the hospital shall ultimately form a part of the medical school of that university for which I have made ample provision by my will." How brief the phrase, how large the purpose! — "apples of gold in pictures of silver."

Like James Henry Roosevelt of New York, "a man upright in his aims, simple in his life, and sublime in his benefaction," [2] whose hospital and dispensary give clinical instruction to the College of Physicians and Surgeons; like James Lenox of New York, whose munificence established a public library and gave birth to a hospital, — Johns Hopkins, already honored as a patron of learning, will be henceforward remembered in the annals of charity and medicine. May we not almost say of him, as Pindar said of Theron (Olympic II., Cary's version), —

> "And I will swear
> That city none — though she unroll,
> A century past, her radiant scroll —
> Hath brought a mortal man to light
> Whose hand with larger bounty flows.
> The blessings to that man we owe,
> Say, who shall hope to count?"

We may form an idea of what this hospital may become by the study of a like institution in London. About a century and a half before Johns Hopkins died, the days of Thomas Guy were ended. Like our benefactor, he had lived unmarried to the age of eighty years, and from humble beginnings had acquired a fortune, with which he provided for the establishment of a hospital. The amount of his gift was more than a million dollars (£238,292). The beneficent influences of Guy's Hospital are now known in every part of the globe. It is doubtless safe to say that every one of us has shared, indirectly, in its benefits. The name of the great surgeon, Sir Astley Cooper, would alone give renown to the hospital to which he was attached, — Sir Astley Cooper, of whom it was said that from the period of his appointment to Guy's, until the moment of his latest breath, he was every thing and all to the suffering and afflicted; his name was a host; but his presence brought confidence and comfort.[1] Addison and Hodgkins, whose names are familiar to the historians of medicine, were physicians in that hospital: so was Richard Bright, whose discoveries have been pronounced the most important contribution to medical science made in the first half of the nineteenth century. The observations and studies made in Guy's Hospital since 1836 fill fifty volumes. Thousands of medical students have been trained within its walls. "Their presence," says a competent observer, "has made the hospital." Hundreds of thousands of patients have received relief from the treatment there afforded. In a single year, five thousand in-door patients have been cared for, and more than thirty thousand out-door patients have sought advice.

But we are planning for a future much longer than a century and a half; for a history as long as that of St. Bartholomew's or St. Thomas's, which now, after many centuries, are more useful than ever.

By a curious coincidence, as I had reached this point in the preparation of my address, I received a volume from Dr. Norman Moore, the warden of St. Bartholomew's Hospital in London, bearing an inscription so welcome and so apposite, that I will read it: "To the library of the newest of hospitals, this account of the progress of medicine in one of the most ancient is given by Norman Moore — with the earnest hope that the Johns Hopkins Hospital may flourish at least as long as the Royal Hospital of St. Bartholomew in Smithfield, and prove no less useful to mankind — on the opening day of the Johns Hopkins Hospital, 1889."

This little book is full of suggestions for us. First, as to the longevity of a hospital. "For more than seven hundred and fifty years the hospital has flourished upon its present site; and its Smithfield gateway, through which passed men of the generation whose fathers saw William the Conqueror enter London, has ever since been open to the sick poor."

Then as to the progress of medical science. Here you may see "how the physician grew from a schoolman into a scientific observer, and how the surgeon, who appeared on the scene in livery and without learning, grew from a handicraftsman to be a man of science."

Next as to the training of illustrious men. Here you will find a record of the names and services of Caius, Bernard, Pott, Abernethy, Lawrence, and Paget; you may learn that Dr. Thomas Young, the originator of the undulatory theory of light, was here a student; and you will come upon the story of one more famous than any person I have named, — the discoverer of the circulation of the blood, the illustrious Harvey.[2]

[1] An address by Daniel C. Gilman, delivered at the opening of the Johns Hopkins Hospital, Baltimore, Md., May 7, 1889.

[2] This phrase (like that above, referring to Johns Hopkins) is taken from a memorial tablet.

[1] Letter of Dr. Roots in the Memoir of Sir A. Cooper.

[2] Dr. Moore calls attention to the fact that it was a fund given by Dr. Caius to encourage the study of anatomy, which was the immediate means of leading Harvey to his discovery and also to a remark in one of Harvey's lectures that it was a passage of Aristotle which first suggested to him the idea.

Time may efface the personality of our founder, as it has effaced the personality of Rahere, the founder of St. Bartholomew's; but the beneficence of Johns Hopkins will last for centuries, and gratitude will cherish the memory of his broad views, his great liberality, his wise and beneficent purposes.

The previous speakers have told us of the circumstances which led to the construction of these buildings, and have described their purposes. Let me, from a different point of view, point out some of the benefits which are likely to proceed from this foundation. As I enter upon this theme, I am reminded that in 1789, John Howard, *facile princeps* among modern philanthropists, published in a quarto volume, just before his death, the observations he had made upon the lazarettos of Europe. That was the beginning of reforms in prisons, asylums, refuges, and hospitals. To this work he prefixed these words of Cicero (*De Oratore*, I. 8), a motto so appropriate that I might take it for a text: "*Quid tam porro regium, tam liberale, tam munificum, quam opem ferre supplicibus, excitare adflictos, dare salutem, liberare periculis.*"

First, last, and always, this hospital is to furnish relief to the sick and wounded. Make the best of it, introduce fresh air and sunshine, and provide the utmost comfort; secure wise physicians, engage the best trained nurses; decorate the walls with pictures; bring fruit and flowers, and books and friends, and even the comforting influences of religion, — yet you cannot conceal the direful consciousness that this is the home of suffering.

> "From any other ill
> (Except it be remorse) can men escape
> By work, — the healing of divinest balm
> To whomso hath the courage to begin, —
> But sickness holds the sick man in a chain
> No will can break, or bend to earthly use." [1]

The names that have been given to these abodes of the sick are suggestive. "Hospitality" and "hospital" alike suggest the bestowal of kindness to guests. The word "lazaretto," ultimately degraded, pointed at first to the restoration of life. "Misericordia," "La Charité," "La Pitié," "The Home of the Good Samaritan," "The House of Mercy," bring to mind the kindly influences of love and care. St. John, St. Thomas, St. Bartholomew, and St. Luke, above all other apostles, are favorite patronymics. Paracelsus died in the Hospital of St. Sebastian. Bethlehem, Bethany, Bethesda, and Jerusalem recall the scenes where the great Physician was present. The name of Christ has been given to many a foundation. In other places the hospital shares with the temple the name of "Hôtel-Dieu," or "House of God."

By whatever name it may be called, this is a convent where sickness is the abbess. The rule of sympathy for the suffering must govern everybody with a strictness of discipline as rigid as the rule of the Benedictines or the Carthusians. Those who daily walk these cloisters will be the warders of life and health, however high their station, or however humble their service; and casual visitors will not cross the threshold of the wards without pity for those who are disabled, or without admiration and gratitude for those whose lives are spent in alleviating distress.

This hospital will not only meet the daily calls of humanity, it will stand ready to render extraordinary services in those emergencies which not even the progress of municipal reform and preventive medicine can entirely ward off. A fire, an explosion, an accident on the rails or on the seashore, the fall of a platform or of a building poorly constructed, may at any moment tax the utmost resources of a great establishment. True, we have no fear of leprosy and the plague; we have almost ceased to dread the coming of the cholera; yellow-fever we are hoping to thwart in its approaches to our Northern seaports (vaccination, which was spoken of by Sir James Simpson "as the greatest thought ever broached in practical medicine," is a great prophylactic): but we are not certain that diphtheria and infectious fevers will not continue to be epidemic; nor can we always be sure that the boards of health in the city and State will succeed in protecting us, as well as they can, from the inroads of pestilence. Indeed, it is well to inquire whether Baltimore is now fortified as it should be against the hostile incursions of epidemic disease. In addition to its other functions, this hospital will stand as a reserved force, — a sort of storehouse of energy, ready to serve the city if apprehension and disease spread their pall upon it.

Here let me say, in anticipation of the future and in memory of the past, that, in all the records of bravery on land and sea, none are more noble than those of the medical profession. Free from all excitement, free from the hope of reward, free from any commands but those which are divine, they have in times of pestilence gone from bed to bed, firm, fearless, faithful, carrying the offerings of cheer, comfort, and relief, and often of restoration to health and vigor. For them there is no repose in time of danger. The black wings of death hovering over a city do not deter them from duty; and often it may be said of them, as Milton said of Abdiel, "faithful found among the faithless," faithful only they. Read the annals of modern pestilence, of cholera in New York, of fever and famine in Ireland, of yellow-fever in the South. Everywhere it is the same story. The more direful the record, the more unflinching, the more self-forgetful, the more humane, are the efforts of physicians.

While the offices of a hospital are bestowed without money and without price on those who are destitute, those who are able to pay for suitable attendance, and for the domestic comforts to which they are accustomed, may discover that they can here be better treated than in many private houses. The conditions of quiet are more easily secured; suitable diet at unusual hours can be commanded; medical attendance is within call at every moment of the day and night; manifold appliances for relief are more readily obtained. More and more frequently travellers, students, all whose homes are in hotels and boarding-houses, and even many who have good private homes, turn toward good hospitals when they see the need approaching for prolonged and special care. For the wants of such persons, provision has been made in the wards here set apart for paying patients, male and female.

This hospital would be a very narrow institution if it kept to itself its experience. It is the essence of quackery to deal in mysteries and nostrums: it is the glory of medicine that it owns no patents, and conceals no discoveries. On the contrary, the best hospitals of the world consider it one of their first duties, second only to the care of their patients, to record the cases they have treated, the methods they have pursued, the results, whether favorable or unfavorable, which have followed. Scientific studies in pathology and practical medicine must be printed. Special papers, often requiring costly illustrations, must be published upon extraordinary cases, and upon new operations and modes of relief. It is thus that the science of medicine is advanced. Where secrecy reigns, carelessness and ignorance delight to hide: skill loves the light.

It is impossible to have a hospital without its becoming a place for medical education. It is interesting to note that in the physician's oath, attributed to Hippocrates, the duty of imparting knowledge is explicitly enforced. Even the country doctor, as he rides from village to village, takes in his gig an observing pupil, like the squire to a knight-errant. Every great surgeon is watched with the closest attention by the younger physicians who assist him. Every mother is the pupil of the physician whom she calls upon to attend her suffering child. So, of course, a hospital, having upon its staff men of rare qualifications who are in daily consultation with their most skilful brethren, is, from the necessities of the case, a place for instruction. How systematic that instruction will be, depends on circumstances that at the moment need not be presented. All that need now be said is, that hospitals the wide world over are the schools of medicine and surgery.

The training of nurses is another form of hospital activity, recently developed, never hence to be abandoned. To the sisterhoods of the Roman Catholic Church, to the Protestant Deaconesses of Kaiserswerth and the Bethanien at Berlin, and to many guilds in many lands, much credit is due for lessons they have taught the world as to the importance of training nurses. Elizabeth Fry was one of the first Englishwomen to propose such instruction. Florence Nightingale, by her services in the Crimean war and by her subsequent writings, has borne a noble part in this work. So, too, have our own countrywomen. The civil war, full of sad recollections, has some bright stories, and among them none

[1] Ugo Bassi's Sermon in the Hospital, p. 13.

more inspiring than the labors of brave, self-sacrificing, and intelligent women in the hospitals. Who that has read "What we did at Gettysburg," or "Hospital Days," has forgotten their lessons? As a direct result of the war, nurses' schools have grown up in every part of this land. Our hospital has such a department soon to be opened, where nurses will be trained, not only for their merciful offices within these walls, but for household engagements, and for visiting among the poor.

A good hospital may readily become the rallying-place of the medical profession who are resident in the city.

> "Through mutual intercourse and mutual aid
> Great deeds are done, and great discoveries made;
> The wise new wisdom on the wise bestow,
> Whilst the lone thinker's thoughts come slight and slow."

One purpose of this central building is to afford opportunities for professional intercourse. Here are rooms set apart for the library that will presently be collected; here the medical journals will be taken in; here are the best appliances and instruments for the treatment of patients; here are rooms for private consultations and for public conferences; here are laboratories for physiological and pathological determinations; and it will not surprise me to hear that within a very short time medical associations are here brought together "for mutual intercourse and mutual aid" at the invitation of Dr. Osler, the physician-in-chief, who this day assumes his great responsibility with the hearty welcome of Baltimoreans, and with the well-earned confidence of the profession throughout the entire land.

Reference must also be made to the lessons that this hospital has already given to the world, before a single patient has been received. The vast amount of thought bestowed upon these buildings, not only in their general arrangements, but in thousands of details which promote their efficiency, has not failed to attract the attention of observers from every part of the globe. The letters which have been received during the last few days from the most distinguished surgeons and physicians abroad, and the presence of this large body of medical men from the distant cities of the United States, are indications of this interest.

Finally, if this hospital becomes the seat of knowledge in all that pertains to the nature of disease, its treatment, its prevention, and its cure, it will of necessity be a constant guide to the people of the city and the State in which it is placed; it will promote the general health of the inhabitants. There is an altar in one of the churches of Messina which bears an inscription to Æsculapius and Hygeia, the god of medicine and the goddess of health; and their statues are found together on the façade of Guy's Hospital. May they always be associated in Baltimore!

Is all this outlay wise? I might answer an inquirer in the words which Wordsworth employed in speaking of King's Chapel, one of the most costly structures in the University of Cambridge: —

> "High Heaven rejects the lore
> Of nicely calculated less or more.
> Tax not the royal saint with vain expense;
> With ill-matched aims, the Architect who planned
> This glorious work of fine intelligence."

For in this hospital, as in that church, are

> "Thoughts whose very sweetness yieldeth proof
> That they were born for immortality."

But I prefer to give a more specific and appropriate reply to those (if any such there be) who say, "I believe in every thing that is practical, in whatever leads to the relief of suffering; but I am afraid of this talk about science. I would rather see a thousand beds for patients than any provision for medical education." Such reflections are to be heard with respect, for they are natural to minds unacquainted with the intimate relations which subsist between the progress of medical knowledge and the progress of medical art. Nevertheless it is true that those who have most carefully studied the conditions by which human life is perpetuated, human sufferings lessened, and human vigor increased, are well aware that every step forward in science leads to many forward steps in practice. May I endeavor to be a mediator between these two divergent views, and bring a few illustrations from the doctor's shop to the attention of those who are practically interested in hospitals, but who have paid no attention to the steps, so slow, so difficult, so uncertain at first but so sure at last, by which the healing art makes progress.

The late Dr. Austin Flint of New York, in an address prepared near the close of his life, has pointed out with the wisdom of experience the probable future of medicine. It would be presumptuous for me to attempt to do again what he has done so recently and so well. But on this day of promise, in view of all this expenditure, it is fitting that we should bring to mind some inspiring thoughts.

Let us first consider the benefits which have come to mankind from the opportunities which hospitals have afforded for the observation of disease. There is no one among us more competent to speak upon this subject than the pathologist of this hospital, Dr. William H. Welch, who, years in advance of its opening, has been engaged as a professor of the university, in the study of the nature and origin of disease. He has called my attention to these noteworthy points: —

"Those who have contributed the most to the advancement of practical medicine and surgery have accumulated their experience largely in hospital service. By the constant attendance of skilful physicians and of well-trained nurses in hospitals, precise observations can be made, and the phenomena of disease and the influence of treatment determined, under the most favorable conditions.

"Our present knowledge of the natural history of disease, of its diagnosis, prognosis, and treatment, are based to a very large extent upon experience derived from hospitals. Text-books, monographs, and medical journals incorporate this experience, and bring it to the knowledge of the medical profession. This is why intelligent physicians are always eager to secure the advantages of a hospital service."

The benefits which medicine has received from purely scientific investigations may be shown by so many examples, that it is difficult to make a selection among them. Dr. Welch mentions these: —

"Upon the foundation laid by Helmholtz's researches in physiological optics, and his discovery of the ophthalmoscope, the art and science of ophthalmology have developed into the most accurate department of clinical medicine.

"The investigations which received their impulse from Du-Bois Reymond in the difficult subject of animal electricity have rendered electricity available for diagnosis and treatment, and have advanced thereby our knowledge of nervous diseases.

"Of the many ways in which the work of the chemist has aided medicine, may be cited, as one of its most recent contributions, the introduction into modern therapeutics of many useful remedies which are the products of synthetic chemistry. Doubtless this is a field which will be cultivated still further, and it would be rash to attempt to foretell what agents for the cure of disease and relief of suffering are still hidden in the chemist's laboratory.

"By the discovery of the specific germs causing various infectious diseases, surgical practice has been revolutionized. It has become possible to prevent the infection of wounds from the exterior, and thus to guard against a host of traumatic infections which rendered dangerous and futile so many surgical operations. Preventive medicine has taken its place among the exact sciences.

"Accurate knowledge of the causes of disease now forms a sure basis for intelligent therapeutics, and there is every reason to expect that the future will bring to light means to overcome the injurious agents which are now, for the first time, known."

But there is another illustration so marvellous that it may almost be called miraculous. The relations of advancing knowledge to advancing charity are brilliantly displayed by the history of methods for the relief of pain.

To put a stop to suffering is an instinct of human nature, distinguishing man from animals. The most scientific men, and the most practical, are agreed upon this, and have been so agreed for centuries. But Anæsthesia, most welcome of all the angels of mercy, came down from heaven. When the older surgeons in this assembly were students, opium and alcohol were the imperfect anæsthetics most usually employed. Their use was restricted and unsatisfactory, if not dangerous. No one can tell what was suffered in places where gentle sleep now quiets apprehension, and

makes the patient unconscious of his state. To this alleviation we are so wonted, that we accept it as the air we breathe. But if you would learn how man secured this boon, how many efforts of scientific and of practical men were combined before the results were reached, recur to the history of four modern agencies, — nitrous oxide, ether, chloroform, and cocaine, — which are like "the gentle dew from heaven, which blesseth him that gives and him that takes." It is a chapter more wonderful than any romance of the Arabian Nights.

Let any one present who is sceptical in respect to the usefulness of science to the healing art keep this record in his mind. Let him reflect on the apprehensions that have been removed not only from the patient, but from his attendant friends; let him see how much easier, and therefore how much more certain, the task of the surgeon has been made; and, above all, let him think of the hours of pain that have been absolutely annulled: and then let him divide the honors, if he can, which belong to science, from those which belong to philanthropy. Let him balance half a century of scientific relief with the previous practice of many thousand years: then let him tell us which is better.

From the past let us turn to the future. All the signs of the times point to a new era in the history of mankind. All the sciences are leading up to a better understanding of the laws of life, to a true anthropology, and the consequent improvement of the physical, mental, and moral powers of man.

There are four or five directions toward which we may turn an expectant gaze, as in days gone by the merchants watched upon the house-tops for the return of the ships they had sent out to distant ports.

Preventive medicine promises to do more and more for mankind. As the germs of many specific disorders have been discovered, so the means of their destruction have been found out. If legislation and civil administration keep up with science, if knowledge is controlled by virtue and followed by temperance, the community will be freed from many of the foes which in former generations have slain their tens of thousands.

From the chemical laboratory new remedies, as well as simpler forms of old remedies, are to be constantly looked for. The synthetical processes which now receive so much attention have lately made important contributions to the pharmacopœia. It would surprise any one whose attention has not been directed to this point to know how many claimants are awaiting judgment. Scores of substances, till lately unknown, as I have heard my colleague Professor Remsen say, are awaiting the study of competent therapeutists. Nobody can foretell what will come from their new contributions to materia medica; but one who watches the processes of discovery must feel certain that secrets hid from the beginning are ere long to be revealed, and that many of the substances already discovered have properties of the most serviceable character.

No one can say what will result from the attention that has been recently given to the study of psychical phenomena by the exact methods of science, but the outlook is hopeful. If we are as far as ever from elucidating the mysterious inter-relationship of the mind and the body, progress has certainly been made in a knowledge of the laws by which they act upon each other. The knowledge that has been required in respect to the functions of the brain and nervous system has already led to the treatment of many disorders, and the relief of many diseases, which a short time ago were beyond the reach of remedy. We are not without hope that in the physiological and psycho-physical laboratories already established here, important contributions will be made to science which will ultimately prove to be of value to medicine, and to the conduct of the body in health and disease.

Medical appliances and surgical instruments are greatly to be improved. A surgeon who has just returned from Europe, after visiting in the interest of this hospital the most celebrated instrument-makers, has informed me that the processes of manufacture even now are behind the devices and requirements of surgical science. The hands of the artisan have not kept up with the brains of the chirurgeon. It is not possible to buy ready made the instruments required by this hospital.

In the near future we are to look for progress in the applications of electricity and magnetism to the treatment of disease as well as to its diagnosis. Chemistry, by its synthetic methods, is producing new remedies, which experimental therapeutics proceeds to test, and pharmacy then appropriates. The laws of light, heat, electricity, and magnetism, are found in close relationship to the problems of relief and cure. The laws of temperature and climate have their services to render. Even the influence of barometrical pressure upon surgical operations begins to be noticed. The study of the nervous system is sure at no distant day to make important contributions to the welfare of man. Psychology is waiting for the results. Experimental physiology is doing its part. Pathology, a term as old as Hippocrates, has become a new science within the last few years. The laws of descent have but just begun to assume a scientific form. Preventive medicine is almost a new conception. The morality of personal hygiene is a new department of ethics. Biology, after having met with the same critical reception with which anatomy, astronomy, geology, and chronology were greeted, may yet be honored as leading to the highest and noblest conceptions of humanity. Anthropology, and the knowledge of man in his relations to the universe in which he is placed, may sum up finite knowledge.

So all along the line, in the laboratories of the university and in the wards of the hospital, knowledge is contributing to the welfare of man. The days of the coming man may not always reach the full allotment to which Chevreul has just attained; but perhaps to die at seventy will be to die in youth, and to reach the age of eighty or ninety in health and vigor will be the rule, and not the exception. Nor is length of days our only hope. The disappearance of epidemics; fewer days of confinement in sickness; fewer "minor ailments;" a decrease of infantile mortality; greater powers of resistance to the evils of certain occupations, and comparative immunity from many infirmities which are now common; artificial re-enforcements and replacements of bodily defects; simpler and surer means of diagnosis; the detection of the nature, origin, and history of specific affections; and finally the assurance of euthanasia, — these, as it seems to a layman, are reasonable expectations which the nineteenth century holds out to the twentieth. Can any outlay be too great if humanity is thus benefited?

To the attainment of these noble aims — "the relief of suffering and the advancement of knowledge" — the foundations of Johns Hopkins are forever set apart. On the one hand stands the university, where education in the liberal arts and sciences is provided, and where research is liberally encouraged; on the other hand stands the hospital, where all that art and science can contribute to the relief of sickness and pain is bountifully provided. Is there any thing wanting? Yes, there is still a great want to be supplied, an arch to rest upon these pillars. An institute of medicine and surgery, a college of physicians and surgeons, a medical school the office of which shall be to promote the training of young physicians and the encouragement of medical science, is imperatively needed. Is it too much to say that there is not such an opportunity on the face of the globe for another Peabody or another Hopkins to benefit his fellowmen?

The university needs all it has, and more, to carry on the non-professional courses to which its funds are appropriated. The hospital, with all its readiness to co-operate in the advancement of knowledge, will, after all, remain — as I have said before, and cannot say with too much emphasis — the home of the sick, the feeble, the injured, and the dying. It is the house of mercy, not the hall of philosophy. But in close alliance with both these foundations there is a place for a school of medicine, which may bear its founder's name, and may render services as significant and memorable as those of Salerno and Bologna, at the beginning of the modern era; as those of Leyden and Edinburgh, where the earliest American physicians received their education; or as those of Berlin and Vienna, to which so many students of this decade resort.

This grateful city should no longer delay placing upon one of the squares near the monument of Washington the figure of Johns Hopkins, with such designs as an artist, and an artist only, could devise, to typify the great ideas which underlie his gifts, — "the advancement of knowledge and the relief of suffering." Then might some friend of this hospital place beneath this dome a copy of Thorwaldsen's "Christus Consolator," with the outstretched

hands of mercy, to remind each passer-by — the physician and the nurse, as they pursue their ministry of relief; the student, as he begins his daily task; and the sufferer from injury or disease — that over all this institution rests the perpetual benediction of Christian charity, the constant spirit of "good will to man." Upon one hill of Baltimore rises a temple "whose guardian crest, the silent cross," is an emblem of the Christian faith; upon another a lofty column reminds us of the patriots' hope; upon a third the Hôtel-Dieu is placed, — the house of charity. Significant triad! Here "abideth faith, hope, charity, . . . but the greatest of these is charity."

BOOK-REVIEWS.

Economic Value of Electric Light and Power. By A. R. FOOTE. Cincinnati, Robert Clarke & Co. 16°. $1.

THE author of this little book claims that the spirit moved him, as it were, to write it *pro bono publico*. The book is essentially a collection of papers read before scientific societies, and extracts from magazine articles on the applications of electricity for producing light and in the transmission of power. Mr. Foote is a strong believer in the future of electricity as an agent in furthering human comfort, and we doubt not that many who may be pondering on the question of introducing electricity in their homes or factories will find valuable suggestions within the covers of this book. In an appendix is given a glossary of electrical terms for the benefit of unprofessional readers.

Treatise on Trigonometry. By W. E. JOHNSON. London and New York, Macmillan. 12°. $2.25.

THIS work is intended for both those who are beginning the subject and hope to continue their mathematical studies, and those who wish to revive their knowledge of trigonometry and to extend it beyond the limits of the ordinary text-book. The treatise is so written as to make a good introduction to much of the higher mathematics; Chapter IX., on the geometry of the triangle, being sure to help those desirous of entering upon modern geometrical developments, and the final chapter presenting a fair view of the transition from the earlier interpretations of $\sqrt{-1}$ to the quaternions of Hamilton.

AMONG THE PUBLISHERS.

HARPER BROTHERS published last week H. Rider Haggard's story of "old and mysterious Egypt," entitled "Cleopatra: being an Account of the Fall and Vengeance of Harmachis, the Royal Egyptian, as set forth by his own Hand." The book is profusely illustrated from drawings by Mr. Greiffenhagen and R. Caton Woodville.

— D. Lothrop Company have issued recently, among many other books, "One Voyage," a story of life at sea from the passenger's point of view, by Capt. Julius A. Palmer; also a pictorial "History of England in Rhyme," and a similar one of the United States. Later they will publish new editions of "Art for Young People" and "Adventures of the Early Discoverers," by Mrs. F. A. Humphrey.

— The J. B. Lippincott Company have in preparation "Elementary Lessons in Heat," by Professor S. E. Tillman, of the United States Military Academy; and a new subscription-book entitled "A Manual of Machine Construction," a practical reference-book for the design, proportions, and method of constructing all kinds of machinery in common use, with all required references for the use of engineers, draughtsmen, and mechanics, by John Richards.

Publications received at Editor's Office, June 17-29.

ALDEN'S Manifold Cyclopedia of Knowledge and Language. Vol. XIII. Electricity to Exclaim. New York, J. B. Alden. 12°. 50 cents.

BLANFORD, H. F. A Practical Guide to the Climates and Weather of India, Ceylon and Burmah and the Storms of Indian Seas. London and New York, Macmillan. 369 p. 8°. $3.50.

DORIOT, SOPHIE. The Beginners' Book in German. Boston and London, Ginn. 273 p. 12°. 90 cents.

GEPP, C. G., and HAIGH, A. E. A Latin-English Dictionary. Boston, Ginn. 563 p. 12°. $1.40.

LIGHT on the Path, with Notes and Comments by the Author. Written down by M. C. Boston, Theosophical Book Co. 68 p. 16°. 30 cents.

LOEWY, B. A Graduated Course of Natural Science. Part I. London and New York, Macmillan. 151 p. 16°. 60 cents.

MEADOWCROFT, W. H. The A B C of Electricity. New York, Lovell. 108 p. 12°. 50 cents.

PENNSYLVANIA Geological Survey. Catalogue of the Geological Museum. Part III. Harrisburg, Geol. Surv. 260 p. 12°.

—— Atlas Northern Anthracite Field. Part III. Harrisburg, Geol. Surv. 8 maps. f°.

—— Atlas to Reports HH and HHH. Harrisburg, Geol. Surv. 56 p. 5 maps. 8°.

PLATO'S Protagoras; with the Commentary of Hermann Sauppe. Tr. by James A. Towle. Boston and London, Ginn. 179 p. 12°. $1.50.

SMITHSONIAN INSTITUTION, Annual Report of the Board of Regents of the, for the Year ending June 30, 1886. Part I. Washington, Government. 878 p. 8°.

Two Great Retreats of History. I. The Retreat of the Ten Thousand. II. Napolean's Retreat from Moscow. With Introduction and Notes by D. H. M. Boston, Ginn. 318 p. 16°. 60 cents.

U. S. WAR DEPARTMENT. Annual Report of the Chief Signal Officer of the Army to the Secretary of War for the Year 1888. Washington, Government. 418 p. 8°.

WEISMANN, A. Essays upon Heredity and Kindred Biological Problems. Oxford, Clarendon Pr. 455 p. 8°. (New York, Macmillan.)