construction are abreast of the times, and fully satisfy the rapidly increasing demand for them.

In order to be a complete success, a direct driven fan should possess high speed, ability to run continuously, and oft-times in the midst of considerable dust, without the engineer's attention at any regular time. These qualities seem to be fully secured in the fan shown, which is made by the Buffalo Forge Company of Buffalo, N.Y.

CLARK UNIVERSITY.[1]

WE are here to mark in a simple way, as befits its dignity, a rare event, which we hope and pray may prove not only the most important in the history of this favored city, but of forever growing significance for our state and nation, for culture and humanity.

Located, with great forethought, in a city whose culture ensures that enlighted public sentiment so needful in maintaining the highest possible academic standards; in a city whose wealth and good will, we trust, are as fair a promise as can anywhere be given or asked of that perpetual increase of revenue now required by the rapid progress of science; in a city central among the best colleges of the East, whose work we wish not only to supplement but to stimulate, whose higher interests we hope to serve, and whose good will and active co-operation we invite; governed by trustees of eminence in the nation as well as in the state, who ask no sectarian and no political questions of their appointees, whose influence without and whose counsels within are of inestimable and well appreciated value; consecrating ourselves to the toil of science at an hour so peculiarly critical and so opportune in the university development of the country, — I must believe that not only every intelligent inhabitant of Worcester, but every unbiased friend of higher education everywhere, will wish to add to our already unexpectedly large endowment of public and private good will at home and abroad, his and her hearty, ungrudging, and reiterated God-speed.

Just because, instead of the easy and wasteful task of repeating what is already well done about us, we strive to take the inevitable next step, and to be the first, if we can, upon the higher plane; because we must study not only to utilize all available experience wherever we can, but to be wisely bold in innovations wherever we must; because there will be indifference and misconception from friends who do not see all the importance of our work at first; because there are difficulties inherent in the very nature of that work itself as great as the work is needed, — we must go slowly and surely, establishing but few departments at first, and when they are made the best possible, adding new and most related ones as fast as we can find the men and money to support them. We must prolong the formative period of foundation, and must each and every one realize well that we are just entering upon years of unremitting toil, in which patience and hope will be tempered with trial. But our cause is itself an inspiration, for it is in the current of all good tendencies in higher education; and of the ultimate success of what is this day begun, there is not a shadow of doubt or of fear.

Our history begins more than twenty years ago, in the plans of a reticent and sagacious man, whose leave we cannot here await to speak of, who in affluence maintains the simple and regular mode of life inbred in the plain New England home of his boyhood, — plans that have steadily grown with his forture, and that have been followed and encouraged with an eager and growing interest, which extended to even minor items, by the devoted companion of his life. Besides a large fund already placed to our account, he has given his experience and unremitting daily care, worth to us large sums in economies, and resulting in well-appointed buildings, and a solidity of materials and a thoroughness of workmanship which I believe are without a parallel of their cost and kind in the country. Not only in the multifarious work of the university office, its methods of estimates, orders, book-keeping, of individual accountability for all books, apparatus, supplies, and furniture, but in the larger questions of university polity without and effective administration within; in the definition of duty for each officer, the strict subordination and the concentration of authority and responsibility sure to appeal to all who have the instinct of discipline, and which are exceptionally needful where the life of science is to be so free, and the policy so independent; in the express exemption, too, of all instructors who can sustain the ardor of research from excessive teaching and examination, in the appointment of assistants in a way to keep each member of the staff at his best work and to avoid the too common and wasteful practice in American universities of letting four-thousand-dollar men do four-hundred-dollar work, in the ample equipment of each department, that no force be lost on inferior tools, — in all these and many other respects, the ideal of our founder has been to make everywhere an independent application of the simplest and severest but also the largest principles of business economy.

As business absorbs more and more of the talent and energy of the world, its considerations more and more pervading if not subordinating, whether for better or worse, not only the arts, the school, the press, but all departments of church and state, making peace and war, cities or deserts, so science is slowly pervading and profoundly modifying literature, philosophy, education, religion, and every domain of culture. Both at their best have dangers, and are severe schools of integrity. The directness, simplicity, certainty, and absorption in work so characteristic of both, are setting new fashions in manners, and even in morals, and bringing man into closer contact with the world as it is. Both are binding the universe together into new unities and imposing a discipline ever severer for body and mind. When their work, purified of deceit and error, is finished, the period of history we now call modern will be rounded to completeness, culture will have abandoned much useless luggage, the chasm between instruction and education will be less disastrous, and all the highest and most sacred of human ideals will not be lost or dimmed, but will become nearer and more real.

When one who has graduated with highest honors from this rigorous school of business, after spending eight years of travel abroad studying the means by which knowledge and culture — the most precious riches of the race — are increased and transmitted, and finding no reason why our country, which so excels in business, should be content with the second best in science, devotes to its services not only his fortune at the end of his life, but also years yet full of exceptional and unabated energy, we see in such a fact not only the normal, complete, if you please, post-graduate ethical maturity of an individual business life, but also a type and promise of what wealth now seems likely to do for higher education in America. It is no marvel that our foundation has already been so often, so conspicuously, and so favorably noted in authoritative ways and places in an European land, where, if monarchy should yield to a republic, university culture could not penetrate its people as it now does. It is thus a more typical and vital product of the national life at its best than are foundations made by state or church in which to train their servants. In thus giving his fortune to a single highest end as sagaciously and actively as he has acquired it, may our founder find a new completeness of life in age, which Cicero did not know, and taste "all the joy that lies in a full self-sacrifice."

The very word "science," especially when used in its relation to business, is too often degraded by cheap graduates who are just fit to look after established industrial processes, but are useless if competition finds or needs new and better ones; who certify to analyses of commercial products that good chemists know are impossible; who, if international competition in manufactures were more free, would give place to better trained, perhaps German, experts still faster than they are doing; who in criminal, medical, and patent-law suits often have the address to carry judge and jury against far better chemists, but who have no conception of the higher quality and more rigorous methods of their own science; who make chemistry, physics, and geology mercenary, culinary, the servants instead of the masters of industrial progress and the very "life-springs of all the arts of peace or war." This evil, although so great and common that even the best men in other professions too rarely see the high ideal culture-power of real science, is yet only incidental and temporary.

A good illustration of the high and normal technological value of pure science is at hand in dyeing, one of the most scientific among

[1] Address delivered by President G. Stanley Hall at the opening of Clark University, Worcester, Mass., on Oct. 2, 1889.

the many and increasing chemical industries. England furnishes nearly all the raw, formerly valueless, material for coal-tar colors, out of which Germany made most of the seventeen and a half million dollars' worth manufactured in 1880. England bought back a large fraction of the colored goods, and Germany made the profits, because she could furnish the best training in pure chemistry. It is for this reason that she is driving other countries out of the field in other leading chemical industries. The great factories there employ from two or three to more than a score each of good, and often the best, university-trained chemists, at large salaries, and the best of these spend a good part of their time in original research in the factory laboratories. The prospect of these lucrative careers has had very much to do in filling the chemical laboratories of the universities with hundreds of students, and the German government (best that of Prussia) has met the demand by erecting and equipping new and sometimes magnificent laboratories at nearly all of her universities. New artificial processes of making organic products of commerce have freed thousands of acres of land where they were formerly grown, and have made new industries and often impaired old ones. Many professors of chemistry make large outside incomes. Nearly all are sanguine, some even declare, that before very long leading drugs, and even food, that will equal if not actually excel nature's products, will be made artificially. The leading professor in one of the largest chemical laboratories of Germany told me in substance that he no longer went after outside technical work, but now made it a virtue to wait for it to seek him; and it has been strongly urged that even the government should take steps to prevent the migration of German chemists to the universities of other countries, lest Germany lose her pre-eminence in chemical industries.

This remarkable contact of the marvellous new business-life and energy of Germany, particularly of North Germany (which in both suddenness and vigor equals any of the wonderful developments in this country), with staid and tranquil academic ways, has had some marked reverberations, and given new direction and impetus to other studies in some other departments where it is not directly felt. It has led to the erection and equipment by the government of great technological schools, and has shown to business men and employers that no course in the sciences which underlie technology can be too advanced, prolonged, or severe to be practical. Where ought the value and significance of such a training be better appreciated than here in the land of Fulton, Morse, Bell, and Edison?

There are, however, eminent chemists in Germany, and many more in surrounding European countries, who deplore what they call the irruption of the technical spirit into the universities. They fear the proximity of the factory and the patent office to the university laboratory has narrowed the field of view and made methods of research relatively less severe; they complain that in their teaching they must hasten over inorganic chemistry, neglecting all the other elements for the carbon compounds, and that there are almost no inorganic chemists in Germany; that in choosing between several substances inviting research, one of which promises great commercial value and the other none, strict scientific impartiality is lost; that in the eagerness for practical results, problems are attempted too complex for the present methods of experimenters, who are trying to "eat soup with a fork," as one sadly told me, and that thus, while published researches are more numerous they are less thorough, and have introduced many formulæ that neither prove nor agree, so that much work now accepted must be done over again and far more thoroughly; that even Liebig set a bad example in this respect, and that many new products, of which university chemists boast, are so inferior to those of nature as to be really adulteration.

What I have tried to illustrate mainly in the field of one science is more or less true under changed ways and degrees in the sphere of others. The sciences are also at the very heart of modern medical studies. Biology explores the laws of life, upon which not only these studies but human health, welfare, and modern conceptions of man and his place in nature, so fundamentally rest. The law of the specific energy of nerves, e.g., which Helmholtz says equals in importance the Newtonian law of gravity, and more than anything else made physiology the science which has had so large a share in raising the medical profession in Germany to a position in the intellectual world such as it never had before, doing for it in some degree what chemistry has done for dyeing; and even instruments like the ophthalmoscope, which almost created a department of medical practice, or the spectroscope, now indispensable in the Bessemer process, in sugar refining, in wine and color-dye tests, the detection of photographic sensibilators, in the custom-house, and in two important forms of medical diagnosis, — all these, to cut short a long list of both epoch-making laws and important instruments, are the direct products of whole-souled devotion to unremunerative scientific research.

It is hard for medical students to realize that they cannot understand hygiene, forensic medicine, pharmacology, and toxicology without a rigorous drill in chemistry; that they must know physics to understand the diagnostic and therapeutic use of electricity, ophthalmology, otology, the mechanism of the bones, muscles, circulation, etc.; that zoology is needed to teach sound philosophic thought, generic facts about the laws of life, health, reproduction, and disease. These, and sometimes also sciences like mineralogy, anthropology, and psychology, are required in Europe, with much more rigor than is common with us, of every medical student. Thus doctors, like technologists, cannot know too much pure science. An eminent medical practitioner in Europe compares young physicians who slight the basal sciences of their profession and pass on to the clinical, therapeutic, and practical parts, to young men who grow prematurely old and sterile. The phrase of Hippocrates, "God-like is the physician who is also a philosopher," is still more true and good in its larger, more modern, and looser translation, viz., exalted is the physician who knows not only the most approved methods of practice, but also the pure sciences which underlie and determine both the dignity and the value of his profession.

Medical instruction, on the one hand, must select as its foundation those sciences and those parts of the sciences most useful in meeting man's great enemy, disease. It needs far more anatomy than physics, and little mathematics, astronomy, or geology. Technical instruction, on the other hand, is and must be so organized as to reflect the state of industry. It properly lays more stress upon chemistry, with its many applications, than upon biology, which has far fewer; more upon electricity than upon molecular physics; and more upon organic than inorganic chemistry. The university, which is entirely distinct from and higher than any form of technical or professional instruction can be, should represent the state of science *per se*. It should be strong in those fields where science is highly developed, and should pay less attention to other departments of knowledge which have not reached the scientific stage. It should be financially and morally able to disregard practical application as well as numbers of students. It should be a laboratory of the highest possible human development in those lines where educational values are the criterion of what is taught or not taught, and the increase of knowledge and its diffusion among the few fit should be its ideal. As another puts it, "The more and better books, apparatus, collections, and teachers, and the fewer but more promising students, the better the work." In Europe, besides its duty to science, the university must not fail of its practical duty to furnish to the state good teachers, preachers, doctors, advocates, engineers, and technologists of various kinds. Here a university can, if it chooses, do still better, and devote itself exclusively to the pure sciences. These once understood, their applications are relatively easy and quickly learned. The university must thus stand above, subordinate, and fructify the practical spirit, or the latter will languish for want of science to apply.

The important facts that are both certain and exact, and the completely verified laws, or well ordered, welded cohesion of thought that approach such mental continuity as makes firm, compactly woven intellectual or cerebral tissue, are so precious in our distracted and unsettled age, that it is no marvel that impartial laymen in all walks of life are coming to regard modern science in its pure high form as not only the greatest achievement of the race thus far, but also as carrying in it the greatest though not yet well-developed culture power of the world, not only for knowledge but also for feeling and conduct. It is of this power that universities are the peculiar organs; to them is now committed the highest in-

terests of man; from them and from science now come the light and advancement of the world. They became and remained the asylums of free thought and conviction when Rome and all other privileged orders declined, and their germs were brought and piously and early planted on these shores by our fathers. The term is not only "the noblest in the vocabulary of science," but universities are the chief nurseries of talent, where is kept alive the holy fervor of investigation, that in its passion for truth is fearless of consequences, and has never been more truly and loftily ideal than now, when its objects of study are often most crassly material. It is their quality more than any thing else that determines not only the status of the medical and all technological professions, but also whether the legal profession is formal, narrow, mercenary, and unlearned, as it seems now in danger of becoming in Germany; because even the German universities, despite their great pre-eminence in all other respects, are by general consent of the most competent Germans themselves relatively weak in those departments which underlie the practice of law, or broadly based on history and social or economic science, informed in administrative experience, and culminating in judicial talent and statesmanship. Universities largely determine whether a land is cursed by a factious, superstitious, half-cultured clergy, or blessed by ministers of divine truth, who understand and believe the doctrines they teach; who attract and enlarge the most learned, and penetrate the life of the poor and ignorant, quickening, comforting, and informing in a way worthy the Great Teacher himself, and making their profession as it should be—the noblest of human callings.

Compared with our material progress, we are not only making no progress, but are falling behind in higher education. It has been estimated that but five per cent of the practising physicians of this country have had a liberal education, and that sixty per cent of our medical schools require practically no preliminary training whatever for admission, while European laws require a university training for every doctor before he can practice. Again, we apply science with great skill, but create or advance it very little indeed. Should the supply of European science, which now so promptly finds its way here and fertilizes and stimulates to more or less hopeful reaction our best scholars, and upon which we live as upon charity, be cut off by some great war or otherwise, the unbalanced and short-sighted utilitarian tendencies now too prevalent here would tend toward the same stagnation and routine which similar tendencies, unchecked, long ago wrought out in China. We all most heartily believe in and respect technical and applied science and all grades of industrial education, but these are as much out of place in a truly academic university as money-changers were in the temple of the Most High.

But yet the fact that these and other evils and difficulties are now so widely seen and so deeply felt, that endowments for higher education seem now the order of the day, that the largest single endowment in this country has already so effectively begun so many reforms in scarcely more than a decade in Baltimore; that churchmen, statesmen, and business men now need only to see their own interests in a way a little larger and broader, as they are now tending to do, to co-operate more actively than they ever have done in strengthening our best foundations, — such considerations sustain the larger and more hopeful view that our country is already beginning to rise above the respectable and complacent mediocrity still its curse in every domain of culture, and will show that democracy can produce — as it must or decline — the very highest type of men as its leaders. The university problem seems to be fairly upon us. We now need men in our chairs whose minds have got into independent motion, who are authorities and not echoes, who have the high moral qualities of plain and simple living and self-sacrificing devotion to truth, and who show to this community and the country the spectacle of men absorbed in and living only for pure science and high scholarship, and are not mere place-holders or sterile routine pedagogues, and all needed material support is sure to come.

A word so characteristic here that it might stand upon our very seal, is "concentration." Of this, our founder, in declining to scatter his resources among the countless calls from individuals, institutions, and causes, from excellent to vicious, and refusing us as yet, in the one work he has set out to accomplish, no needed thing, sets an example. We have selected a small but closely related group of five departments, and shall at first focus all our means and care to make these five the best possible. Neither the historical origin nor the term "university" have any thing to do with completeness of the field of knowledge. The word originally designated simply a corporation with peculiar privileges, and peculiarly independent to do what it chose. We choose to assert the same privilege of election for ourselves that other institutions allow their students, and offer the latter in choosing their subjects a larger option between institutions. The continental habit of inter-university migration, also, on the part of students, if once adopted here, would no doubt stimulate institutions no less than it has stimulated competing departments in the same university. Our plan in this respect implies a specialization as imperatively needed for the advanced students as it would, we admit, be unfortunate for students still in the disciplinary collegiate stage. If our elementary schools are inferior to the best in Europe, and if our fitting schools are behind the French Lycee, the German gymnasium, and the great English schools, it is our universities that are comparatively by far the weakest part of our national system. The best of these best know that fifty or one hundred instructors cannot do the work of three hundred and fifty; that they cannot hope at present to rival European governments which erect single university buildings costing nearly four million dollars each, as at Berlin and Vienna, nor equal the clinical opportunities of large European cities with poorer populations and more concentrated hospital systems. Our strongest universities are far too feeble to do justice to all the departments, old and new, which they undertake. Our institutions are also too uniform; the small and weak ones try to copy every new departure of the stronger ones, as the latter copy the far stronger institutions in Europe. If the best of them would do work of real university grade, should they specialize among the fields of academic culture, doing well what they do, but not attempting to do every thing, the American system might yet come to represent the highest educational needs of the country. In contrast with the present ideal of horizontal expansion and the waste of unnecessary duplication, we believe our departure will be as useful as it is new.

Again, concentration is now the master word of education. In no country has the amount of individual information been so great, the range of intelligence so wide, the number of studies attempted by young men in colleges and universities so large for the time and labor given to each, the plea for liberal and general, as distinct from special and exclusive studies, been so strong. This is well, for general knowledge is the best soil for any kind of eminence or culture to spring from, and because power, though best applied on a small surface, is best developed over a large one, and not in brains educated, as it were, in spots. More than this, our utilitarian ideal of general knowledge is far more akin to that of Hippias, who would make his own clothes and shoes, cook his own food, etc., or to that of Diderot, who would learn all trades, than to the noble Greek ideal of the symmetrical all-sided development of all the powers of body and mind. The more general knowledge the better; but every thing must shoot together in the brain. In the figure of Ritcher, the sulphur, saltpetre, and charcoal must find each other, or the man makes no powder. The brain must be trained to bring all that is in it to a sharp focus without dispersive fringes. The natural instinct of every ambitious youth is to excel; to do, or make, or know something better than any one else, to be an authority; to surpass all others, if only in the most accuminated speciality. Learning thus what true mental freedom is, he is more docile in all other directions.

If it be extravagant to say that no minds are so feeble that they cannot excel, if they concentrate all their energies upon a point sufficiently small, nothing is more true than that the greatest powers fail if too much is attempted. This is not only a wise instinct that makes for economy, but, in the parliamentary committee-rooms, in corporation meetings, in the court room, in business, in science, in the sick-chamber, the modern world in nearly every department is now really governed by experts, — by men who have attained the mastery that comes by concentration. The young man who has had the invaluable training of abandoning himself to a long experimental research upon some very special but happily-

chosen point was typically illustrated in a man I knew. With the dignity and sense of finality of the American senior year quick within him, his first teacher in Germany told him to study experimentally one of the score of muscles of a frog's leg. He feared loss and limitation in trying to focus all his energies upon so small and insignificant an object. The mild dissipation of too general culture, the love of freedom and frequent change, aided by a taste for breezy philosophic romancing, almost diverted him from the frog's leg. But as he progressed he found that he must know in a more minute and practical way than before — in a way that made previous knowledge seem unreal — certain definite points in electricity, chemistry, mechanics, physiology, etc., and bring them to bear in fruitful relation to each other. As the experiments proceeded through the winter, the history of previous views upon the subject were studied and understood as never before, and broader biological relations gradually seen. The summer, and yet another year, were passed upon this tiny muscle, for he had seen that its laws and structure are fundamentally the same in frogs and men, that just such contractile tissue has done all the work man has accomplished in the world, that muscles are the only organ of the will. Thus, as the work went on, many of the mysteries of the universe seemed to centre in his theme; in fact, in the presence and study of this minute object of nature he had passed from the attitude of Peter Bell, of whom the poet says,

> " A cowslip by the river's brim
> A yellow cowslip was to him,
> And it was nothing more,"

up to the standpoint of the seer who " plucked a flower from the crannied wall," and realized that could he but understand what it was, " root and all, and all in all, he would know what God and man is." Even if my friend had contributed nothing in the shape of discovery to the great temple of science, he had felt the *omne tutit punctum* of nature's organic unity, he had felt the profound and religious conviction that the world is lawful to the core; he had experienced what a truly liberal education, in the modern as distinct from the mediæval sense, really is. We may term it non-professional specialization.

Perhaps the most thorough and comprehensive government reports ever made in any language are those of the English parliamentary commissioners on endowments. The first of these occupied nearly nineteen years, and fills nearly two-score heavy folio volumes. In all, about twenty thousand foundations, new and centuries old, large and small, devoted to a vast variety of uses, good and questionable, were reported. The conclusions drawn from this field of experience, which is far richer and wider in England than elsewhere, was, that, of all the great popular charities, higher education has proven safest, wisest, and best, and that for two chief reasons: first, because the superior integrity and ability of the guardians who consented to administer such funds, the intelligence and grateful appreciation of those aided by them, and the strong public interest and resulting publicity, all three combined to hold them perpetually truest to the purpose and spirit of the founders; and secondly, because in improving higher education, all other good causes are most effectively aided. The church can in no other way be more fundamentally served than by providing a still better training for her ministers and missionaries. Charity for hospitals and almshouses is holy, Christ-like work, but to provide a better training for physicians and economists, teaches the world to see and shun the causes of sickness and poverty. Sympathy must always tenderly help the feeblest and even the defective classes, but to help the strongest in the struggle for existence, is to help not them alone, but all others within their influence.

Of all the many ways of supporting the higher education, individual aid to deserving and meritorious students is one of the most approved. In the University of Leipzic, e.g., four hundred and seven distinct funds can aid eight hundred aud forty-nine students. Of these funds, the oldest was established in 1325, and they are increasing in number, more new ones having been given between 1880 and 1885 than in any entire decade before. In size they range from thirty-five thousand to fifty dollars; in Berlin, from one hundred and forty thousand to one of less than forty dollars. In cases where conditions are specified, the most frequent limitation is to students from a certain locality, and next, to those of a certain family. By the older founders students of theology were more often preferred, but the more recent funds are for medicine, law, philology, and pure science; and a fund of over two hundred thousand lately given the University of Marburg is for advanced students in those sciences which underlie medicine. These funds are often given, named for, held, and sometimes awarded by churches or their pastors, magistrates, heads of fitting schools, boards of education, representatives of prominent families, for students of their name, the donor himself or herself, individual professors, etc., subject of course to satisfying the university examiners. Many are tenable for one, more for three, and some for five and six years. The funds must be invested with pupilary security, and with interest commonly less than four per cent. In Cambridge and Oxford provision is made for nearly one thousand fellows and eight hundred scholars, not to mention the exhibitions at Oxford. The fellowships are more lucrative, and are designed for more advanced men than are provided for in the German universities, the fellows aiding the master in internal administration. In England, besides the religious and other founders, as in Germany, the great historic industrial and mercantile corporations provide many of the fellowships and scholarships, particularly those of the sixteenth and seventeenth centuries; and they are granted by bishops, curates, heads of business corporations, masters of the great schools, heads or fellows of colleges. In France, where these foundations were swept away by the Revolution, stipends and bursaries are provided annually by the government. New appropriations for the most advanced students of all was the secret of the remarkable Ecole Pratique des Hautes Etudes, founded in 1868, of which a recent report just printed for the Exposition says, condensing its substance, that its purpose has always been to foster scientific zeal with no shade of temporal interest, that it restored the almost obliterated idea of higher education, gave unity to scientific interests throughout France, and made her feel the scholarly desiderata of the age; made young professors not only well instructed, but trained in good methods; that, although its profound researches are not manifest to the public, it has given a more scientific character to all the faculties, and rendered a service to the state out of all proportion to its cost. In France individuals co-operate with the state in this work.

Has there ever been devised a form of memorial to, and bearing the names of, husbands, wives, children, or parents, by which even the smallest funds could be bestowed in a way more lastingly expressive of the individuality, spirit, and the special lines of interest of the donor, more worthy the dead and more helpful to the highest ends of life? Since the first endowment of research in the Athenian porch and grove, thousands and thousands of donations of this sort have borne tangible witness to the sentiment so often and vividly taught by Plato, that, in all the world, there is no object more worthy of reverence, love, and service than eugenic, eupeptic, well-bred, gifted young men, for in them is the hope of the world.

The more advanced our standards are to be, the fewer will be our students, and the more expensive their needed outfit of books and apparatus. If we divide our running expenses only by the number of students our present fellowships and scholarships allow us to receive out of our two hundred and fifty applicants, the amount we spent per student, the first year, will probably be without a parallel. Besides this, for a number of students with important researches on hand, we are expending hundreds of dollars each for their individual needs, and should be glad to do so for more as good men. The best students very often graduate with empty pockets, but with their zeal and power at its best, and when an extra year or two would make a great difference in their entire career. Also, as the field of knowledge grows more complex, the economy of energy needed for concentration is impossible without the leisure secured by comfortable support.

Connected with all the protection, exemptions, and privileges so dearly prized and tenaciously clung to by the mediæval universities, there have always been dangers, sometimes grave and not yet entirely obviated. The new charity is often popularly called a science as well as a virtue. Its axiom is that no man has a right to give doles to beggars without satisfying himself personally or through some agency to that end that his gift will do good and not

harm to the recipient. History, and I may add personal observation, shows that the same general law holds true to some extent in universities. I believe they should not award fellowships to men fresh from college (save in the very rarest cases), unless they were able to guide and direct as well as to follow their work in every detail. A fellow should be encouraged and stimulated by a daily and familiar intercourse with the professors. His methods, reading, and researches should be kept at their best, and the entire resources of the institution should be a soil for his most rapid and helpful growth. Students thus served, even if their gratitude does not prompt them, as in some late instances in Germany, to study, revive and try to conform with piety to the ideal of ancient and almost forgotten donors, whose provisions they enjoyed, will not be lacking in appreciation. To appoint a man to use such funds in electing among undergraduate courses, or to take his chances among the confusing multifarious subjects offered in foreign institutions is, I believe, in most cases of small utility, and in some cases that I know, positively harmful. May the methods of exclusion we are studying be so effective that neither our precious funds nor the precious energy of our instructors be wasted upon the idle, stupid, or unworthy students, now too often exposed in vain for four years to the contagion of knowledge.

"Education used to be a question for ladies and for schoolmasters," said a French statesman last spring, but it is now not only a question of state, on which the support of all great institutions depends, but the great question into which all others issue if profoundly discussed or studied. So greatly do republics need the whole power of education, and so serious is their struggle for existence against ignorance and its attendant evils, that it has well been said that the problem whether this form of government be permanent is at bottom a question of education. But monarchies are no less dependent upon the education of their leaders and servants. In his famous address declaring that if Germany was ever to be free and strong, it must be by becoming the chief educational state of Europe, must realize the platonic republic in which the education of its youth was the highest care of the rulers, Fichte laid down the policy which has been one of the chief causes of the wonderful development of that country. Moreover, evolution, which shows that even life itself is but the education of protoplasm, cells, and tissues, that the play-instinct in children and the love of culture in adults not only measure the superfluous individual energy over and above that required by the processes necessary to life, but are perhaps largely the same, also makes it plain that the hunger for more and larger education of life is but the struggle of talent to the full maturity and leadership which is its right.

For myself, I have no stronger wish or resolve than that, in the peculiarly arduous labors I expect, I may never forget that this institution should be a means to these high purposes, and not degenerate to an end in itself: and may it be as true of our graduates to remotest time, as it is of us in a unique way and degree to-day, that we could not love Clark University so much, loved we not science and education more.

HEALTH MATTERS.

The Influenza.

A SINGULAR characteristic of the present epidemic of influenza is its delay in visiting the British Isles. It seems to have been rampant in Paris and in Germany for some time before it crossed the channel, and victims are claimed for Boston even before the existence of the disease in England was acknowledged. This naturally raises the question whether it is a disease really brought from a distance. Is it anything more than the general prevalence of catarrhal affections, of colds and coughs, which the time of year, and the remarkably unsettled weather we have lately experienced, make readily explicable without any foreign importation? Indeed, is influenza, after all, anything more than a severe form of the fashionable complaint of the season?

To answer the last question first, and so to put it by, there can be little doubt that influenza is a distinct, specific affection, and not a mere modification of the common cold.

The symptoms, the history of the disease, and its distribution, all justify us in treating it as a distinct and specific disease, which when it is prevalent will rarely be mistaken, though, with regard to isolated and sporadic cases, difficulties of diagnosis may arise. About its nature, or its affinities with other diseases, it is unnecessary to speculate. It will be sufficient to inquire what its recorded history in the past justifies us in expecting as to its behavior in the future. There are few cases in which history proves so important an element in the scientific conception of a disease as it does in that of influenza. For hardly any disease shows a more marked tendency to occur in epidemics — that is, in outbreaks strictly limited in point of time. After long intervals of inaction or apparent death, it springs up again. Its chronology is very remarkable. Though probably occurring in Europe from very early times, it first emerged as a definitely known historical epidemic in the year 1510. Since then, more than 100 general European epidemics have been recorded, besides nearly as many more limited to certain localities. Many of them have in their origin and progress exhibited the type to which that of the present year seems to conform. We need not go further back than the great epidemic of 1782, first traceable in Russia, though there believed to have been derived from Asia. In St. Petersburg, on January 2, coincidently with a remarkable rise of temperature from 35° F. below freezing to 5° above, 40,000 persons are said to have been simultaneously taken ill. Thence the disease spread over the Continent, where one-half of the inhabitants were supposed to have been affected, and reached England in May. It was a remarkable feature in this epidemic that two fleets which left Portsmouth about the same time were attacked by influenza at sea about the same day, though they had no communication with each other or with the shore.

There were many epidemics in the first half of this century; and the most important of them showed a similar course and geographical distribution. In 1830 started a formidable epidemic, the origin of which is referred to China, but which at all events by the end of the year had invaded Russia, and broke out in Petersburg in January, 1831. Germany and France were overrun in the spring, and by June it had reached England. Again, two years later, in January, 1833, there was an outbreak in Russia, which spread to Germany and France successively, and on April 3, the first cases of influenza were seen in that metropolis: "all London," in Watson's words, "being smitten with it on that and the following day." On this same fateful day Watson records that a ship approaching the Devonshire coast was suddenly smitten with influenza, and within half an hour forty men were ill. In 1836 another epidemic appeared in Russia; and in January, 1837, Berlin and London were almost simultaneously attacked. Ten years later, in 1847, the last great epidemic raged.

Many interesting points are suggested by this historical retrospect. What is the meaning of the westward spread of influenza, of cholera, and other diseases? Is it a universal law? To this it must be said that it is by no means the universal law, even with influenza, which has spread through other parts of the world in every kind of direction, but it does seem to hold good for Europe, at least in the northern parts. The significance of this law, as of the intermittent appearance of influenza, probably is that this is in Europe not an indigenous disease, but one imported from Asia. Possibly we may some day track it to its original home in the East, as the old plague and the modern cholera have been traced.

As regards, however, the European distribution of influenza, it has often been thought to depend upon the prevalence of easterly and north-easterly winds. There are many reasons for thinking that the contagium of this disease is borne through the air by winds rather than by human intercourse. One reason for thinking so is that it does not appear to travel along the lines of human communications, and, as is seen in the infection of ships at sea, is capable of making considerable leaps. The mode of transmission, too, would explain the remarkable facts noticed above of the sudden outbreak of the disease in certain places, and its attacking so many people simultaneously, which could hardly be the case if the infection had to be transmitted from one person to another.

Another important question, and one certain to be often asked, is suggested by the last; namely, whether influenza is contagious. During former epidemics great care was taken to collect the ex-