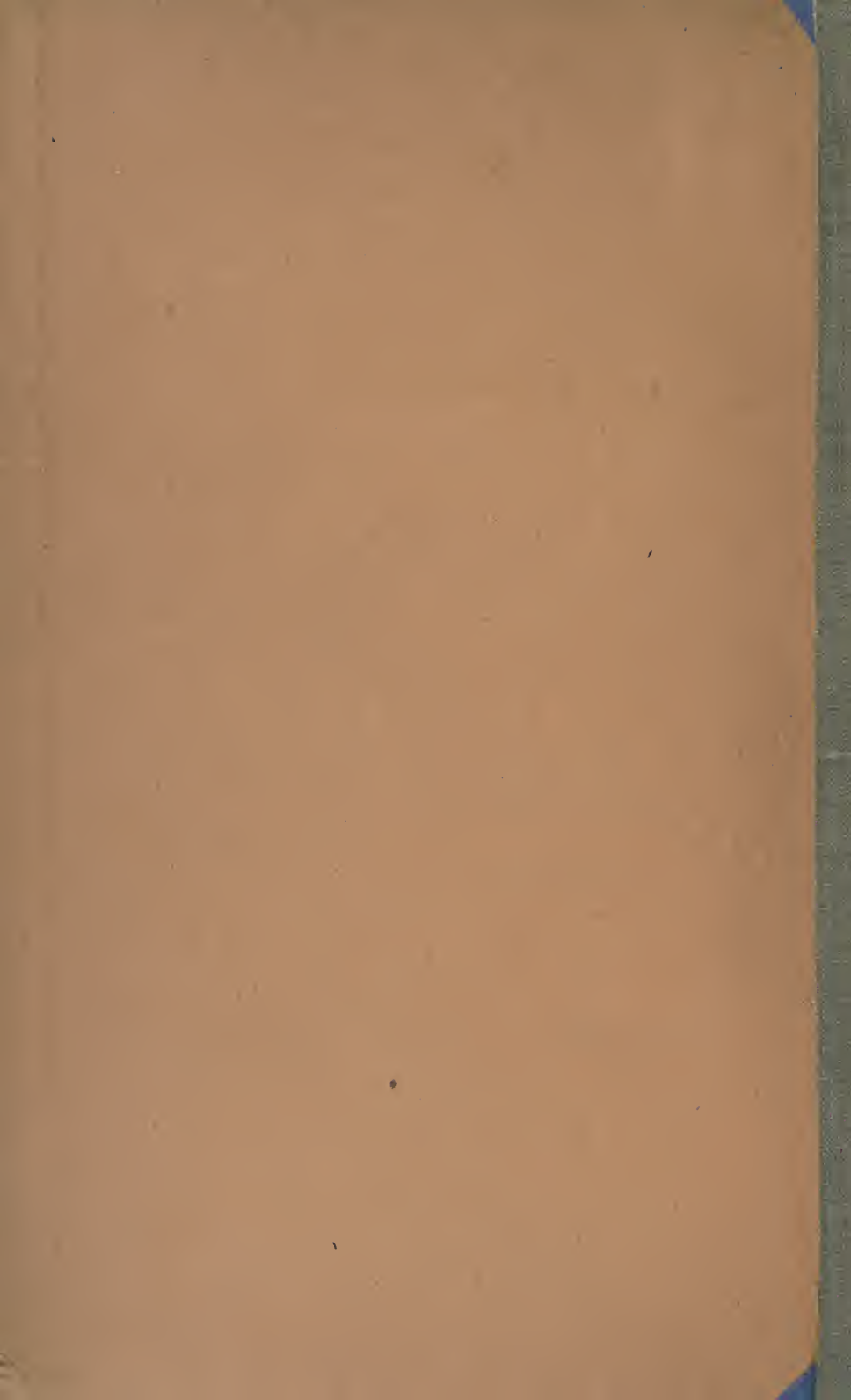
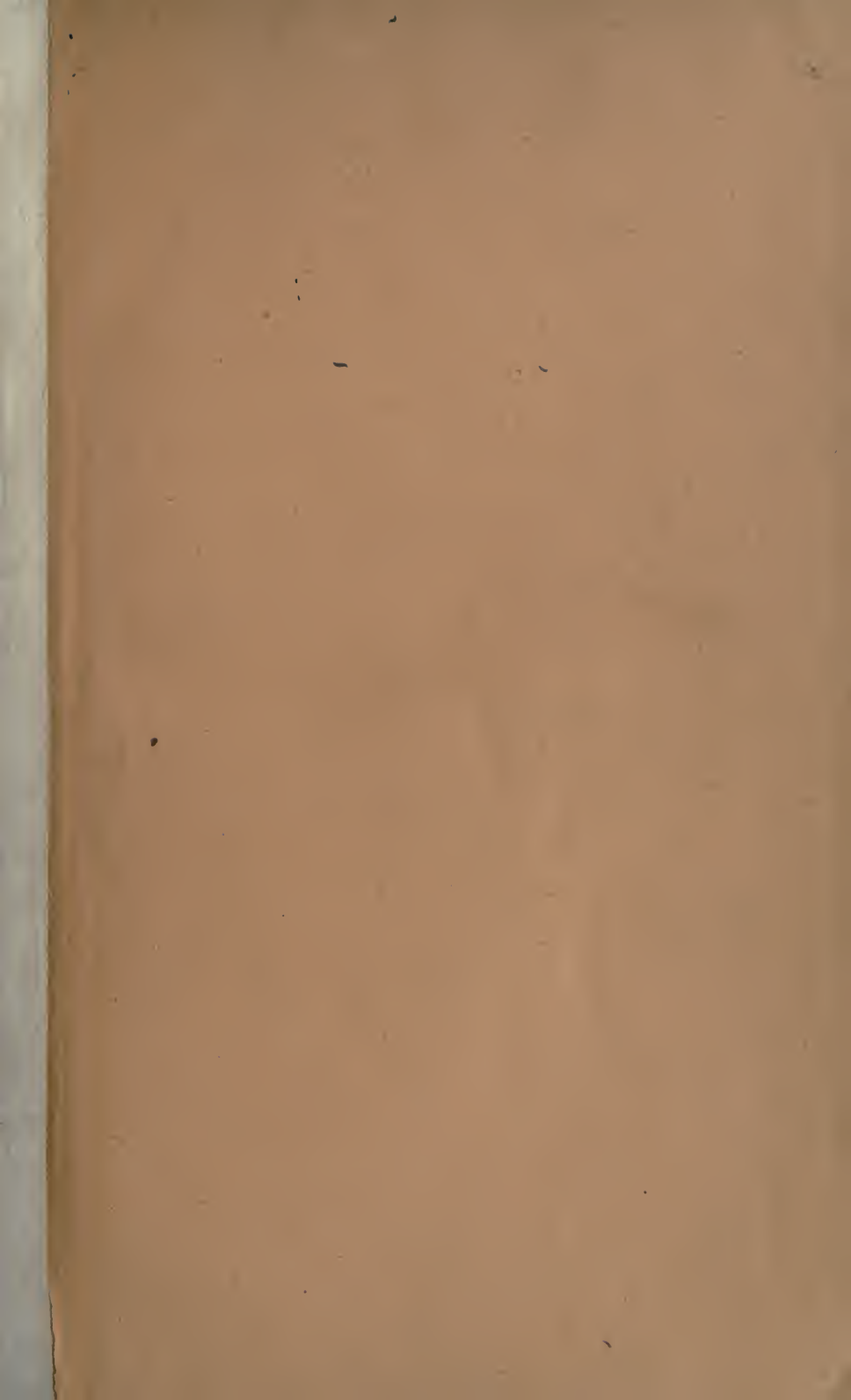


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CONTENTS:

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SOME RECENT SOCIOLOGICAL VIEWS.

JAMES H. BAKER.

Sociology is the science which considers the fundamental laws of association and the means of social progress. It is thus distinguished from the special problems of human association treated in Economics, Political Science, Ethics, etc. Sociology as a distinct science is comparatively new, but it is increasingly engaging the attention of thinkers and philanthropists and gives promise of large results for human betterment. The theme proposed is a large and difficult one, and calls for a summary of some accepted views with more or less reference to leading writers. It must be understood, however, that the personal equation will enter into the entire treatment of the subject.

PRINCIPLES.

Many theories regarding the basal principle of association have been advanced. We may quote that of Professor Giddings, who finds the original subjective social element to be "consciousness of kind." He thus defines his meaning: "The consciousness of kind is that pleasurable state of mind which includes organic sympathy, the perception of resemblance, conscious or reflective sympathy, affection, and the desire for recognition." Together with the struggle for life appears the social tendency as the struggle for the life of others—the germ of altruism. Instinctive association later becomes conscious and purposeful, and what is called the social mind is developed. Society advances by survival of the fittest ideals and forms of organization.

That society is not a self-shaping organism is now generally admitted. Even Herbert Spencer, after the extensive use which he makes of his device to set forth the organization of society, explains that there are only certain limited analogies between the human and the social organism; and Huxley repudiates the use of such analogies on the ground that the units of society are independent existences. Any exclusive biological doctrine of social evolution appears to be materialistic and fatalistic. It refuses a unique character to the psychic elements of human nature, denies free agency, and leads to the *laissez-faire* view which even today is the worst feature of our civilization. If he who attempts to prove free will is logically insane, he who in real problems denies free agency is practically a fool.

There is a difference between biological laws and human social laws, since society has a moral aim. "Ethics and evolution are as far asunder as the poles." Natural evolution at a certain point becomes "artificial and teleological"—conscious purpose appears as a factor in guiding events.

Professor Ward claims in substance, that psychology alone can explain human society and that the social bond is found in the feelings. Professor Giddings and Professor Baldwin advance similar views.

In substantial agreement with the doctrine of these writers, we ascribe chief importance to the inventions, thoughts and sentiments of individuals who have the power of initiative and leadership. "The matter of social organization is thought; the method in social organization is imitation. Society grows by imitative generalization of the thoughts of individuals." Carlyle's "Heroes and Hero Worship," though presenting an exaggerated view, is a notable recognition of this principle. History furnishes many examples of the power of genius to create public sentiment. "Let who will make the laws of a people, if I write their songs" was uttered with genuine insight.

The principle of struggle and survival in evolution is of course generally accepted; Weismann's principle that acquired traits are not transmissible is accepted by many. The followers of Weismann, like Benjamin Kidd, hold that natural selection must obtain, or society will degenerate. If, they claim, we inherited the mental and moral culture of the past, there might be progress without natural selection; but, if the survival of the best-adapted variations is the only means of progress, then struggle must go on; the race deteriorates if the fit and the unfit have an equal chance to survive; lack of competition would mean biological deterioration and death. This question is of far-reaching importance in all discussion of progress, and, until it is settled, the manner of solving many practical problems must remain in doubt. Certainly the belief in accumulated heredity is widespread, and nothing but scientific demonstration will overthrow it. In the meantime, even if Weismannism be true, the accumulated culture of the race is transmissible from generation to generation through education, and this fact strengthens the faith of the optimist.

In passing we may refer to another important view, as held by Benjamin Kidd. He teaches that reason is selfish, and that by itself it serves to intensify the struggle. This view is of course disputed. Professor Ward says that civilization has advanced through will and intellect; that the intellectual faculty, superseding biological evolution, rapidly adapts the environment to man, and does away with brutal selfishness; that the intuitive reason desires not the harm of others. It is difficult to compare views because of the different meanings attached to terms by different writers, but reason in its full sense must recognize the principle of altruism, must know that rich individual growth includes social desires and aims, and must perceive the rational and divine order of the world.

We grant there must be struggle in some form, but even Kidd recognizes there must be another principle to make civilized society possible. He brings in the power and sanction of religion, as the necessary altruistic influence. The rational selfishness of individuals is the disintegrating influence; religious belief provides a sanction for social conduct; the first must constantly be subordinated to the second. He believes evolution teaches that the race must continue to grow more and more religious. He believes that in an improved religion we shall conquer; we may add that the victory will be easier and more complete because of an improved science.

One conclusion is justified, namely, that social progress can not rely upon natural selection alone, but must bring to its aid all the forces of material and physical betterment, of public opinion, law, morality and religion.

MEANS OF PROGRESS.

CHARACTER OF THE PEOPLE.

A century ago "*laissez-faire*" was the cry of economists and "natural rights" the means to cure social ills. Today ethical principles and co-operation enter into the discussion of social and economic questions. John Stuart Mill moralized Political Economy. He showed broad sympathy with the masses and exerted a powerful influence upon all political thought. Men like Carlyle, Ruskin and Tolstoy have popularized and spread ideas making man more than an economic member of the State. Christianity, just coming to full consciousness of its mission, inaugurates humane movements for the cure of social ills. Judging by some recent tendencies even wealth is beginning to see the necessity of some kind of ethical code.

According to a principle previously noted, the individual furnishes the material for progress, and individual responsibility is to be determined in the light of that principle. Those who are natural leaders have the larger duty. There will always be distinctions in society, and this is as desirable as it is inevitable. Since the many will accept the guidance of the few, the good citizen will always be ready to make some reasonable sacrifice for the public good. Avoidance of this duty is the worst of our evils. The active interest of intelligent citizens is the only efficient and final check on official neglect and abuse; the safety of democracy depends on a healthy public sentiment. Progress cannot come through struggle alone; its trend must be ideal, social and ethical.

Biology, psychology, history show that, if man is selfish, he is also pre-eminently social. Spite of all the existing evils of government, the governments of civilized nations are being made the instruments through which the will of the people finds expression. Democratic government is the servant of the people; the will of the people can control its character and its tendencies; it is the necessary machinery for bringing about many reforms; and a people who have not the virtue and active energy to effect reforms through government are incapable of accomplishing them through any other organization of society or lack of organization. I have always held the view that the forces working in the world are the forces of progress. Carroll D. Wright closes his volume on "Practical Sociology" with a most hopeful view. He claims that as a result of the human struggle we have a new man, a new political economy, a new state—the kingdom of Christ on Earth, a new religion—that of progress, and a coming "revival of a religion which shall hold in its power the church, industry, commerce, and the whole social fabric."

Spencer of course believes in the natural evolution of institutions and he makes a long list of the products of civilization that have developed by natural process, without government interference, or indeed in spite of interference. He thinks there must always be a higher and a lower in society. Whatever view we may take of his decentralization doctrine, he is undoubtedly correct in claiming that the form of political institutions is less important than the nature of the citizens. The character of the units makes the character of the aggregate. Political institutions may not be modified faster than the character of the citi-

zens is changed. France and America furnish illustration of this fact. The hope of progress is not in legislation but in character. We hope, and I think may believe, that Spencer is right in his Utopian view. "The ultimate man will be one whose private requirements coincide with public ones. He will be that manner of man who, in spontaneously fulfilling his own nature, incidentally performs the functions of a social unit; and yet is only enabled so to fulfill his own nature by all others doing the like."

Individual responsibility in social reform can not be too strongly urged. *Laissez-faire* is materialism, fatalism, selfishness, savagery, indifference, laziness, mere subjective religious life and Pharisaism. It is the Priest and the Levite and not the Samaritan.

EDUCATION.

Whether Weismann's view or Spencer's of heredity be true, we may be sure that wide-spread education pays, because the accumulated traditions and stores of knowledge are transmissible, if not by heredity, then at least by education and the social atmosphere. Giddings says "States should assume cultural functions. The members of the state see that social cohesion is a spiritual union rather than an external compulsion, and that it depends upon the ideas of individuals. They believe it to be as necessary to guide the minds of men as it is to suppress crime and insurrection. Rightly or wrongly, they believe also that the guidance will be inadequate or pernicious unless the state itself is the supreme guide." He notes some twelve modes of equality, a sense of which he regards as necessary for the safety and success of democracy, and he argues that a sense of these equalities can be established only by an efficient public school system.

RELIGION.

Another force for progress is religion. Even Herbert Spencer concedes there is a great truth running through the whole history of religious thought and feeling, namely, the belief in unseen causes. He believes that religion will still and ever possess the minds of men, though modified in doctrine to harmonize with the best universal instincts of human nature. The press from time to time heralds the beginning of movements in Germany, England and America looking toward a broad religious philosophy, and spiritual life abounding in good works. The churches are adapting themselves to new interpretations in accord with the growing conception of truth and are meeting new demands for practical Christianity. We may believe religion will still be the dominant influence toward ideal and altruistic living, and that Kidd's theoretical need of religion as a socializing force will be met in fact.

THE STATE.

There are two extreme tendencies of society,—individualistic and socialistic. Each tendency, besides containing a selfish element, looks toward bettering human conditions.

Individualists are opposed to state interference. Individualism developed from the Fifteenth to the Nineteenth centuries as a movement toward religious and political freedom. The later development of individualism is economic.

Adam Smith, the great political economist, was an individualist. Individualists argue that individualistic countries are the most progressive; that regulative legislation is always faulty; that dependence upon the state weakens the people and lowers the social level; and that socialism is the negation of freedom. Spencer is a strong advocate of individualism. He claims that, while benefit according to incapacity and need is the principle ruling in the family, the relation of the state to the citizen must be governed by the principle of reward according to merit; that by competition the quality of the species is preserved. He objects to the disintegration of the family and the too ready assumption by the state of responsibility for children.

On the other hand Kidd uses evolution in favor of state interference, and Huxley uses biology to the same end. Socialists use evolution to show the necessity of organic social life without competition.

The aim of socialists is not at paternal or state control, but at the gradual co-operative reorganization of society through government. They are neither revolutionary nor anarchistic. There are other types of socialists; but in England, America and Germany, the term is commonly applied as above noted.

Socialists claim that the co-operative state would bring individual freedom instead of servitude of labor to capital; would tend to the survival of the best instead of the strongest, and would make good character.

Spencer says that, while there must be sympathy enough to mitigate ills without helping the worst to multiply, there must be no communistic distribution equalizing good and bad, but must always be private ownership of things produced by labor. The German socialists under the militant idea want to establish merely a new form of coercion and regulation. He cites the ancient Peruvian Empire with its detailed military organization. He argues that, while spontaneous sympathy will bring an average of benefit, in the social state society would perish; parental instinct would disappear. Human nature is not fitted to the social state, is too selfish. The officers of such a state would be corrupt.

John Rae takes a similar view. Socialism intent on diffusion of progress fails to see that it would cut the springs of progress. Incentives to production and energy of effort would be relaxed. Human nature would take its ease. There would be diminution of production, increase of population, industrial slavery. Freedom would disappear under another form of absolute government. Military despotism would be better.

Between these extreme views there is a golden mean. We may dismiss anarchism and revolutionary socialism at the outset. Even if in a distant age government control can be largely relaxed, abolition of government today, human nature being as it is, would necessitate the gradual re-establishment of government through a chaos and struggle which would be a repetition of Middle-Ages history. Did we have the social state to-day, human nature being what it is, we should have under another form of organization an exaggeration of all the political corruption and selfishness and weakness which exist under present forms of government. In all civilized countries political changes will be an evolution and not a revolution. We may throw aside all supposed absolute rights and inflexible principles. Let the state do what it can do better than individuals. Gid-

dings says that normal evolution is neither individualistic nor socialistic; that the distribution of functions between public and private agencies is a varying one; that we can gain and maintain liberty through government. John Rae believes in extending the sphere of the state. Kidd thinks that, while state management is not desirable, state regulation and control will be extended in the interest of free competition. John Rae holds that *laissez-faire* is no longer a living faith; that the state cannot divest itself of a distinct social mission; that state functions do not interfere with individualism; that the state may be a social reformer without being socialistic. Huxley believes in state functions. Ward expresses his views somewhat in this fashion: Plutocrats cry *laissez-faire* and create fear of government and advocate individualism. He thinks unequal distribution worse than all the evils government can commit. The individual has ruled long enough; society must govern its own affairs. Sociocracy is the ideal aim. Sociocracy recognizes all forms of government, but holds it to be the duty of society to guard its own interests and work out its destiny. It is the art of applying the active forces of society to society's problems. When the people govern their own affairs instead of leaving them to party machines all issues irrelevant to the real question will be laid aside. What is called the natural does not rule in the affairs of men. The artificial is infinitely superior to the natural. Government is artificial and can be changed according to progressive ideas whenever intelligent and moral leadership desires.

The tendency today is toward more government control and, I believe, rightly. Though many of society's ills must be treated by government instrumentality, yet, when the cure is effected, there may properly be a reaction toward individualism. The abuse of monopoly, the evils of poverty and degeneracy must be met in the immediate future by extension of governmental functions. Charles Booth uses the phrase "socialism in the arms of individualism," and it is a very significant phrase.

ECONOMICS.

POVERTY.

We must acknowledge that the sociological problem as related to poverty is startling and difficult, and calls for an earnest attempt at solution.

The cry of some extremists is that the rich are growing richer and the poor poorer. The former may be true, but not the latter. This is demonstrated by Carroll D. Wright in his "Practical Sociology." He shows that in 1891 the purchasing power of a day's labor was in the proportion of 168 to 100 greater than the purchasing power in 1860. He claims that the effect of machinery, saving the incidental readjustment of labor, has been in every way beneficial.

The causes of poverty are hard to determine with accuracy because of the varying conditions for every set of statistics, and the personal equation of statisticians. Some say lack of work, insufficient work and poorly paid work added together are the supreme causes of poverty; that capitalists get too great a share; that misfortune and not misconduct accounts for much the larger amount of poverty. Individualists say, inefficiency of the poor, shiftlessness, lack of thrift, prodigality, etc., are prominent causes. One important table makes an average,

taken from three large cities, of causes of poverty of applicants to certain charity organization societies. Prominent causes in the order of their percentage are as follows: (1) Sickness, accident or death; (2) lack of employment, not due to the employee; (3) intemperance; (4) lack of thrift, industry and judgment.

To meet the problems of the unemployed a Massachusetts commission suggests, among other things, (1) removal to farms; (2) industrial education; (3) state public works in winter; (4) state labor colonies. These remedies are socialistic in character. Individualists recommend manual training, temperance, thrift, etc. Wright suggests these remedies for social disorders, but they may apply, in part, specifically to the problem of poverty: (1) trade, technical and manual training; (2) justice to labor; (3) equitable distribution which must come under some system without resorting to socialism which is revolution; (4) prison instruction in trades; (5) moral law in business relations.

Certainly we must recognize many causes of poverty. It is harmful to make a hobby of any one theory, or to try to find a panacea in any one remedy. Unwillingness may be subject to state regulation; lack of thrift, prodigality, etc., may be modified by philanthropic endeavor; inability can be removed in a percentage of cases by education and by the influence of such work as that of the "settlements;" lack of opportunity for work can be met in part in times of distress by state or municipal provision for needed public improvements; various kinds of misfortune should be met by state provision and organized philanthropy; hopeless pauperism should be the state's care; inequitable distribution will be gradually modified by labor organizations and the development of altruistic principles in society. There is much of poverty that no plan of state or society can remove until the tone of the whole social organism is improved. I refer to the lack of aims and motives in those who are otherwise physically and mentally capable. The world is full of opportunities for establishing in thousands of centers productive industrial activities, if the unemployed had the power of initiative. This whole subject is related to the problem of degeneracy.

MONOPOLY.

The problem of industrial combinations is a growing one and it enters into the whole question of human relations, social and governmental. Some believe that there are natural limits to combinations: limited fields for additional enterprises; regulative power of demand as related to price and quality; the selfishness of the people who resent injury; the sense of justice of the people. Others hold that monopolies are not necessarily evil, but the inevitable accompaniment of our new civilization.

That monopolies, so far as harmful in fact and tendency, should be subject to control is, I believe, the growing theory. The findings of the United States Industrial Commission, which has recently finished its labors, are significant, especially as the commission cannot be charged *a priori* with undue hostility to wealth. Regarding railroads the commission recommend for discrimination and other evils: (1) That government control be strengthened and that the authority of the Interstate Commission be restored and its functions be enlarged; (2) that for effectiveness the Commission should be representative of various interests; (3)

that capitalization and financiering of railroads should be regulated by legislation; (4) that discrimination in favor of imports be prohibited. Regarding industrial combinations they recommend, amongst other things: Publicity; prosecution for violation of federal anti-trust laws; national and state laws against discrimination between customers; laws concerning over-capitalization and to furnish state supervision; federal taxation and supervision; tariff modifications as related to the evils of monopolies; investigation of the whole question of import duties.

These findings show the need of control through government, and the belief in its possibility and feasibility. Moreover, the very fact of the report shows that specialists, statesmen and even politicians and monopolists are awake to the fact that reform must come.

TAXATION.

Taxation is another interest that is related to the problems of altruism. The Industrial Commission advocate: (1) that states raise their revenue from corporations, inheritances and incomes, supplemented, when necessary, by indirect taxation—the taxation for local purposes remaining on real estate and personalty; (2) that corporations be taxed on the value of their franchises, based on actual value of stocks and bonded debts, less value of real estate assessed locally; (3) that states levy graduated taxes on inheritances; (4) that the state establish a graduated tax on incomes; (5) that there be special taxes upon any business not otherwise made to bear its just share.

Professor Seligman, who is one of the progressive writers on taxation, says tax is to correspond as far as possible to revenue of citizens. Citizens should support government according to their capacity to support themselves. Revenue or income is now regarded as the ideal basis for taxation. He advocates as a present policy the inheritance tax, and the corporation tax for state purposes.

DEGENERACY.

In spite of certain biological doctrines of social evolution, in spite of the advocates of struggle, in spite of all *laissez-faire* theories, one important fact must be recognized—namely, that human sympathy is growing and that human sympathy must be preserved in all its strength and purity; it is the bond that unites the units into a social aggregate. At the same time it is conceded by all scientific philanthropists that, as struggle is modified by altruism, the unfit of every description are preserved to the detriment of the race as a whole, and that some humane solution of the difficulty must be sought. The burden of the state is becoming such that the causes of degeneracy must be in large part removed. The very fact that state and society are assuming the care of the unfortunate shows the growth of altruism and a recognition of the solidarity of society. The dependent, defective, and delinquent classes are beginning to receive attention and study commensurate with the importance of their effect upon the welfare of the whole social fabric. Since all degeneracy is due to heredity or environment, state and society can reach, and to some extent regulate, the causes. Sociology is becoming an important subject of study in institutions of learning;

in institutions for the care of wards of the state experiments are conducted with the desire to discover practical principles for care, education and reformation. State and national conferences are comparing results of practical experience. Every city counts its philanthropic organizations by the dozen, and organized charities are doing with wisdom and efficiency what formerly was done by unwise and harmful spontaneous charity.

The economic organization of society as related to the class of dependents has already been discussed. Dependents who are able but ignorant or unwilling must be reached by education, and by all influences that will awaken the dormant impulses to right activity. There are thousands of splendid men and women who need sympathy, encouragement and guidance, and in some cities the chief work of charity organizations is not alms-giving, but developing a self-respecting, self-active personality. The class of dependents who are born paupers, hopeless in ability and motive, should at once become the care of the state, and the sexes should be permanently segregated.

The defectives, on humane and economic grounds, should be educated, each according to his capacity, and the hopelessly incapable should remain under institutional care, the sexes being separated.

The class of delinquents furnish greater problems than other defectives. Criminals as a whole are likely to possess physical anomalies, physical degeneracy, and a humbly developed mental organization. Children with these traits often become criminal because of social conditions; they do not readily find employment and easily turn to evil ways. Those born with criminal taint usually inherit it from some form of degeneracy in parents. With good environment, however, many of these may become good citizens. Poor homes, bad surroundings, lack of education and occupation may make criminals of normal children. It is shown that a large percentage of criminals have no trade. One table of statistics shows that only six per cent of inmates in the Elmira Reformatory had good homes. The home is the starting place for all sorts of reforms. Practical sociologists today deplore the tendency to disintegrate the family, and whenever possible endeavor to preserve its integrity and keep children within its fostering influence. For care of dependent children, homes are preferred to institutions. Of course, industrial and other education for all neglected children is nearly the panacea. Children with positive and exaggerated native criminal tendencies, whose offspring could but be degenerates, should at an early age be placed under custodial care.

In the treatment of criminals, belief in the indeterminate sentence is growing. The first work of prisons is reformation. When a criminal is reformed and has been taught an honest trade he is ready to be released; if he is a hopeless criminal by nature, he never should be restored to society. So far as possible prisoners should be made self-supporting. It is an anomaly that able-bodied criminals should be supported in idleness by good citizens.

Since the struggle in human society is bound to be lessened, and race deterioration will surely follow unless degenerate tendencies are eliminated, what is the aspect of the problem? Society will no longer allow the unfortunate to perish. The answer seems to me plain and simple. Dickens, in his marvelous study of

social problems, emphasized with terrible vividness the evils of society from neglected children, when these should become grown and trained in vice and hence powerful for harm. The work of improving the lower strata of society must begin with children. Educate the normal children of the poor, teach them some trade and start them right in life. Educate all who, under right influences and training, can become useful citizens. Remove waifs from unwholesome surroundings, or rather improve the surroundings. But in the name of humanity place all those who by nature must become hopeless paupers, imbeciles, all who by nature will become hopeless criminals under permanent custodial care. Teach them some simple occupation and make them in part self-supporting. Segregate the sexes that such unfortunates and society may be spared the fatal gift of degenerate offspring. This will do more to regenerate society than use-inheritance and all remedies proposed, except the great moral evolution of the race as a whole, which I believe is going on. To those not acquainted with recent views and experiments, some of these propositions may seem chimerical. But in some states already imbeciles, epileptics, etc., are colonized and the sexes are segregated. The members of these institutions, or colonies, are given some light occupation and are made comfortable—better off than they would be under greater freedom. This method is humane, is practicable, and its use is a common-sense duty. I predict that so far as scientific investigation shall determine—not inconsistently with proper sympathy—this method of decreasing degenerate elements of society will be employed. The radical method proposed by some medical men of putting all the unfit to painless death will never be employed—it would destroy human sympathy; besides, too many of us would be in danger. The plan in operation would produce a French-Revolution frenzy of destruction. All reforms are possibly by conservative, wise and humane methods.

THE FUTURE.

Altruism is growing; philanthropy is becoming scientific and practical. Are poverty, degeneracy and crime decreasing? Probably we are at too early a stage of practical investigation to draw definite conclusions; but we feel certain that science under the inspiration of altruism will discover the means for reducing all the evils from which society suffers.

RECENT ESSAYS BEARING ON THE SOCIAL IN EDUCATION.

HARVEY A. CARR.

In times past, education was largely a family or parental function. The family, present and future, was the corporate survival unit in conscious educational activity. Formal education was individualistic in tendency; as to aims, it centered around the child—its success, happiness and development. Many definitions of the aims of education still embody this personal, parental attitude; they entirely face the child with no glance over the shoulder at social ideals and tendencies—as to where the journey tends; they emphasize individual acquirements—power, character, culture, complete development, etc., etc.

Education is evolving from parental to social care, from a family to a state function. On the one hand the family has gradually surrendered the function, as society performs it better, and on the other society has tended to usurp the office as corporate consciousness and the spirit of democracy have arisen. The aim of education becomes objective or social. Society demands that certain ends be attained. The young must be fitted as members of the social corporation. The particular end changes with varying emphasis; at one time the political consciousness is dominant and training for citizenship is demanded, the industrial with its requirements, or the social with its demand for an ethical and social character, but the aim is social or objective. The idea has been further accentuated by historical studies of educational systems, and by biological and sociological theories with their emphasis upon adaptation to existing conditions as the keynote of success.

With the industrial ideal has come science, technical, trade and manual-training schools, specialization, electives, readjustments of the curriculum, demands for shorter courses, etc. The tendency has been illiberal and utilitarian to some extent, a somewhat mechanical adaptation to the social regime, a training to fit the individual as a mere wheel in a complex interacting system.

With the rise of democratic self-consciousness, the ideal becomes more liberal in nature. The essence of democracy is to superadd to a mechanical arrangement a psychic relationship—a conscious partnership in the social corporation. The social aim of education arises wherein the aim is to educate the young as conscious partners, rather than as mere clerks or laborers. Social participation and social self-consciousness is the ideal. The old industrial and political ideals are not destroyed; a new one is added. The curriculum and the various branches must be remodeled with a social reference, the child must be conscious of their bearing and relation to present progress. All roads now lead to the "new Rome." Social industries and institutions pervade the school, furnishing educational material to incite an interest in and understanding of the real active

world round about. An intimate connection between the school and society must be established. The social spirit of conscious coöperation is fostered by the organization of the school into a conscious corporate body that finds unity of action in self-government, on the playground, through athletics, care and decoration of grounds and buildings, and a multitude of other corporate activities. To a training for life is added the celebrated dictum that "education is life." From the old parental ideals, education has evolved until now it is a training by, for and through social activities and relationships.

Various phases of these lines of thought have been strongly emphasized in recent educational writings. G. Stanley Hall has a most excellent article on "Some Social Aspects of Education" in the *Pedagogical Seminary*.

He summarizes the position of sociology in its adverse criticisms to present-day educational practice: Man is a social being, and when isolated from society tends to imbecility and one-sided development. Social interaction is thus markedly educative and the social spirit, social activities and relationships should enter into and pervade the school. In view of these principles the following criticisms are urged: Education is too individualistic, the child is isolated from the home and from nature; education being conservative, like all institutions, the curriculum looks to the past rather than to the present; the curriculum is rigid and non-adaptable to varying personalities; form is emphasized rather than context; science is abstract and unrelated to living nature; present-day current questions appealing to live social interests, such as religion, politics, etc., are ejected from the school because of divergence of public opinion; instruction and work is individual, allowing of no mutual help, coöperation or emulation on the part of the pupils; there is but little correlation of branches; the parts of the whole system are not articulated, with consequent gaps, overlappings and waste; and the grades are isolated, making promotion difficult and interaction of grades impossible.

President Hall admits these indictments to some extent, but considers them too sweeping and somewhat exaggerated. There are certain tendencies in these directions, but critics fail to see on the other side social tendencies already at work, and which may be further utilized by judicious management for the improvement of present conditions. These social instruments and means he briefly mentions: 1st. Language is a social instrument, and its very use necessitates social interaction, communication, and experience; 2d. Imitation is primarily a social activity whose force and extent are much greater than commonly supposed. It necessitates interaction and communication; 3d. The school may be organized as a social unit whose corporate activity may be expressed in various ways as decoration and improvements of grounds and buildings, etc.; 4th. Self-government may be initiated; 5th. The socializing effect of group-games and of the playground in general may be extended; 6th. A greater connection between the home and the school may be made through home activities; 7th. Nature study may link the school with every-day surroundings; 8th. Social, political, ethical and philanthropic agencies in their actual concrete workings may be studied; and 9th. The same may be done of the social industries of the immediate environment.

With the advent of adolescence President Hall advocates a change of locus from society to the individual. Training of the pupil in individuality and not for social ends is to be emphasized. Society must fit personality and not *vice versa*. Culture and a wide general knowledge must take precedence over specialized training. Educational methods must look toward, not the present, but the future society through a full and wide development of the individual. (1)

An interesting and instructive attempt to unite more closely for mutual interaction the school and society in the Greenleaf Public School of Washington, D. C., is described by Sanford Bell. (2) The work was conceived and carried out by Principal Riordon of one of the regular ward schools in the poorest section of the city. A school garden five feet in width and skirting the inside of the school yard fence gives expression to the conscious corporate activity of the school. The entire work is done by the children, community activity and ownership lasting till harvest time. Flowers and vegetables are raised which are divided and used in the school. The children voluntarily keep off the garden in their play.

Two courts of sixty feet square were improved and fitted up by the children for playgrounds. They are shaded by awnings and are provided with swings, seesaws, benches, sand piles, gymnastic apparatus, etc. All improvements were made or purchased by the children and belong to them as a community. Disciplining is left as much as possible to them. These grounds are used before and after school hours and on Saturdays.

A monthly paper is edited and published by the pupils and a savings bank, paying interest on deposits, is also officered and managed by them.

The manual training consists as much as possible of the necessary industrial activities of the school community. The girls take care of the halls and recitation rooms as to cleanliness and decoration; actual accounting and bookkeeping are necessary; reports, programmes and announcements are typewritten and copied on a mimeograph; telephones and electric bells are put in and kept in repair; actual painting and carpentry are taught, the buildings being thus kept in constant repair.

A vacation school was established; the morning hours being devoted to a variety and combination of academic and industrial work, and the afternoon to the playground, with an hour's programme of music, recitations, etc. Saturdays were used for country excursions. The afternoons were open to the parents, and members of the professions and trades gave simple talks on their respective industrial activities.

Miss Jane Addams, in her book on "Democracy and Social Ethics" (3), has a chapter on Educational Methods, in which she deals very sanely and sympathetically with current educational practices in relation to the social needs of

(1) G. Stanley Hall, *Some Social Aspects of Education*, Pedagogical Seminary, Vol. IX, No. 1, pp. 81-93.

(2) Sanford Bell, *An Educational Object Lesson*, Pedagogical Seminary, Vol. IX, No. 2, pp. 237-248.

(3) Jane Addams, *Democracy and Social Ethics*, Chap. VI, pp. 178-220. Mac-Millan & Co., 1902.

See also Prince Kropotkin, *Mutual Aid*, London, 1902.

urban industrialism. Her views are the result of long experience with the actual conditions in the Hull House Settlement and are of inestimable value to either the theoretical or the practical educator who is earnestly attempting to adapt the educational institution to the rapidly evolving social conditions.

Miss Addams shows well that the essence of democracy is to educate each individual into the corporate consciousness of the evolving society; that democracy includes all of the body politic and that social progress depends upon bringing each member into, not mechanical, but conscious relationship to the whole; each must be not a silent, mechanical, but a conscious dynamic integer; a conscious co-partner of the great corporation.

In view of this Miss Addams characterizes present learning and training as too individualistic in that it fits too exclusively for individual or family success and neglects that knowledge which gives social value and meaning to the daily experience of the industrial laborer. As a case in point, she pictures an Italian colony in their relation to the educational system. They were mostly peasants in Italy and in the family industrial stage with its diversified activities for the whole family. Here their whole industrial life is changed. The father works in a factory, the mother's home work is very limited in comparison to her former outdoor and domestic activities. The child has comparatively little to learn from his parents that will put him in touch with surrounding industrial and social conditions.

The school in no way utilizes the child's language, his habits of mind and body or his social traditions; the school has no power or attraction for him whatsoever. It is but natural that he should leave school and enter a factory at 14, or take to selling papers or the life of the street at an earlier age. The knowledge gained in school in no way relates to his future occupation or daily experience; it is commercial or professional in tendency, in that it is clerical in nature; it is associated with a rise in life and away from trade and industry; it has no relation to productive industry and the industrial worker. Business colleges also emphasize the clerical part of commercialism and do not minister to the factory employee. The same is true of university extension and settlement work; it is bookish, academic and divorced from their actual life and experience; it appeals to a few of the academic type, but leaves the mass untouched. Industrial education has attempted the problem, but has failed, in that it has trained experts—engineers, chemists, electricians, machine builders, etc.—rather than educated machine tenders; it has raised but a few to a higher position, but has done nothing to improve those who remain laborers.

The dehumanizing effects of the machine monotony that results from specialization and division of labor must be overcome. According to Miss Addams this can be done by giving the workman some conception of the evolution of his industry in its relation to social and industrial progress. Machines and processes have their evolution, their growth, their historic associations with human progress as do ancient buildings or ruins. We inject the "doing of life" into education and we should also surround the "doing of life" with education, give life and meaning to the workman's activities. The interdependence of society must be more than mechanical—a conscious, psychic affair. The historical evolution of

industry, of the machines, processes and the worker, in its relation to the unity of purpose in an evolving society would serve to orientate the worker and to evaluate his position in reference to the whole.

President Hall (1) in an article in the Pedagogical Seminary characterizes briefly three attitudes or aims that have or may obtain in an educational system: 1st. The training of the old schools which looked largely to the past for its ideals. This is the natural tendency of every system in that an evolving society continually outgrows a conservative institution. 2nd. The training that aims to fit for present social conditions. Efficiency in present social, political and industrial activity is the keynote. Standards are fixed and defined and hence the training with this ideal tends to become illiberal. The child is subordinated to social demands. 3rd. The training that looks forward to the world to be, for the next stage of development. Society is changing rapidly and unless we aim ahead we train children after the fashion of the man who was born an hour too late. It aims for future projected efficiency and is both liberal and specialized in nature.

This last phase of the subject is well and thoroughly treated by Prof. Allin in an article (2) in the Journal of Pedagogy. Prof. Allin shows convincingly that the educative process is part and parcel of a general biological and social law which he terms "The Law of Future Specific and Social Efficiency." This law is that natural selection has reference more to the future welfare of the species than to present survival.

The attempt is made to prove that in the organic life of the past only those species have survived the actions of whose members were conducive to propagation of and the best provision possible for the young. The young have been the goal and heirs of all efforts, directly or indirectly.

"One of the most striking, and yet at the same time one of the least observed, facts about specific action is the pre-eminence of the specific as such. The individual is secondary to the species. Instincts, which are characteristically the grand trunk line of transmission and continuity in the lower orders of the zoölogical series, are peculiar and very important in this, that they are always in their origin and bloom for the benefit of the *species* to which the animal may belong which possesses the instinct. They are of benefit to the individual only secondarily, in so far as that individual may be of benefit to the species. The mother gives up her life for the child. She dies, but the child, and through it the species, lives. The salmon struggles up the Columbia river for a thousand miles, is torn and battered by the rocks and waterfalls on the long and weary journey, lays its eggs, and dies; but the race lives on, although at the loss and sacrifice of one of its best members. The long history of the mammalia or *mothers* is a record of innumerable such examples. Of course, it is not necessarily true that the individual performs an instinctive act *in order that* the species may be benefited, but the persistent fact

(1) G. S. Hall, The High School as the People's College *versus* the Fitting School, Pedagogical Seminary, Vol. IX:1, pp. 63-74.

(2) Arthur Allin, The Law of Future Specific and Social Efficiency, Journal of Pedagogy, Dec., 1902 (Syracuse, N. Y.), pp. 119-127.

See also an article by the same author on The Basis of Sociality in the American Journal of Sociology, Vol. VIII, No. 1, July, 1902.

remains that in the long run only those species and individuals survive which act in such a way that the species may be further propagated. Instincts are always for species or race preservation. They are specific, altruistic, other-regarding, profoundly social. They may not be all consciously such, but in their origin and bloom they are in their final import intensely social. It is a question of survival. It is a question of propagation and of the safety and welfare of the propagated. The individuals of a species which do not propagate obviously nullify the probability of like descendants. That which militates against the species thereby militates against the survival of the members of that species. The species that survives is characterized by the fact that its members act in such a manner that descendants are provided, and also provided for in some way or other. The goal of their activities is the young and their welfare. The young are heirs of all efforts, directly or indirectly (*Erziehung, eine Fortsetzung der Erzeugung*). In the highest mammalian species, man, art, religion and science are, in the long run, directly or indirectly means for more certain perpetuation of the species and the more certain welfare of the same. The rank of a species is determined by the degree of such care for the young. The survival of the fittest means the survival of the parental, and all efforts are to be judged according to a parental standard. The greatest good to the greatest number must also be interpreted in a similar manner, not as the greatest happiness of the greatest number, but as such parental conduct, direct or indirect, as will be most conducive to the propagation and welfare of the species."

That species or society persists in which there is progressive adaptation of each successive generation. Natural selection implies progress or greater adaptation. Without provision for the future the species must die.

As instances, Prof. Allin cites the parental care of the mammalia where the life of the mother is sacrificed for the future welfare of the species through her progeny, and Weismann's argument that the duration of life itself is determined by natural selection, being conditioned upon the time necessary for propagation of and provision for the young; that the life and survival of the individual is of value only as it secures the further evolution of the species by propagation and education. Hence in the long run natural selection and evolution face the future rather than the present. The law is inherent in the very concept of progressive evolution, for selection must provide in one generation a basis for a better adjustment in the progeny. Increasing plasticity, parental care and education are cases in point.

Of course this process is not necessarily conscious on the part of the individual or society. The result may be attained, no matter what the motive may be, as is instanced by the worldly ambition and money getting of parents. The motive may be selfish or sordid, but the fact remains there is better provision for their progeny. However the majority of parents desire to give their children better opportunities than they themselves had. Dr. Allin instances the growth of paternalism in the state, municipal improvements on a large scale, transisthmian canals, national irrigation, transcontinental railroads, protection of industries, and other large enterprises of society which minister more to the future than to the present. It is but a continuance of the biological fact of increasing provision

for the young and represents the dominant tendency in social progress. "Society," he says, "is not composed (merely) of those now living; it represents the living as the servants of posterity," a saying which embodies the very essence of the social institution of education in that it is an outgrowth of parental care.

The present ideal of education is the adaptation of the young into the present social fabric, a training for existing needs and demands as though society represented static and fixed conditions. This emphasizes unduly narrow specialization. Education must be this and more; it must also have an eye to the future and emphasize those conditions which will allow of continual adaptation in a changing evolving society; it must both survey the present, and chart the future.

How this has been done in the past or is to be accomplished in the future Dr. Allin does not say. The law is merely stated in its bearing upon a proper educational ideal.

THE ENGLISH EDUCATION ACT.

M. F. LIBBY

The London *Times* of December, 1902, publishes the new education act in full. The English *Journal of Education* of April, 1902, gives a clear abstract of the act. This journal published the act in full, but before it had been debated, and hence not in its final amended form. The debates are to be found in a sufficiently complete form in *The Times*. The leading speeches, outside the house, by Balfour, Rosebery, Sir John Gorst, Chamberlain, the Duke of Devonshire, and others, are given in all the English papers. The letters between Dr. Clifford and Mr. Balfour can be had in the form of campaign literature. By a study of these sources and of the English periodicals one can form some opinion of the nature of this latest pitched battle between National Education and Established Church Education in England.

Mr. Balfour protests that this bill is a great triumph for National Education, in spite of the fact that it pleases the church party. But the non-conformists do not shout for this alleged triumph of theirs. On the other hand they call the act "The Bishop's Bill." Certainly the Conservatives are practically all Episcopalians. The bill was carried in crucial divisions by a majority of 170. Seldom has there been a great parliamentary struggle over an act which was eventually passed by such a majority.

The object of this paper is to give a mere but clear sketch of the whole situation. }

From Elizabeth's reign until the 18th century free grammar schools provided all education for the English proletariat. In 1698 these had decayed through crowding of the population into towns. The "Society for Promoting Christian Knowledge" then founded 1,000 schools. In the beginning of the 19th century we find two rival societies carrying on this work—one favoring ecclesiastical management, the other state control. From 1830, a memorable year, to 1870, we find incessant struggles between the societies, concerning government grants, appointment of inspectors and other questions. Between 1833 and 1858 the expenditure by government and municipalities had increased from twenty thousand to seven hundred thousand pounds. From the days of the Duke of Newcastle and Mr. Lowe to 1870 the system of paying teachers by results (examinations of individual pupils) gave some steadiness to the system, which, however, was unsatisfactory, especially to the new liberal democracy.

The English regard the act of 1870 as a compromise between the church and squire on the one hand, and the liberals and non-Conformists on the other. It did a great deal for national secular education similar to the American system, but it recognized the church schools and subsidized them out of the public purse; not directly from the rates, but indirectly from the parliamentary exchequer. This

act established school boards and gave them the power to see that all children got some education, but of course not to interfere with children educated by the church schools. The cost of board schools was defrayed by parliament, fees, and direct tax on every householder in the district; while church schools were supported by their own supporters and by the exchequer at London.

The board schools had been efficient and were gradually but surely gaining on the church schools. The board schools have been denounced as "godless schools." But as the Methodists and Baptists and Independents and other non-Conformists were their chief supporters these denunciations have not alarmed the English people outside the established and the Roman Catholic churches.

Shortly after the brief successes of Lord Roberts in South Africa the Conservatives went to the country and were returned with an overwhelming majority. It is freely asserted that the church compelled the government to use this majority, for which they claimed much credit, in passing a new act which would rescue the church schools from impending ruin. Neither Mr. Balfour nor Mr. Chamberlain is inclined to reaction. The act honestly does all it can to advance education, but it cannot do much in the present juncture.

The salient features of the new act are these: The boards are abolished; new "*local authorities*" are established and are *entirely elective*, being in reality the county councils. These appoint managers for the schools, but these managers, in the case of the church schools, must be nearly all church representatives. *The church schools are to draw on the rates.* The managers hire and dismiss the teachers.

This arrangement seems incredible to us in America, but the first part of this paper explains it.

To the calm outsider the bill is a fairly just compromise, somewhat favorable to the church party, as is shown by the simple fact that all the church people and the House of Lords supported it strenuously, while the Liberals and non-Conformists seem to find in opposing it a sincere ground of reunion. This argument is tempered by the ever-present fact of party politics, by which the opposition oppose the government.

Mr. Balfour says, with his air of philosophic aloofness, that the bill will work well for National Education. The astute Chamberlain told his constituents that if they turned out the Conservatives the Liberals could not bring in so good a bill, nor any bill, because it would ruin them through dissensions. This fact seems indisputable. Lord Rosebery declares that to give the church power to collect "rates" is to subvert the principles of British freedom and that the pretended *unity of control* is the flimsiest kind of sham, while Episcopalian managers appoint only Episcopalian teachers. He more than hints that if he were a Nonconformist he would refuse to obey the law and withstand "the little tyrant of his field." Dr. Clifford, speaking for the Baptists and many others, declares flatly that the law must be resisted.

It is far from improbable that the Liberals and Nonconformists are embittered chiefly through disappointment that the act of 1870 was not allowed to do its complete work, which, in their estimate, would have involved the complete ruin of the church schools. The present panic concerning the need of education as a

weapon against commercial rivals favored the board schools, which, as they selected teachers solely on grounds of educational efficiency, naturally afforded better educational opportunities than the church schools, which selected teachers partly on other and to them more important grounds.

Even in this rough sketch of the largest points of a comprehensive and complicated measure, it must be added that the bill makes an honest, though not masterly effort to coördinate elementary, secondary and technical departments of the very disjointed English educational *system* or, rather, *arrangement*.

With more money the church schools must do better work. The secular part of their programme will be scrutinized as never before. The power of the purse has always been a great power and may prove greater in this case than the Liberals now believe.

Conjecture as to results is perhaps idle. The long war is far from its end. Will the American idea prevail? Can it prevail without disestablishment? Will this act help or hinder disestablishment? Will there be a large access of desire for religious and sectarian education, such as hardly any American dreams of? Will the Episcopalians gradually relinquish this desire themselves? To what extent will the new system handicap the English in their commercial struggle? Will the religious education of the denominational schools counterbalance the possibly superior keenness and acumen of the American system? Between these questions and their disturbing answers lie the experiences of a generation. We must hope for our own peace of mind, that time is on the side of broad national views of the moral and religious problems of nations in which citizenship must accommodate itself as the honorable ideal of very various races, and in which no name of a sect meets like apperception in comparatively many.

THE ORIGIN AND FUNCTION OF HABITS.

ARTHUR ALLIN.

I. THE ORGANIZATION OF HABITS.

Habits are the definite, regular rhythmic activities of an organism which have been acquired during the lifetime of that individual. In contrast with instincts they are reactions acquired *de novo*. Owing to the great increase of unorganized material in the nervous system (increase of plastic endowment) as compared with the lower animals, new combinations, associations and reactions are rendered possible. While instincts are adaptations and useful to the organism, they are fitted for a relatively simple, unchanging environment. With the increase of the social heritage the environment has become exceedingly complex and at the same time changeable. Hence the inflexibility and perdurability of instinctive life tends to become a disadvantage and plasticity or the possibility of the organization of new reactions, *i. e.*, habits, increasingly usurps a larger and larger field. The instincts of biology tend to give way to the habits of sociology, adaptability to the environment being the ever-present criterion. Thus the habits acquired through present-day education possess a relatively greater survival value for the individual and for the species than the instincts which are the survivals of the curriculum of the infinite past.

Habits may grow out of spontaneous, impulsive, reflex movements, may develop from variations occurring in connection with instincts and instinct-impulses or they may be acquired *de novo* in various ways, as for example, through simultaneous stimulation of two sensory areas, etc. The organism reacts in various ways to internal and external stimuli, many strange and new reactions arising in the process. Those which are useful for certain ends survive, while many others tend to disappear. This is especially evident in childhood. (1) After the completion of the first act the system, to quote Dr. Carpenter's words, "grows to the way in which it was first exercised." This automatic acquiescence of the system to its primary impressions and reactions makes possible the acquisitions of the social heritage. Reactions, whether good or bad, when they have attained the status of habits, are retained. Past habits which have been overcome are still retained in a latent condition. They exist side by side with reigning, dominant reactions, regaining ascendancy at times in disease, weakness or crises when the governing hand of the so-called higher ideals loses its strength. The past, though latent, is always a possibility. Treacherous, lurking foes may be left

(1) Baldwin, *Mental Development in the Child and in the Race*, Chap. VII. Social and Ethical Interpretations, Part II, Chap. III.

Perhaps it is advisable to follow the terminology suggested by Osborn, according to which the term "modification" should be confined to acquired, and "variation" to congenital changes.

in the rear of the advancing column, or on the other hand every ally gained may but make more sure the success of the expedition.

1. *With maximum of automatism there is minimum of consciousness.* As a habit becomes more automatic, consciousness gradually ceases to accompany the individual parts of the action. Consciousness apparently accompanies those nervous processes in which there is a relatively large amount of resistance and hindrance to the transmission of nervous impulses. With growing ease comes unconsciousness. Progressive habituation or automatization means often the short-circuiting of nerve paths. In the construction or organization of a new habit the nervous impulses coming in from the sensory apparatus traverse the spinal cord or basal ganglia of the brain, attain certain cortical areas and then return by motor channels *via* the ganglia and possibly the spinal cord. As the habit becomes automatic the nervous impulses travel simply to or from the spinal cord or to and from the basal ganglia. At first the "central telephone office" is called up to secure connections, but after connections are established there is no need to trouble the central office.

Insufficiently organized habits tend continually to re-enter consciousness, producing vagueness, indecision and uncertainty. "What you can't do blindfold you can't do at all." "The high school boy who must halt in his mathematical work to remember the multiplication table, is enjoying the fruits of a pseudo-freedom in the grades. *There is no freedom except through automatism.* Automatism is not genius, but it is the hands and feet of genius." (1)

"The great thing then," says James, "in all education is to make our nervous system our ally instead of our enemy." Some writer has said that good habits are better than good principles. With the growing automatization, mental and cerebral energy is set free for further acquisition and co-ordination. Each ideal or practice becomes automatic and registered in the system with the result "That men may rise on stepping-stones of their dead selves to higher things."

If anyone should ask an expert typewriter operator where certain keys were on the keyboard of the instrument on which he daily writes, he could with difficulty rely on the accuracy of his visual memory; but on the other hand his fingers will not make a mistake, even when they are writing at a very rapid rate. He might not pass with credit an examination in visual memory, but in conduct he is adept. The conduct or service rendered is the desideratum. This should be taken into serious consideration, not only in school examinations, but also in all school work, which is but a preliminary exercise for the life of adult service.

2. *Hierarchy of habits for certain activities.* "A man is organized in spots—or rather in some spots far more than in others. This is true structurally and functionally. It is strikingly true of the various sense organs and their functions. No less is it true of the various parts of the central nervous system and their functions. A man has some habits which are sporadic and isolated, some which are bunched together in loose groups (such as the outlay of skills which make one a carpenter), and then, some habits which are knit together into a hierarchy.

"A hierarchy of habits may be described in this way: 1. There is a certain

(1) Bryan and Harter, *Studies on the Telegraphic Language, The Acquisition of a Hierarchy of Habits*, Psych. Rev., July, 1899, pp. 369 and 375.

number of habits which are elementary constituents of all the other habits within the hierarchy. 2. There are habits of a higher order which, embracing the lower as elements, are themselves in turn, elements of higher habits, and so on. (3) A habit of any order, when thoroughly acquired, has physiological, and, if conscious, psychological unity. The habits of lower order which are its elements, tend to lose themselves in it, and it tends to lose itself in habits of higher order when it appears as an element therein. (1)

This hierarchy of functions has been termed by Groos "the monarchistic constitution of the mind." Many other scientific facts and theories could be cited in substantiation of this view of the matter, such as, for example, Hughlings Jackson's three-level theory (2) confirmed by so many clinical experiences, the laws of reflex action as enunciated by Pflueger, the progressive medullation of nerve fibres (Flechsig) (3), the development of the individual from fundamental to accessory activities (Ross), etc. (4)

The hierarchy of instincts and reflexes which represents to us the bequest of the unconquerable past is still further extended and enlarged in the acquisition of the social heritage. This also is transmitted to us in hierarchical fashion, and owing to the plasticity of the nervous system in youth, is acquired educationally by the young. Thus acquired habits tend to represent the ideals, laws and standards of a very highly developed society. The imperial tone of our ideals re-echoes the sovereign behests of accumulated wisdom. The "Stern Daughter of the Voice of God" gives utterance to few justifying reasons—they have been lost in a long-forgotten past.

Thus conscience grows. As there is no one imagination but an imagination for each sensory cortical area and for each system of ideas, so there may be said to be not one conscience but many, a conscience for every dominant system of ideas and reactions, a conscience for this subject of study, for that occupation, for this person and for that. Furthermore, these consciences form groups and systems which again are co-ordinated with or subordinated under other groups. Each dominant habit thus forms an imperative, with possible exceptions and conditions, but all are subject to the Categorical Imperative of Social Service.

Character is therefore a vast system of smaller systems of habits, the hierarchical constitution (5) of our natures probably extending even to molecular structure. It is as if the railroad systems of a country were all consolidated into one system or organization with one board of managers at its head directing an almost endless chain of subordinates. The systems of thoughts and habits form groups of systems, as for instance, in those cases where home and club life are used to serve business aims or where business enterprises and social life are subservient to the dominant habits of home life. A man's specialty or skill may be

(1) Bryan and Harter, *Studies on the Telegraphic Language*, loc. cit., pp. 360-361.

(2) Hughlings Jackson, *Remarks on Evolution and Dissolution of the Nervous System*, *Journal of Mental Science*, April, 1887, pp. 25-48.

(3) Flechsig, *Gehirn und Seele*, Leipzig, 1896.

(4) Ross, *Diseases of the Nervous System*, 1885, p. 83, ff. Burk, *From Fundamental to Accessory in the Development of the Nervous System*, *Pedagogical Seminary*, Vol. VI (1898), pp. 5-64.

(5) Ribot, in his *Diseases of Will* (1894), p. 113, also discusses hierarchic co-ordination.

a system quite different from that of his religion or artistic life, his common sense being usually a special system of uncommon sense or skill in some line of thought or action. His success is tantamount to the organization of his groups of systems of habits in such a way that they are a factor in the public service. "Profligacy consists not in spending, but in spending off the line of one's career." *In der Beschränktheit zeigt sich der Meister*. Without the monarchistic constitution in the organization of habits one's actions are unstable as water, or remind us of the eternal rolling of a Sisyphus stone.

"It is striking how easily dexterities are acquired, if sufficient limitation is exercised. One-sidedness produces virtuosity. He who admires a spider for spinning his web, should bear in mind how limited his other faculties are. Nor should he forget that the spider did not learn his art himself, but that it was acquired slowly by innumerable generations of spiders and that this art is almost all they learned. Man takes to his bow and arrow if his nets fail to catch him food, but the spider must starve." (1)

Character may be said to be the sum total of our habits. As such only an infinitesimal part is present in consciousness at any time, different habits and different systems functioning at different times. Thus the major part of character is latent or potential, the present thought and action being a function of that potential character. As in the kaleidoscope, only one system is in view at a time. At one time Dr. Jekyll and at another Mr. Hyde is in the ascendancy. The electric light is turned on in this room of the mansion while the others are in the dark; as the servant passes through the different rooms each room is lit in turn but is left to darkness the moment she leaves one room for another. This explains the many-sidedness of our natures, the different aspects of our characters which we manifest to our friends at different times, many inconsistencies of conduct, changing ideals in life, alternating personalities, conversion of opinion, and many similar matters. (2)

This organization into systems extends also to the extra-organic. One who is master of himself uses his sense and motor organs as tools and instruments for the furtherance of some higher plan. In the same way tools and instruments, animals and human beings are systematized in the carrying out of great commercial plans. Nevertheless the master in any field of activity must transform his lieutenant from a mere dependent and tool into a sympathetic participant in the fortune and honor of his establishment, must open the path to individual promotion, must give to industry and genius their legitimate share and must make his force of men and mechanics a co-operative band of willing workers aiming at the accomplishment of the ideals and purposes of the whole system. Good school government is obviously based on the same idea. The hierarchical system of organization is but the universal principle of the division of labor.

3. *Habit and interest*. The theory somewhat generally accepted by psychologists that pleasure is the psychical accompaniment of the discharge of surplus-stored energy and that pain is the accompaniment of an abnormal discharge due

(1) Ewald Hering, *Memory as a General Function of Organized Matter*, Open Court Co., 1895.

(2) Note the derivation of such words as morality, ethics, habit, character, etc., etc.

to excessive stimulation or drain on the reserve (1), is, if true, pedagogically very interesting on account of the conclusions which may naturally be drawn from it. It may be taken for granted that surplus-stored energy will tend to accumulate in those nerve cells and muscles which function habitually. This increased function will, up to a certain limit, be accompanied by increase in strength, assimilative capacity and directive power; that is to say, the habit will be accompanied by greater pleasure, and on the psychological side the interest becomes more and more dominant and imperious. *The interest is, however, the sign and symbol of the underlying controlling habit.*

Progressive habituation often produces pleasure and interest. Kipling's *Galley Slave* is an instance of Rousseau's saying that slaves lose all in their chains; even a desire to leave them, and that tranquillity of life can also be found in a prison.

"But to-day I leave the galley and another takes my place;
There's my name upon the deck-beam—let it stand a little space.
I am free—to watch my messmates beating out to open main
Free of all that life can offer—save to handle sweep again.

By the brand upon my shoulder, by the gall of clinging steel,
By the welt the whips have left me, by the scars that never heal,
By eyes grown old with staring through the sun-wash on the brine,
I am paid in full for service—would that service still were mine!"

The prisoner of Chillon says,

"I learned to love despair.
* * * * *
My very chains and I grew friends,
So much a long communion tends
To make us what we are:—even I
Regained my freedom with a sigh."

Interests are therefore indicative or symbolic of habits and of growing capacities. *We do not things because they are interesting, but because they are habitual.* Imperious interests are imperious habits.

Habits may also be imperious without being interesting, for in addition to the instincts, reflex acts and secondarily automatic activities which may be unaccompanied by consciousness, the somewhat general consensus of physiological psychologists may be cited in support of the view that there are perceptions and ideas and accordingly habits, which are unaccompanied by either pleasure or pain. A pedagogy or an ethics built on the basis of interest is, therefore, not only incomplete in so far as it omits those acts which are indifferent to pleasure and pain—a large part of life—but also is deficient in causal explanation. Its analysis is not ultimate. It deals with signs and symbols—pleasure and pain—and not with the underlying controlling factors, *viz.*, habits. A calculus of pleasure must give way

(1) It is a common saying that a man is as old as his arteries. Many an individual in adult life lives on a lower level because of over-strain, never-ending examinations and demands too urgent for the organism still in its formative stages. The surplus energy and the consequent interest or zest in life are lacking. On the other hand a too superficial training in youth will produce similar results.

to a calculus of habit, and individual appreciation must give way to social service.

We follow our likings and inclinations because that is the way we are built. Function acts in harmony with structure. "It is because of this invariable experience of its moral and vital results that the new education follows the 'liking' of the boy; because 'liking' is in very deed 'the great ruler'; because it is here, in the real needs of our nature—in our need for struggle, conflict; in our need for expression, for creation; in our need for being of use, for taking a hand in the game; in our love of home, of country; because it is here, and not in the visible pedagogue, that we find the real schoolmaster, the stern, the inexorable one, the one who lays upon us the tasks that are really hard, who makes the calls upon our powers which they must hear and obey, and leaves in his track a more living power and a more far reaching and a firmer will." (1)

Every interest implanted means a habit implanted, and that means that the pupil becomes automatically progressive along that line. His interests are his teachers. He pursues ends of his own accord. This is the essence of the democratic idea: every man self-acting, his own teacher, an autocracy of each individual. The undemocratic forms of government treat the individual as an infant or as a potential political criminal. According to Hegel the history of mankind is a progress in the consciousness of freedom. Freedom, like Protestantism, may possibly be defined as doing what you please, following your interests, likings or habits. Whether those habits are determined in their nature, members of an all-embracing causal chain, would still remain a matter of investigation; some writers, however, claiming that determinism and free will are like the lion and the lamb lying down together—with the lamb inside the lion.

Spinoza, in the same spirit, endeavors to explain psychologically this feeling of freedom by citing facts in support of his statement that we think we are free because we are ignorant of the causes of our actions. There is certainly a manifest difference between those acts which are performed because of external compulsion and those performed because of individual initiative, interest or habit. The scientific justification for freedom and democracy evidently lies in the fact that men, allowed to follow their "bent," capacity or interest, will accomplish more than if subjected to external compulsion. Some will fail, others will become "cranks" and idiosyncracies, but in the long run the progress of the mass will probably be greater.

Habit and interest also play an important role in the acquisition of knowledge. One of the prime conditions necessary for the attainment of knowledge is that new facts be associated with the facts already attained. Isolated facts possess little foothold in memory. If, therefore, the interests or habits of the pupil be aroused to such an extent that he thinks over the new facts (psychologically speaking, associated ideas are aroused), then the new facts are attached or linked to the older system and will henceforth belong to that system. In the associational life of the individual, isolation means oblivion. Organization or incorporation into systems means everything. Appealing to past habits is simply linking or grafting on new facts to older systems. A prime pedagogical

(1) Joseph Lee, Münsterberg on the New Education, Educational Review, Sept., 1900, p. 137.

necessity, then, is to keep interests, i. e., older habits, aroused in every subject. To live without interest is to live without initiative; the throttle is closed and nothing but external compulsion will move the machine. One of the worst curses that can befall a nation or individual is what a German writer has called *verdammte Beduerfnisslosigkeit*. Instead, therefore, of barely assigning a new lesson, let the interests and needs of the pupil be first aroused by stirring up a problem, giving some interesting information, solving one of the new problems, asking pupils to hunt up all the information possible on the new topic, asking the pupils to tell the teacher the facts about the next lesson without her asking for them, etc., etc. Assimilation of new knowledge is not assimilation, it is a concatenation, combination, linkage—or in short, association. Let the old habit react on the new and the new becomes the old. “Any object not interesting in itself may become interesting through becoming associated with an object in which an interest already exists. The two associated objects grow, as it were, together: the interesting portion sheds its quality over the whole; and thus things not interesting in their own right borrow an interest which becomes as real and as strong as that of any natively interesting thing. The odd circumstance is that the borrowing does not impoverish the source, the objects taken together being more interesting, perhaps, than the originally interesting portion was by itself.” “From all these facts there emerges a very simple abstract program for the teacher to follow in keeping the attention of the child: Begin with the line of his native interests and offer him objects that have some immediate connection with these.” “Next, step by step, connect with these first objects and experiences the latter objects and ideas which you wish to instill. Associate the new with the old in some natural and telling way, so that the interest, being shed along from point to point, finally suffuses the entire system of objects of thought.” (1)

4. *The end of habit.* The end of habit should be social utility, a character devoted to social service. “Character means power of social agency, organized capacity of social functioning. It means social insight or intelligence, social executive power, and social interest or responsiveness.” (2) That man is therefore educated who knows and feels the needs of society, has the ability to promote them, and has the willingness and disposition to do so. “As to methods,” says Dr. Dewey, “this principle”—that man exists for society, and that the school should be a social community which reflects and organizes the fundamental principles of all community life—“when applied, means that emphasis must be upon construction and giving out, rather than upon absorption and mere learning. We fail to recognize how essentially individualistic the latter methods are, and how unconsciously, yet how certainly and effectively, they react into the child’s way of judging and of acting. Imagine forty children all engaged in reading the same books, and in preparing and reciting the same lessons day after day. Suppose that this constitutes by far the larger part of their work, and that they are continually judged from the standpoint of what they are able to take in a study hour, and to reproduce in a recitation hour. There is next

(1) James’ Talks to Teachers (New York), 1899, pp. 94-96.

(2) Dewey, Third Year Book of the National Herbart Society.

to no opportunity here for any social or moral division of labor. There is no opportunity for each child to work out something specifically his own, which he may contribute to the common stock, while he, in turn, participated in the productions of others. All are said to do exactly the same work and turn out the same results. The social spirit is not cultivated—in fact, in so far as this method gets in its work, it gradually atrophies from lack of use.” (1)

To be of social service, habits of expression must be cultivated in order to utilize the habits of impression. As James puts it, “No reception without reaction; no impression without correlative expression—this is the great maxim which the teacher ought never to forget. An impression which simply flows in at pupils’ eyes or ears, and in no way modifies his active life, is an impression gone to waste. It is physiologically incomplete. It leaves no fruits behind it in the way of capacity acquired. Even as mere impression, it fails to produce its proper effect upon the memory; for, to remain fully among the acquisitions of this latter faculty, it must be wrought into the whole cycle of our operations. Its *motor consequences* are what clinch it. Some effects due to it in the way of an activity must return to the mind in the form of the *sensation of having acted*, and connect itself with the impression. The most durable impressions are those on account of which we speak or act, or else are inwardly convulsed.” (2)

“When we turn to modern pedagogics, we see how enormously the field of active conduct has been extended by the introduction of all these methods of concrete object teaching which are the glory of our contemporary schools. Verbal reactions, useful as they are, are insufficient. The pupil’s words may be right, but the conceptions corresponding to them are often direfully wrong. In a modern school, therefore, they form only a small part of what the pupil is required to do. He must keep notebooks, make drawing, plans and maps, take measurements, enter the laboratory and perform experiments, consult authorities and write essays. He must do in his fashion what is often laughed at by outsiders when it appears in prospectuses under the title of “original work,” but what is really the only possible training for the doing of original work thereafter. The most colossal improvements which recent years have seen in secondary education lie in the introduction of the manual training schools; not because they will give us a people more handy and practical for domestic life and better skilled in trades, but because they will give us citizens with an entirely different intellectual fibre. Laboratory work and shop work engender a habit of observation, a knowledge of the difference between accuracy and vagueness, and an insight into nature’s complexity and into the inadequacy of all abstract verbal accounts of real phenomena, which, once wrought into the mind, remain there as life-long possessions. They confer precision; because if you are *doing* a thing, you must do it definitely right or definitely wrong. They give honesty; for, when you express yourself by making things, and not by using words, it becomes impossible to dissimulate your vagueness or ignorance by ambiguity. They beget a habit of self-reliance; they keep the interest and attention always

(1) Dewey, Third Year Book of the National Herbart Society.

(2) James, loc. cit.

cheerfully engaged, and reduce the teacher's *disciplinary* functions to a minimum." (1)

It is also true, on the other hand, that excessive kinesis prevents formation of steady, persistent, consecutive habits of thought, just as excessive aesthesis tends to form a "walled-up" mind without executive power and hence without utility. A true character, like true ideas, is composed of habits (ideas, feelings and actions), which are really successful habits, habits which prove themselves socially fruitful. (2)

II. SOME RECENT EXPERIMENTAL CONCLUSIONS ON PRACTICE AND HABIT. (3)

1. *Expenditure of Nervous Energy*—Nervous energy discharged in a part of the brain by peripheral or central stimulation tends to cause a diffusion of nervous impulses over other nervous areas. Thus the tickling of the feet may start nervous impulses to every part of the nervous system. A telegram may cause great visceral and emotional disturbances. A small amount of strychnine introduced into the system will aid this process of nervous diffusion, causing quicker reaction and often irritability. Nervous weakness, epilepsy, etc., are conditions favorable to diffusion. This diffusion of nervous impulses, normal and abnormal, is the physiological basis of association of ideas and actions, and is thus a fundamental factor in our psychological life.

2. *Specialization in Diffusion*—Instead of a chaotic diffusion, nervous impulses may gradually take definite channels, following lines of least resistance. Inherited reflexes and instincts and formerly acquired habits may outline the growth of such paths or habits. The establishment of such paths means a limitation of the diffusion and an increase of the amount and force in the definite specialized channels thus established. With progress in habituation this energy expended may in time be limited or increased to meet the requirements of the case.

"Practice makes perfect" means no waste by diffusion, and the least expenditure of energy needful. (4) Martin's description of the education of the spinal cord is in point here. "Much of what is called educating our touch or our muscles is really education of the spinal cord. A person who begins to play the piano finds at first much difficulty in moving his fingers independently; the nervous impulses from the brain to the cord radiate from the spinal centers of the muscle which it is desired to move, to others. But with practice the independent movements become easy. So, too, the localizing power of the skin can be greatly increased by exercise, as one sees in blind persons who can often distinguish two stimuli on parts of the skin which are so near together as to give

(1) James' Talks to Teachers (New York), 1899, p. 36.

(2) Cf. Georg Simmel, Ueber eine Beziehung der Selectionslehre zur Erkenntnistheorie, Archiv. f. sys. Philos. Bd. 1, Heft 1, p. 34.

(3) Reprinted by courtesy of the editor of the Journal of Pedagogy (Vol. XIV, No. 3).

(4) Note the similarity of phenomena in physiological, economic and territorial division of labor.



to other people only one sensation. Such phenomena depend on the fact that the more often a nervous impulse has traveled along a given road in the gray matter, the easier does its path become, and the less does it tend to wander from it into others. We may compare the gray matter to a thicket; persons seeking to beat a road through from one point to another would keep the same general direction, determined by the larger obstacles in the way, but all would diverge more or less from the straight path on account of the undergrowth, tree trunks, etc., and would meet with considerable difficulty in their progress. After some hundreds had passed, however, a tolerably beaten track would be marked out, along which travel would be easy and all after-comers would take it. If instead of one entry and one exit we imagine thousands of each, and that of the paths between, certain have been often traveled, others less and some hardly at all, we get a pretty good mental picture of what happens in the passage of nervous impulses through the gray matter of the cord; the clearing of the more trodden paths answering to the effects of use and practice. The human cord and that of the frog must not, however, be looked upon as pathless thickets at the commencement; each individual inherits certain paths of least resistance, determined by the structure of the cord, which is the transmitted material result of the life experience of a long line of ancestry." (1)

3. *Law of Short Exercise*—A short exercise often repeated is preferable to long drawn-out practice for the rapid development of accurate adjustment of the muscles. Long uninterrupted practice at writing, drawing, piano playing, etc., wastes time and energy, cultivates inattentive habits and strengthens those wrong variations and adjustments which tend to gain a place in the chain of unconscious reactions. (2)

4. *Law of Greatest Initial Gain*—The greatest gain in rapidity and regularity of muscular action is made during the first periods of exercise; the rate of progress diminishes as practice continues at each experiment, as well as at successive experiments. (3) As the muscles come more completely under control, the influence of practice becomes less during each experiment. The "curve of practice," *i. e.*, the curve of change for a continuous experimental session, seems to be very similar to the "curve of habit," *i. e.*, the curve of change for successive sessions. In both alike the gain is most rapid in the first part of the exercise. In the latter part of the exercises progress is less perceptible; it is the stage of the expert. The experiments of Ebbinghaus and others in the learning of nonsense-syllables all bear out the same law. (4) Consciousness as an accompaniment of the habit tends to disappear the more automatic the habit becomes, the reason probably being that the nervous resistance gradually be-

(1) Martin, *Human Body*, pp. 580, 581.

(2) W. Smythe Johnson, *Researches in Practice and Habit*, 1889. Yale University Thesis, pp. 25, 14-25, 51.

(3) *Ibid.* pp. 14, 17. This has a causal connection with one of the laws of muscular work: "When a muscle begins to contract, it can lift the largest load; as the contraction proceeds, it can lift only a less and less load, and when it is at its maximum of shortening, only relatively very light loads." (Landois-Stirling, p. 606, Vol. II., 4th Ed.)

(4) Ebbinghaus, *Grundzüge der Psychologie*, Bd. I, Theil II. Pp. 624 ff.

comes less during the growth of the habit. "Man wird täglich dummer, aber brauchbarer," as a Badischer Beamter puts it.

5. *Law of Minimum Gain*—A minimum gain in rapidity during any practice period seems to be the best condition for impressing a habit upon the nervous system. The decrease of mal-adjustments, disadvantageous variations and hence probable error, is noticeable in a process of steady habituation as compared with a process in which spasmodic accelerations take place. (1) To attain the standard aimed at in the practice each error has to be rectified and a new habit begun. Thus three units of time (1) the time lost in the establishment of the error which might have been employed in acquiring the correct habit, (2) the time occupied by the obstructiveness of the bad habit, and (3) the founding of the new habit in the face of the old one, are taken where only one unit was necessary. Add to this the uncertainty of future behavior due to the persistence of the bad habit. It must be remembered that habits remain with us, though latent, even if they are superseded by better ones. If the subject puts forth the greatest effort in the beginning of an experiment, the error is correspondingly greater in the first part. But when the special effort is relaxed, muscles revert to their more accustomed speed of adjustment, and at the same time become more regular in their functioning. Ebbinghaus, in his experiments with nonsense-syllables, (2) discovered a psychological law which may have decided bearings on pedagogical practice. In the learning of a row of twelve nonsense-syllables, sixty-eight repetitions, each repetition immediately following its predecessor, were found to be less advantageous than thirty-eight repetitions of another row, which repetitions were distributed over three successive days. In other words, a distribution of the effort over several days with a relatively small amount of effort expended each day involves less effort in the sum total and a better result than the massing of effort at one period of time. G. E. Mueller, Jost, and Pilzecker have also confirmed these results by other experiments. (3) Jost also proved that the result was not due to fatigue in the case of the massing of the effort at one time. He also found that the results of the distribution of effort over a larger area of time was still more advantageous, *i. e.*, two repetitions on twelve successive days was better than eight repetitions on three successive days.

For pedagogical practice this is obviously important. The student reviews in the morning that which he has learned over night; the teacher holds numerous reviews and quizzes, and even the much abused examination receives some justification. The advertiser insists this week on what he insisted last week, and you are now quite firmly convinced that what he says is true, although you have never made a personal examination.

6. *Practice and Attention*—"The practice at each sitting should last only so long as the movements are purposely directed." (3) "Purposeful attention and persistent effort on the part of the subject are the two most essential ele-

(1) Yale Psychological Studies, loc. cit., p. 9.

(2) Ebbinghaus, *Grundzüge*, etc., pp. 629 ff.

(3) Jost. Die Associationsfestigkeit in ihrer Abhängigkeit von der Verteilung der Wiederholungen. *Zeitschr. f. Psych.* Bd. 14, S. 436. Mueller u. Pilzecker, Experimentelle Beiträge zur Lehre vom Gedächtnis, *Zeitsch. f. Psych., Ergänzungsband.* 1, 1900.

ments in practice for the establishment of any definite mode of muscular action." (1) This seems to be true especially of the beginning of practice, but towards the end, when the feelings and actions of an expert begin to manifest themselves, I venture to suggest that attention and consciousness may be at times harmful. In the first stages, however, attention means both an excellent nutritional condition of the muscles and nerve cells and excellent powers of co-ordination of movements to definite ends. Practice produces a more lasting and accurate habit when the muscles and nervous system are in an excellent condition of metabolism. Fatigue and weariness render success almost impossible. (2)

7. *Advantage of Muscular over Sensorial Reaction*—In so-called reaction time experiments, a technical term for those experiments in which the time is measured which elapses, to take one example, between, say, the perception of a sound and one's reaction to it by pressing a reaction-key—there is a decided difference in time between the sensorial reaction type and the muscular reaction type. In the "extreme muscular" type, as Lange, its first observer, called it, the attention of the person reacting is kept on the finger which is about to press the key as soon as the sound is perceived; in the "extreme sensorial" type the attention is kept on the sound-signal. Herr Lange's own muscular time averaged 0".123; his sensorial time, 0".230.

May not the fact of this difference in reaction be important pedagogically in so far as attention to the motor reaction rather than to the suggestion or copy produces greater rapidity, more correctness and less irregularity? Since suggestion and imitation play such important rôles the matter is worthy of more extended experimental investigation and possible application.

8. *Summation of Stimuli*—By this is meant that a single weak stimulus, which is of itself incapable of discharging a reflex act, may, if repeated sufficiently often, produce this act. The single impulses are conducted to the central nervous system, in which the process of summation takes place. So far as purely reflex acts are concerned, Rosenthal found that three feeble stimuli per second are capable of producing the effect, although sixteen stimuli per second are most effective. (3) W. Stirling, according to Landois-Stirling, has shown it to be extremely probable that all reflex acts are due to the repetition of impulses in the nerve centers. (4) The psychological experiment is well known of stimulating the leg of a brainless frog a number of times if the first stimulation does not succeed.

The sound of a doorbell may not call up much of a motor response, but repeated often (Halloween night) may cause a very considerable response. A slight tickling when one is asleep or awake may, if continued, produce convulsive responses. "To strike a horse repeatedly on the same spot is to invite him to kick." Continued dropping of water from a faucet during the night, or the intermittent sounds of a mouse gnawing, produce extreme irritability.

(1) Yale Psychological Studies, p. 25.

(2) *Ib.* p. 16.

(3) See Landois-Stirling, Vol. II, 606-617, on the conditions of muscular activity.

(4) Landois-Stirling, Vol. II, p. 785 (4th Ed.).

Stories of ingenious systems of torture of a similar nature for prisoners will readily occur to the reader. Repeated losses, as, *e. g.*, Job's, continued insults, mannerisms, especially of those one dislikes, continued criticism of one's personal appearance, continued disobedience of one's requests in classroom work, old songs, old stories, etc., are instances in point. Continued acts of kindness and love or of hate produce eventually a strong and steady disposition in the recipient. Similarly with repeated dreams in the minds of the nervous or superstitious.

Nagging is one continuous *jerking* at the reins of authority. Nerves are said to be "worn to a frazzle" by this unintermittent process. The sheer exhaustion of patience is a popular equivalent for the scientific phrase of summation of stimuli. The process is the same in the irritation produced by, say, an ill-fitting garment, as it is in the rebellious thoughts induced by the small talk and small thoughts of a more or less constant companion. Nagging often originates in an excessive narrowing or widening of interests. Too many duties are assumed, or there are not enough on which the full tide of vital activities can be expended. In the one case exhaustion supervenes, and in the other the horizon is filled with petty trifles and wrong perspectives.

This law is of wide general application, as is evidenced by a multitude of facts. In the schoolroom the teacher's loud voice, nagging, slovenly dress or gait, mannerisms of speech and gesture, tone of voice, low ideals of thought and behavior may finally cause a very decided revulsion. The steady persistence of higher types of thought and feeling will as surely culminate in action. Good examples should act as the drama acts, by suggestion rather than by homily. A confiding young son once told his father that he didn't like his Aunt Jane. When asked the reason he said, "Oh, she's always talking about G-a-w-d." In approaching a German theater one generally meets a number of vendors of the programmes or of the words of the play. One approaches the first of them with a confident shake of the head, but by the time the last one is reached, confidence has collapsed and the summation of stimuli has accomplished its mission. The psychology of advertising shows many evidences of this law. "Pears' soap is the best." Temptation in all its forms usually works by the summation of stimuli. The young man of slight moral resistance, on his way home in the evening, passes through one, it may be two, streets of saloons; in the third street his inhibitory power is exhausted and he passes helplessly through the doors.

9. *Cross-Education*—Training of one portion of the body trains at the same time the symmetrical part and also neighboring parts. (1) Volkmann relates (2) experiments showing that practice of the finger tip of the left hand increases the fineness of the touch of the finger-tip of the right hand, but does not increase that of the left forearm. Practice on the third phalanx increases

(1) E. W. Scripture, Theodate Smith and Emily M. Brown, in *Yale Psychological Studies*, Vol. 2, pp. 114-119, 1894.

(2) Volkmann, *Ueber den Einfluss der Uebung auf das Erkennen rauemlicher Distanzen*, *Ber. d. k. Sächs. Ges. d. Wiss., math.-phys. Kl.* 1858, X38.

the fineness on the first phalanx. Fechner (1) relates an observation by Weber on the ability to write with the left hand obtained by learning with the right hand. Fechner states that practice in writing the figure nine backwards with the left hand frequently caused him involuntarily to write the nine backward when he used the right.

These observations, says Scripture, seemed of sufficient importance to justify a further inquiry regarding the general law of education followed by our muscular abilities, and also regarding the possibility of what he briefly calls "cross-education." His conclusions were that the increase of steadiness of movement due to practice is not limited to the control of the muscles immediately trained, but affects the control of the corresponding muscles on the opposite side of the body. This training seems to be of a psychical rather than of a physical order and to lie principally in steadiness of attention. (2)

Scripture's hypothesis (3) for explaining cross-education is, "physiologically speaking, that the development of the center governing a particular member causes at the same time the development of higher centers connected with groups of members, psychologically speaking, development of the will power as a whole." Diffusion of nervous energy into neighboring nerve cells following most accustomed paths, *i. e.*, lines of least resistance, seem to explain to a large extent these phenomena of cross-education. (4)

10. *The Law of the "Plateau"*—Bryan and Harter, in their experiments on habit (5), claim that the improvement in learning to receive telegraphic messages, while rapid for a time, ceases at a point just below the required proficiency, to be followed later by a stage of more rapid improvement. "For many weeks there is an improvement which the student can feel sure of, and which is proved by objective tests. Then follows a long period when the student can feel no improvement and objective tests show little or none. At the last end of the plateau the messages in the main line are, according to the unanimous testimony of all who have experience in the matter, a senseless clatter to the student, practically as unintelligible as the same messages were months before. Suddenly, within a few days, the change comes, and the senseless clatter becomes intelligent speech. W. S. Johnson affirms that the "plateaus" mentioned by Bryan in the habit curve would seem rather to indicate resting periods in the effort. If the subject can be induced to sustain the same effort day by day, there will not be any "plateaus" in the habit curve. (6)

- (1) Fechner, *Beobachtungen, welche zu beweisen scheinen, dass durch die Uebung der Glieder der einen Seite die der anderen zugleich mitgeuebt werden*, *Ber. d. k. Sächs. Ges. d. Wiss., math.-phys. Kl.*, 1858, X. 70.
- (2) Scripture, Smith and Brown, *op. cit.*, p. 118.
- (3) Scripture, *Recent Investigations in the Yale Laboratory*, *Psych. Rev.*, 1899, VI. 165.
- (4) Note the similarity in Pflueger's *Laws of Reflex Action*. Note also the experiments of Urbantschitsch and Patrick's observations on right-handedness in the *University of Iowa Studies in Psychology*, Vol. I, 1897. For further observations the reader is referred to Walter W. Davis, *Researches in Cross-Education*, *Studies from the Yale Psychological Laboratory*, Vol. VI, 1898, and Vol. VIII.
- (5) Bryan and Harter, *Studies in the Physiology and Psychology of the Telegraphic Language*, *Psych. R.*, Vol. IV, No. 1, p. 52.
- (6) *Loc. cit.*, p. 33.

11. *The Law of Sudden Attainment*—After some study practice and experimentation (period of trial and probation) the goal of the effort is suddenly attained, the *knack* is acquired, the expert emerges from the novice stage. In the experimental stage the nervous energy seems to be diffused at random for some time, partial habits are formed, but the paths are not complete enough for easy action. Other and older habits perhaps tend to drain off the energy diffused, thus weakening the growing habits. This is instanced by the worry and confusion of thought of a business man. Small details will appear as important as the main items, but let him sleep over the matter and in the morning his affairs will appear in their true proportions. In the acquirement of a new language many persons experience this feeling of sudden mastery. Religious conversions are often but the culmination of long but concealed effort. Joy comes with the cessation of the inhibitory processes and with the final establishment of the habit. No man can serve with joy two masters. In matters of courtship the young man often says, "It seems I have known her for years." His long cherished ideals have suddenly met their realization. Habits of thought are freed from their inhibition and joy is the result.

12. *Gain in Rapidity and Accuracy through Rhythm*—Energy is saved, time gained, accuracy increased and amount of product enlarged by rhythmic movements. If the output of energy is so regulated that it follows a certain proportion and so regulated that the beginning and end of a movement always lie between the same spatial and temporal boundaries, we have the essence of habit and practice. Habit and practice largely mean equal intervals occupied by movements and equally strong movements of the same muscle or group of muscles. Proportion is its main characteristic. When freed from interference by the higher centres and the will the proportion in expenditure of time and energy is likely to be better maintained by the lower centres. When influenced by the higher centres (intelligence), the movement is likely to be hindered or accelerated by other ideomotor associations. Fatigue, a subjective measure of work performed, is less likely to arise the more practiced and habitual the movement may be. Fatigue more easily ensues when the amount of energy expended is at one time too great and at another time too small and when the intervals are irregular, demanding extra adjustments, etc. (1)

In the progress of socialization of the race through technic we see the same influence of rhythm. It is well known that the machine is useful because it saves time and labor but does this because of its rhythmic action. It can only enter with profit where movements are repeated with due uniformity, with the greatest rapidity, and where often the action of one part of the machine is but one instance out of a thousand similar ones in the same machine (*e. g.*, spinning in a wool factory). (2) The machine must be freed from causes of irregularity, such as change of material, change of caprice in the mind of the operator, etc. The

(1) Karl Buecher, *Arbeit und Rhythmus*, pp. 26-26.

(2) Schmoller, *Grundriss der allgemeinen Volkswirtschaftslehre*, Erster Theil, S. 219: "Die Uniformierung, Mechanisierung, hoechste Beschleunigung, und vollendete Praecision, welche das Wesen des machinellen Arbeitsprozesses charakterisiert, wird wohl die ganze Volkswirtschaft indirekt beeinflussen; tiefgreifend umbilden wird sie nur bestimmte, freilich sehr erhebliche Teile."

machine presupposes many parts performing their individual tasks (division of labor) and on the part of the object manufactured a division into many parts which can be made separately. Under these conditions the machine has revolutionized society. Inasmuch as the machine is an extension of the apparatus of the body, that which has been said of the machine may be inferred to be also largely true of the body.

13. *Law of the Greatest Attainment through Freedom*—A generation ago it was the accepted theory of educators generally that instruction, to be most effective, should cross the grain of the youthful mind; that if disinclination were shown to any particular study, the teacher should catch at this as his welcome clue; and that the scholar should thereafter be practiced and drilled, for his mind's good, against his indifference, his dislike, and even his repugnance, until he should learn to do well and freely that for which he had originally the strongest inaptitude. In a word, indisposition towards any kind of mental exercise was to be dealt with like a sinful inclination; war was to be made upon it until it should be conquered. Not only a better observation of life, but the study of physiological psychology, has led the educators of today to a widely different view of the office of instruction. It is now generally admitted that it is the first duty of the teacher to ascertain the true bent of the youthful mind, and that, so far as practicable, instruction should be made to conform thereto; that the successful teacher is not the one who compels the scholar to do at the last reasonably well that which he was at the first least disposed to do, but the one who brings the scholar to do, in the fullest degree and in the most perfect manner, that for which he has the greatest aptitude, leading him, with ever increasing freedom and pleasure of work, in the way which nature has pointed out; that in any other system of training there is enormous and irreparable loss of nervous force and moral enthusiasm, with the result certain to be lower and less desirable than the system which seeks to develop to their highest efficiency the native powers of the mind. (1)

14. *The Law of Adequate Exercise*—"I desire to challenge peremptorily," says General Walker, "the whole policy of giving out exercises of any appreciable degree of logical difficulty to children of an early age, thoroughly convinced that such a practice involves, to repeat the phrase already used, bad psychology, bad physiology and bad pedagogics." (2) General Walker further says, "The notion that exercises, either mental or physical, prescribed for young children, should be often up to the full limit of their powers and should at times exceed those powers, is distinctly false. The true gymnastic for the growing child is through exercises easy and pleasant, which lead insensibly up to ever higher planes of attainment, as the faculties are expanded and strengthened, according to their own law of growth through gentle and agreeable exercise. Wherever fatigue, confusion and the sense of strain begin, there the virtue of the exercise ceases, whether for the promoting of the powers as they exist or for creating new powers. Loss and waste—it may be much, it may be little—begin at this point, and go forward from this point, at a constantly accelerating ratio.

(1) General Walker, *Discussions in Education*, p. 225.

(2) *Ibid*, p. 226.

In college, thirty years ago, those of us who were given to athletics were accustomed to use heavy dumb-bells, the heavier the better. Twenty-four and thirty-two pounders; the famous "fifty-sixes" and even eighty-pound dumb-bells were much in favor with young fellows who desired to become strong. Today a prize fighter preparing to contest the championship of the world uses, habitually very light dumb-bells, just heavy enough to give a purpose to his blow, and to be distinctly felt at the end of the strokes. He makes with the light bell ten strokes to one he would make with the heavy bell, and gets twice as much good from the exercise. If this be the part of wisdom for the grown giant, overflowing with the exuberance of his strength, much more is such a course desirable in the case of the young, tender children, yet in the gristle, the frame and brain still plastic and yielding, with the possibilities of manhood and womanhood but dimly intimated.

Whether for the promotion of future growth, or for the training of the powers as they are, or for the acquisition of the inestimable art of rapid and accurate computation, school exercises in arithmetic should, in the opinion of the Boston Board, be easy and simple, with the resulting advantage of becoming more frequent than is possible, within any reasonable limits of time, in the case of the highly complicated and difficult sums and problems with which the traditional gymnastics deals." (1)

The experimental evidence derived from the labors of Ebbinghaus, G. E. Mueller and others with the learning of nonsense-syllables proves unmistakably the harm and danger arising from the imposition of excessively large burdens on the student. The "sums" and problems which even the "master" of the country school could hardly solve are mostly delightful memories of the "good old times" and are fortunately disappearing along with the head-splitting "lessons" and unexplained assignments of the next "ten pages." From the experiments of Ebbinghaus and others it is surprising to note the confusion, disorder and perplexity which arises when the number of syllables in each row is increased only a small amount over the largest number which the mind can master after having them once presented. In such a case the mind is not able to retain even as many syllables as were attained when the rows possessed fewer syllables. *A priori* one might imagine that at least as many syllables would be retained while the excessive syllables would be omitted, but in reality the inability to master the excessive number injures also the ability for the lesser and the number of syllables reproduced after one view of them decreases very rapidly. While, for example, a row of six nonsense-syllables can be reproduced correctly almost without exception, after having once been seen, a row of twelve such syllables can only be reproduced in its first and last number? The subjective certainty also decreases with increase in number of syllables, the whole row being gradually mastered in parts. Individual parts once mastered are being continually brought into confusion by other parts not yet mastered. (2) This confusion introduces inaccuracy of judgment as may be seen from Bolton's experiments on memory in school children. He found that there is an apparent tendency to over-estimate the number of ideas presented to

(1) General Walker, Discussions in Education, p. 251.

(2) Ebbinghaus, Grundzuege der Psychologie. Bd. I. Th. II, p. 624.

the mind, when the number of ideas is slightly greater than the memory span; but the general rule is to under-estimate the number. (1)

15. *Attainment and Nutrition*—In a poor state of health, weakness or fatigue, more mistakes are possible, and consequently more time and energy are wasted. Slovenly habits of thought and action are generated. "Perfect inhibition is the sign of perfect health." Associated ideas and movements fail to appear, and maladjustments of various kinds occur. Visitors to foreign countries when fatigued tend to lose command of the language of the country they are visiting. Aphasia is increased in fatigue. What is learned in a state of fatigue is soon lost. Chronic fatigue produces introspection and consequent loss of objective associations. Social service is thus impaired. Inability or dislike to bearing responsibility is another way of saying the same thing. In weakness inattention gradually merges into abulia.

Fatigue rapidly ensues when the work is distasteful. Maggiora has shown that more can be accomplished without fatigue when the work is properly adjusted. Again, damp, muggy days, certain seasons, the time of day, etc., influence the working capacity of the organism, its interests and its attainments.

Weariness comes to a muscle, not because so much capital has been spent, but because it has been spent at too quick a rate. Its expenditure is greater than its income. Whether a muscle wearies or not with action, and how soon it wearies, will depend not so much on how much work it is called upon to do as on whether or no the expenditure involved in the work outruns the income. You may take a weak muscle, that is to say, a muscle with a scanty store of available living stuff, and a strong muscle, that is to say, one with an ample store; and by timely calls upon the weak one, and an imperious sudden demand on the strong one, you will get much work from the former, leaving it still fresh, while the latter is wearied before it has done a little of the work of the first. (2)

16. *Warming Up*—Initial or preliminary practice may often induce fatigue. After a short rest, however, better work, greater rapidity, and a greater amount of work can be attained than in the beginning of practice. This does not seem to be of universal application, but it is a quite general phenomenon. It may be noticed for instance in animals. Dogs on the chase, animals pursued, and especially race horses, show the effect of warming up.

Athletes, for example, ball-players, realize the importance of practice just before the game. A pitcher will hardly enter the box until he has his arm in working order by a few minutes' practice. Orators are often dull at first, but warm up. Experiments performed by E. G. Lancaster in lifting a weight with the index finger show the effects of this warming process. In the initial practice the subject did not lift more than 800 grams before the warming up occurred. In one instance the subject's warmed-up curve with 600 grams was continued a long time and then additions were made until he was lifting 1,075 grams, which he raised to a good height until stopped by the operator. There was a feeling of muscular exaltation that made it a pleasure to lift the weight after the warming up occurred. In

(1) Th. F. Bolton, *The Growth of Memory in School Children*, Amer. J. of Psych., Vol. IV, No. 4, p. 380.

(2) Sir Michael Foster, "Weariness," *Nineteenth Century*, September, 1893, p. 340.

studying the same phenomenon of warming up was observable. Religious services and school work beginning with musical exercise exhibit the same profitable preliminary practice.

According to Dr. Lancaster's experiments it is evident that persons "warmed up" in, say, an intellectual exercise, will show a warmed-up curve in physical exercise, although they may have rested physically up to the time of the physical experiment. (1)

17. *Influence of Age on Memory*—In learning nonsense-syllables, i. e., syllables consisting of a vowel between two consonants, an adult, according to Ebbinghaus (2) is able to memorize much larger rows of syllables than can children. To give a relative estimate, those at the age of 18-20 can reproduce approximately one and a half times as many syllables as those from 8 to 10 years of age. After completed bodily development the figures remain practically constant. Ebbinghaus relates that for 20 years the figures have remained the same for him. Within certain limits we can say that, beginning with the age of 13-15, the "curve of practice" and the "curve of habit" are repeated in what may be called the "curve of life," that is to say, the rate of progress is greater in the beginning, then gradually falling off to a level.

18. *Inaccuracy of Subjective Judgments*—The objective accuracy of a repeated or "reproduced" row of nonsense-syllables and the subjective conscious estimate of their correctness do not always, by any means, coincide. A row is repeated easily and smoothly as if one had nothing to do with it, and one is considerably surprised to be informed afterwards by the person conducting the experiment that it was wholly and completely correct. Quite frequently the opposite occurs; the pleasant consciousness that the row has been correctly repeated is later disturbed by the fact that one or more errors have been made. (3)

Similar phenomena were observed by Prof. Judd, in experiments with illusions. The gradual disappearance of the illusion owing to continued practice was not a matter of consciousness and hence it could be inferred that the effects of practice were not always to be judged by subjective opinion, but rather by objective results. (4)

In the general phenomena of weariness it is quite frequently noticeable that the subjective estimate does not tally correctly with the real state of the body. Neither does the subjective feeling of exaltation always indicate a favorable condition of metabolism in the body.

One of the most marked characteristics of modern progress is the substitution of extra-organic instruments and natural forces for the erring and uncertain sense and motor instruments of the human organism. The stress of the times is ever toward automatic precision and certainty.'

(1) E. G. Lancaster, *Warming Up*, Colorado College Studies, Vol. VII, 1898. For other researches bearing on this point of weariness and recovery the reader may be referred to Lombard's researches on *The Effect of Voluntary Muscular Contractions*, Amer. J. of Psychology, Vol. III, pp. 24-25. Lombard's experiments seem to point to the central nervous system as the seat of the successive rhythmic changes of weariness and recovery.

(2) Ebbinghaus, op. cit., p. 621.

(3) Ebbinghaus, op. cit., p. 623.

(4) C. H. Judd, *Practice and Its Effects on the Perception of Illusions*, Psych. Rev., Jan., 1902, p. 32.

THE LAW OF ACCELERATION AND INCREASE OF SENSORY STIMULATION.

ARTHUR ALLIN.

The fact that Pestalozzi's simple but wonderful intuitions have been followed by such magnificent fruit is ample testimony to the genius of the man. The school systems which have been founded upon his doctrine of sensory instruction are living monuments to the memory of this poor but genial Swiss. From the germs of his ideas and life have sprung the kindergarten, the laboratory method, nature study, manual training, and many other integral factors of our modern curriculum. His continual cry was one that has been echoed by nearly every pedagogical reformer since his day: *Das Fundament des Unterrichts ist die Anschauung*. "The foundation of education lies in sensory observation." "The first development of thought in the child," he said, "is very much disturbed by a wordy system of teaching." His demand that "We must psychologize instruction" (1) is but the fit and proper helpmate for the more recent demand, "we must socialize the school." Only in the union of these two complementary truths or processes can education be justified.

That which Pestalozzi discovered empirically and intuitively is based upon scientific truths. When he insisted persistently on personal observation and the acquisition of individual experience as a *sine qua non* of early education he was but following out the plan laid down by nature. Recent contributions of eminent histologists have given a scientific justification for this important pedagogic doctrine. It may be summed up as the law of Acceleration and Increase of Sensory Stimulation. This law on the physiological and anatomical side is the justification for laboratory methods, manual training, nature study and all object teaching.

From the investigations of Ramon a Cajal (2) and others it is known that between the sense-organs and the different regions of the cortex there exist closely connected chains of conductors or neurons by means of which one single impression taken up by one single element of the chain at the periphery is carried on, avalanche-like, by an ever increasing number of nerve cells until a very large number of nerve cells are excited in the cortex.

This appears to be a general law applicable to all the senses. Take for example the sense of sight. In the *fovea centralis retinae*, where visual acuteness

(1) "Ich will den menschlichen Unterricht psychologisieren."

(2) Ramon a Cajal, *Einige Hypothesen ueber den anatomischen Mechanismus der Ideenbildung, der Association und der Aufmerksamkeit*. Archiv für Anatomie und Physiologie, 1895. Also: *Sur la morphologie et les connexions des éléments de la rétine des oiseaux*. Anatomischer Anzeiger, 1889. Also: *Les nouvelles idées sur la structure du système nerveux* 2nd Ed., Paris, 1895. Also: The Coronian Lecture in Proceedings of the Royal Society, Vol. XV, London. Schwalbe, *Anatomie der Sinnesorgane*; Edinger and others.

is the greatest, one rod or cone affected by a ray of light carries the excitation over to a bipolar cell; this in turn conducts it further to a ganglion cell lying beneath it (cell of the ganglionic layer); this by means of its nerve prolongations branches out richly in the fore part of the corpora quadrigemina carrying the excitation over a considerable number of cell groups; finally the axis cylinders of these cell groups end in the occipital region of the cortex of the brain, where, by means of their branches, they come into contact with the bush-like endings of an innumerable number of pyramidal cells. Thus from a single impression received by a single cone, hundreds or perhaps thousands of nerve cells of a cortical area are discharged of their nervous energy.

The same process is observable in reference to the auditory apparatus. One or two hair cells of the Organ of Corti transmit the excitation of an acoustical nerve fibre (cell of the ganglion spirale of the cochlea), which on its side continues the excitation to the ventral acusticus nucleus of the medulla oblongata; here each acoustical root fibre by means of a bifurcation (Koelliker, Held and others) and numerous collaterals distributes the movement over numerous nerve cells. Each of the conductors or axis cylinders of the cells of the ventral nucleus runs to the corpus trapezoides of the medulla oblongata, where by means of their numerous collaterals, new series of neurons, which lie in the trapezium nucleus, the superior olivary body, the nucleus praeolivaris and the nucleus of the posterior corpora quadrigemina, enter into the chain of conduction; finally the excitation reaches the cortex, where it probably spreads over a considerable group of pyramidal cells.

This avalanche-like method of conduction is likewise observable, according to Ramon a Cajal, in the sense apparatus for smell. In fact, it appears to be a general arrangement for afferent nerves in general. Golgi, Cajal, von Lenhossek, van Gehuchten, Koelliker, Retzius and other well known histologists may be cited as authorities for these statements.

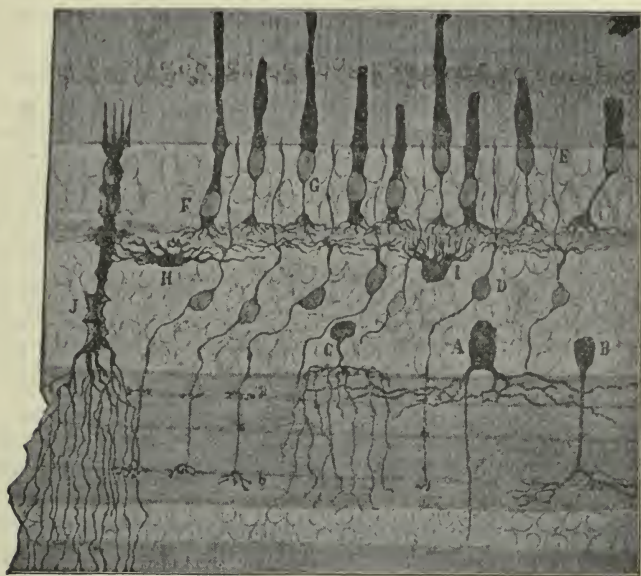
It is therefore evident that no matter how few the peripheral sensory cells may be which are stimulated, the number of pyramidal cells of the cortex set in motion by the excitation originating in the periphery is extraordinarily large. The physical basis therefore of a perception or sense-presentation is not a single cell, but rather a large number of cortical cells. Each cell in the cortex participating in a perception may be a unit functioning often in other perception-complexes. This is very important in the explanation of association, imagination, memory, etc.

Ramon a Cajal, from whom the major part of these anatomical facts is taken, suggests that the cortical sensory centers present, according to this view, a genuine, enlarged and widened projection of the sensory surface of the sense organs, and that, therefore, there exist, as some writers have supposed, a central retina and a central Organ of Corti. Each peripheral sensory cell, however, is represented in the cerebral cortex, not by one single pyramidal cell, as so many popular writers loosely assert, but by a group of such cells.

The exact nature of the nervous excitation is still problematical. It probably involves the decomposition of highly complex and unstable chemical compounds. It has been likened to a row of card houses or a row of bricks. A dis-

turbance, an explosion at one end of the row will set the whole row in commotion, the movement gathering impetus and momentum as it proceeds. If this be so the acceleration and increase of nervous excitation in the sensory apparatus is again noteworthy.

The following diagram taken from Cajal illustrates the first stages of this acceleration movement in the sensory mechanism. (1)



(Section of the retina of the chick impregnated by the Golgi method) :

A, giant spongioblast; B, pear-shaped or long-stemmed spongioblast; C, small or neuroglia spongioblast; D, bipolar cell; E, club (massue) of Landolt; F, small stick (batonnet); G, cone; H, subreticular cellule; I, bipolar (?); J, fibre of Mueller.

(This figure contains elements taken from different preparations.)

Furthermore, the primary peripheral stimulus may be almost indefinitely small but the resulting muscular reaction very large and altogether out of proportion to the strength of the primary excitation, as for example, in convulsions arising from tickling. It may be that the nerve cells lying in the path or chain of conduction are of the nature of reservoirs and that the liberated energy of each nerve cell releases a still greater store in the succeeding nerve cells. Moreover, a larger number of nerve cells are brought into play and the accumulated nervous energy of the final total will be out of all proportion to the number at first engaged. The spreading of epileptical convulsions is apparently of this nature.

Important as this law of acceleration and increase may be, another aspect of the question must, however, not be forgotten. At first sight one might suppose that if this law is true and valid, then conduct will be shaped and governed by

(1) From the article of Cajal in the *Anatomischer Anzeiger*, cited above.

the nature and strength of the impinging stimuli. This, however, would not be taking into account the fact that the stimuli affect an already organized structure which is prepared to react to such and such stimuli and not to others. On the physiological side some nerve cells are *loaded*, and on the psychological side there are corresponding *interests*. Storm and besiege the organism as they may, some stimuli will produce, relatively speaking, no reaction, while on the other hand persistent, all-embracing or explosive reactions may be induced by apparently insignificant stimuli. All sorts of delectable oratory may not persuade the kitten to come nearer to you, but the trailing of a string across the floor appeals mightily to certain predatory characteristics peculiar to its kind. The Decalogue contains no commandment for parents to love their children, but all the thunders of Mount Sinai accompanied the command that children were to love and honor their parents. A mother sitting in a park surrounded by hundreds of noisy children will hear one little voice of pain above all the rest. It is evidently the waiting, attending attitude which brings the quick reaction. Forces are mobilized, ready for action. Where our interests are, there will be found the track we follow. Taking, therefore, two stimuli of apparently equal potency, the one that appeals to loaded sense-organs or to central nerve cells already filled with surplus-stored energy will succeed in eliciting a reaction much stronger than the one appealing to sense-organs or nerve cells exhausted by work, worry or disease.

Various phenomena of nervous action subsidiary and complementary in nature to this tendency to acceleration and increase of sensory stimulation might be cited in this connection. For instance, *the solidarity of the nervous system is conducive to the propagation of nervous impulses from one area or group of nerve cells to another*. This solidarity of function explains to some extent the reinforcement of currents by other currents from other areas. Pain is reinforced by severe excitation of the auditory or visual areas. Pleasure may be increased also by suitable excitation of other areas. Thus that which influences one area or group of nerve cells influences the rest of the system, this unity of function with relative differentiation of functions of different parts probably constituting the physical basis of personality.

Motor movements may reinforce other motor movements. Certain *occupa-sense areas*. All the phenomena of encouragement and discouragement may be cited here as witnesses. Instance a cake-walk, a wrestling match, a schoolboy fight, hand-clapping and foot-stamping at a contest.

Motor movements may reinforce other motor movements. Certain occupations induce more lively mental action, and on the other hand lively cerebral or mental action may induce more rapid corporeal activities. Clenching some object in the hand assists some in thinking, assists others in trials of skill, running, etc. (1) The German habit, sometimes observable, of striking the side of the nose with the forefinger, and the habit of scratching the head during the solution of some knotty problem, stimulate the trigeminus nerve endings, thus causing a larger determination of blood to the brain and increased mental action. (2)

(1) Some of these phenomena can of course be explained as automatisms, whereby troublesome movements are inhibited.

(2) Lauder Brunton, *Action of Medicines*, 1899, pp. 168 ff.

Additional sensory stimulation may call up by association or suggestion additional motor movements. I need only cite the very fine illustration of Baldwin: "Suppose we hang up a piece of meat over Carlo's head and tell him to jump for it. His first jump falls short of the meat. He jumps again and clears a greater distance. Why does he jump farther the second time? Not because he argues that a harder jump is necessary to secure the meat, but because by the first jump he got more smell, blood, color and appetite stimulus from the meat. Now suppose it to be a red rag instead of meat, and Carlo refuse to jump a second time. This is not because he concludes the rag would choke him, but because he gets a kind of sensation which takes away what appetite stimulus he already had. The thing is a thing of sensational dynamogeny or suggestion, and the child's state of mind up to his twenty-fourth month, more or less, is just about the same."

In the dull despair of the teacher, rank incompetence is often charged to the discredit of the pupil when a wider range of power on the part of the teacher would have brought into play *additional* stimuli and thus have secured reaction and self-expression by the pupil.

The law of diffusion of nervous currents throws additional light upon the matter under discussion. Intense pains, for example, often involve a much larger area than that injured. It may result in convulsive movements of the whole body. Musical tones reinforce color and visual discrimination. (1) This law of diffusion is also exemplified in the association of ideas. From various well known experiments, stimulation of one sensory area in the cortex is known to reinforce the activity of neighboring areas. In the association of ideas the nervous process, whatever it may be, diffuses itself over various areas, but especially in the direction of one particular area, thereby calling up an associated idea or movement. The stimulation of the first sensory area necessarily involves by the law mentioned above the stimulation of a large number of nerve cells in that area. On the psychical side the accompanying perception will be full of details, vivid and persistent. The idea called up by association will comprise fewer details and may be less vivid and persistent owing to the probable circumstance that fewer nerve cells are engaged and less nervous energy involved. Thus perception, the first-hand information of direct sensory stimulation, is, comparatively speaking, full, vivid, complete and lasting. Second-hand information, *i. e.*, knowledge of one sense derived by association of ideas from the sense area of first stimulation, is on the other hand, less complete, somewhat vague, misty and less permanent.

The exceeding importance of this distinction between primary sensory knowledge and second-hand information can hardly be over-emphasized or over-illustrated. It is full of meaning and pregnant with consequences, not only in pedagogic matters, but in all affairs of life. An illustration from every-day life, simple and obvious though it may be, may serve to make the distinction clearer. Suppose, for example, that A has been present at the arrest of a man caught in the performance of a criminal act. Thanks to this process of increasing sensory stimulation, A is possessed of visual perceptions of great vividness, detail and persistency; he sees, as in a great canvas picture, the actions of the combatants, the faces of the surrounding crowd, the shrinking attitude of the prisoner, the police-

(1) Urbantschitsch, Amer. Jour. of Psychology, I: 530.

man handcuffing the accused and marching him off to jail. In A's description of the affair to B, who was not present, the psychical results produced in B's mind are of quite different nature from those acquired by A, who was present at the disturbance. B's auditory impressions as he listens to the descriptions while in one way somewhat complete because of immediate sensory stimulation may be classed as second-hand information with all the characteristics of such information; but imperfect as it may be, it stands a chance of still greater deterioration, because in the diffusion of nervous currents from the auditory area to various parts of the nervous system, and especially to the visual area, only a portion arrives at the visual area, and arouses associated ideas corresponding in some degree with the perceptual visual presentations of A, who was present at the disturbance. In B's visual picture of the occurrence the details are lacking, everything is dim, misty and uncertain. He fails perhaps to see the expression on the face of the criminal, the varying, changing attitudes of the crowd, etc. He lacks *particularity* in almost every case. It was *a* policeman, *a* criminal, and *a* dim and uncertain crowd. On the physiological side we may safely assert that in A's visual perceptions thousands of nerve cells in the occipital cortex were aroused to activity, whereas in B's visual image there were comparatively few visual nerve cells stimulated from the auditory area. The consequence was paucity of mental images, vagueness, instability and uncertainty.

Thus, to take another example, one present at the battle of Hastings would have some very realistic pictures of the dying men, the posts of the stockade shot with quivering arrows, Edith, the queen mother, searching for the body of her son Harold, and a thousand other details. No second-hand information could possibly produce the same result. In history teaching the nearest approach to perceptual reality can only be obtained by illustrations, paintings, and the use of the stereopticon.

It is evident at a glance that the present overwhelming movement towards illustrations in our school books, school rooms, monthly, weekly and daily publications, lectures, etc., is but a tardy recognition in a practical form of the vital importance of the law here under discussion.

Many pedagogical applications of the foregoing principles could be cited such as the following, selected at random: In the primary grades the making of boats, houses, a wagon, a loom, bow and arrow, etc., in the workshop attached to the school; the making of physiological and physiographical models; the introduction of photography in the various departments of school work; sloyd work, cooking, sewing, etc., the making of collections—not the keeping of them—of various articles and living things; an aquarium, an aviary, a botanical collection, a mineral collection, a collection of stamps for geographical work, etc., a collection of works of art, books, etc.; (Nature-study is almost a farce without the presence of the living things); the use of the stereopticon in the teaching of geography and history and all other subjects in which the natural objects are not available for presentation to the senses; use of the stereopticon in teaching art; geographical, geological, historical, commercial and political excursions wherever possible; visits to manufactories, mines, electric light plants, sessions of legislative bodies, stock exchanges, higher seats of learning, etc.; the use of the typewriter in the schools;

use of museums, art schools, pictures, magazines, etc.; the use of objects in the teaching of mathematics, especially in the earlier grades; introduction of the usages of the social world into the school; less traditional book lore and book methods and more socialization of the school room; introduction of weights and measures, banking facilities, etc.; introduction of social ends and aims and then the use of arithmetical, algebraical and geometrical processes as means to those ends (by the inevitable force of tradition, arithmetical processes, like all other processes, tend to become ends in themselves rather than means for the adequate supply of the demands of society); *viva voce* teaching of languages; employment of as many senses as possible in the teaching of languages, *i. e.*, by dictation, writing, speaking, etc; legislative sessions, newspaper reports, telegraphic dispatches, etc.; different forms of dancing in the inculcation of courtesy, grace and the finer emotions; introduction of dramatic presentations in the grades, as well as in the high schools; the introduction, to a certain extent, of the source method in the teaching of history. An arithmetical process, such as long division, should not be taught as such, but as a means for determining, say, the amount of the material needed for the new house of some child in the room. Children should not learn to read, but read for the sake of the subject-matter. So it should also be with the teaching of spelling, writing, composition, etc. The time needed for the teaching of these subjects in the schools will thus be materially shortened. The concrete social life of the pupil should be the starting point for the teacher. Should we ever leave it? Fame and fortune are awaiting the person who will transform the teaching of gymnastics from being more or less an end in itself, into the satisfaction of some social and organic concrete end. Will it come through the drama, pantomime, an extension of the Delsartean system, or through the organization of the already existing play activities based on the more accurate knowledge of the organic and social nature and functioning of youth? Certainly the present form of gymnastics teaching is crude and pedagogically insufficient.

As to manual training, the future school curriculum will undoubtedly describe it as an initiation into technic, as an introduction into the ways and means of historical progress in culture. Training in technic will take its place side by side with the other two great branches, the study of nature's forces and the study of man's social activities.

MISCELLANEA.

SOME STATISTICS BEARING ON EDUCATION IN THE UNITED STATES. (1)

I. Elementary Schools.

Expenditures on elementary education in Europe (1900-1901) approximately	\$246,000,000
Expenditures on elementary education in United States (1900-1901) ..	\$226,043,236
Value of all school property in United States (common schools)	\$576,963,089
Enrollment in elementary schools of Europe, approximately	45,000,000
Enrollment in elementary schools of the United States	15,603,451
Total enrollment in public and private elementary schools in United States	16,984,751
Estimated number of children 5-18 years of age in 1901 in United States	21,897,678
Estimated population of United States in 1901	77,262,743
Number of teachers employed in United States (1900-1901)	430,004
Percentage of male teachers in United States:	

1870-71	1879-80	1889-90	1899-1900	1900-1901
41.0	42.8	34.5	29.9	28.8

Average monthly salaries of teachers (1900-1901); males	\$ 47.55
Average monthly salaries of teachers (1900-1901); females	39.17
Paid for teachers' and superintendents' salaries (1900-1901)	142,776,168.00
Average expenditure per pupil (for the whole school year)	21.14
Average daily expenditure per pupil	14.7 cents
School expenditure per capita of population (1900-1901)	\$2.93
School expenditure per capita of population (1900-1901)	\$1.75

(1) Compiled from Advance Sheets of the Report of the U. S. Commissioner of Education for 1900-1901. This report promises to be the best yet issued in a long line of most excellent reports.

Expenditure by the twenty largest cities for maintenance and operation of public schools and of police departments.

[Data from Bulletin of the Department of Labor, No. 42, September, 1902; calculations made in the Bureau of Education.]

City.	Spent for schools, building omitted.	Spent for police department.	Ratio.
New York.....	\$19,731,629	\$10,199,206	\$1.98 for schools to \$1 for police.
Chicago.....	8,203,493	3,685,982	\$2.23 for schools to \$1 for police.
Philadelphia.....	3,319,604	3,086,264	\$1.09 for schools to \$1 for police.
St. Louis.....	1,526,140	1,602,182	\$0.95 for schools to \$1 for police.
Boston.....	3,043,640	1,754,151	\$1.73 for schools to \$1 for police.
Baltimore.....	1,417,392	967,823	\$1.46 for schools to \$1 for police.
Cleveland.....	1,257,345	417,932	\$3.01 for schools to \$1 for police.
Buffalo.....	1,161,834	793,294	\$1.46 for schools to \$1 for police.
San Francisco.....	1,166,763	789,251	\$1.48 for schools to \$1 for police.
Cincinnati.....	1,126,681	555,185	\$2.03 for schools to \$1 for police.
Pittsburg.....	843,648	490,287	\$1.72 for schools to \$1 for police.
New Orleans.....	478,025	231,374	\$2.07 for schools to \$1 for police.
Detroit.....	869,713	542,049	\$1.60 for schools to \$1 for police.
Milwaukee.....	764,963	342,508	\$2.24 for schools to \$1 for police.
Washington.....	1,182,916	687,922	\$1.72 for schools to \$1 for police.
Newark.....	830,081	428,495	\$1.94 for schools to \$1 for police.
Jersey City.....	500,332	421,616	\$1.16 for schools to \$1 for police.
Louisville.....	512,947	273,615	\$1.87 for schools to \$1 for police.
Minneapolis.....	736,981	216,698	\$3.40 for schools to \$1 for police.
Providence.....	739,695	371,875	\$1.99 for schools to \$1 for police.

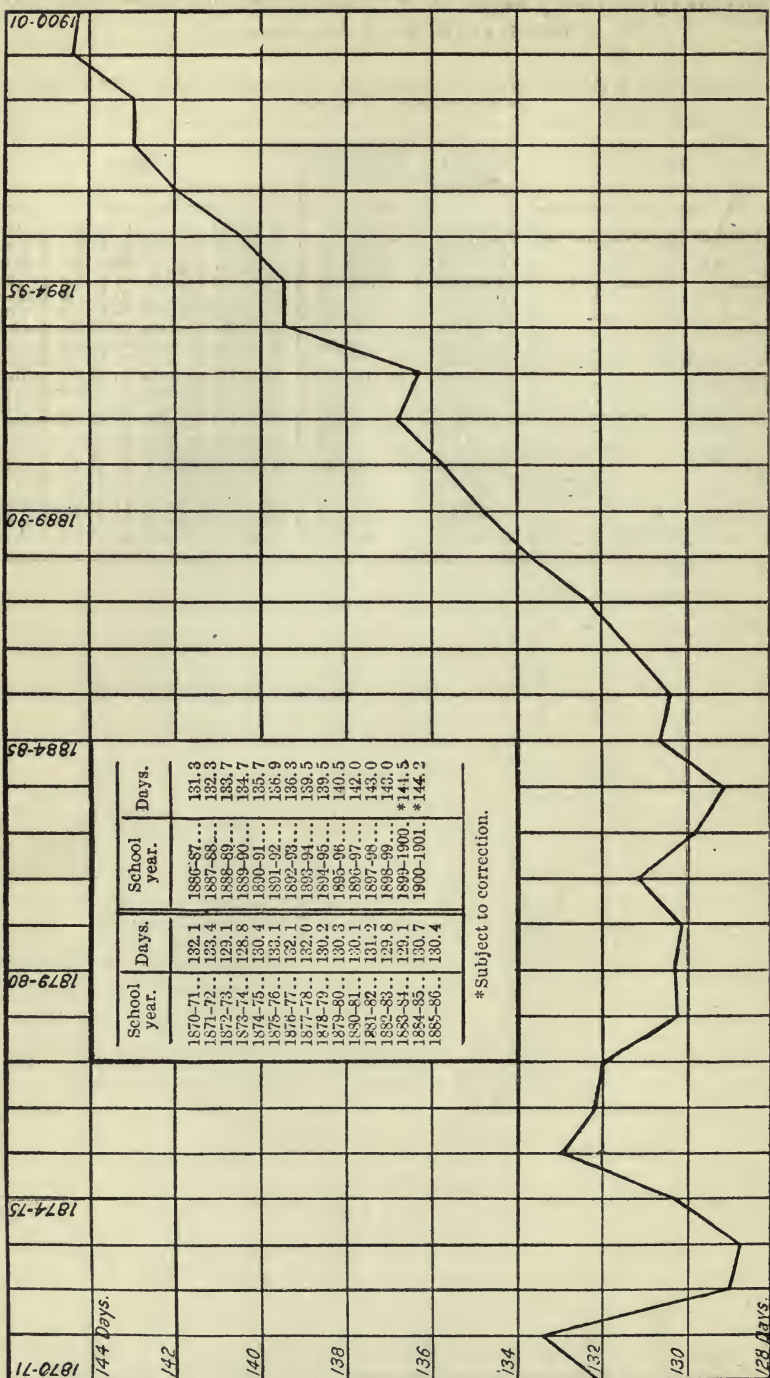


DIAGRAM 1—Average number of days the schools were kept each year since 1870-71.

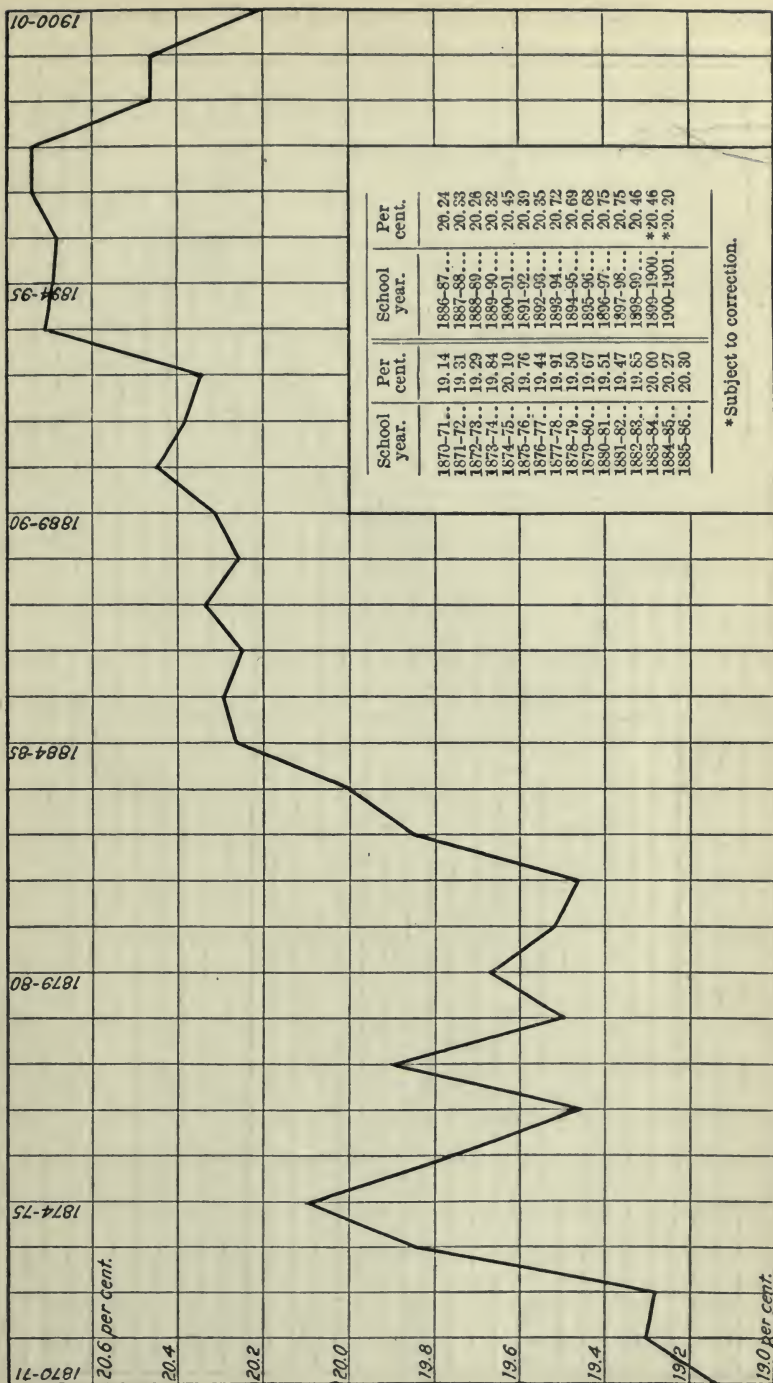


DIAGRAM 2.—Per cent. of the population enrolled in the common schools each year since 1870-71.

1870-71	175				
	183				
	184				
	188				
1874-75	191				
	185				
	172				
	167				
	156				
1879-80	156				
	163				
	170				
	180				
	188				
1884-85	196				
	197				
	197				
	207				
1889-90	217				
	224				
	231				
	240				
	248				
	255				
1894-95	255				
	262				
	263				
	267				
	270				
	284*				
1900-01	293*				

DIAGRAM 3.—Amount expended for common schools per capita of population each year since 1870-71.

DIAGRAM 4.—Number of secondary students in public and private secondary schools.

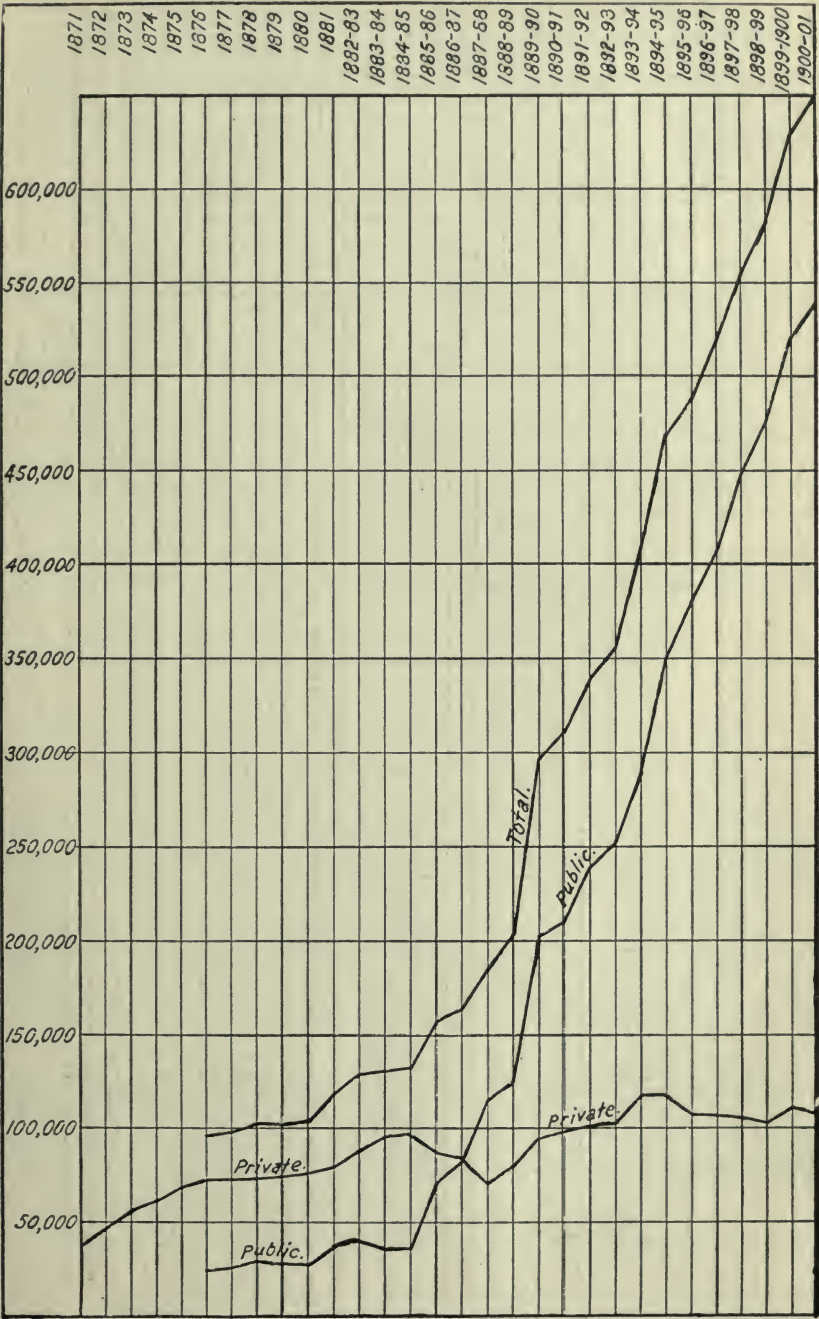
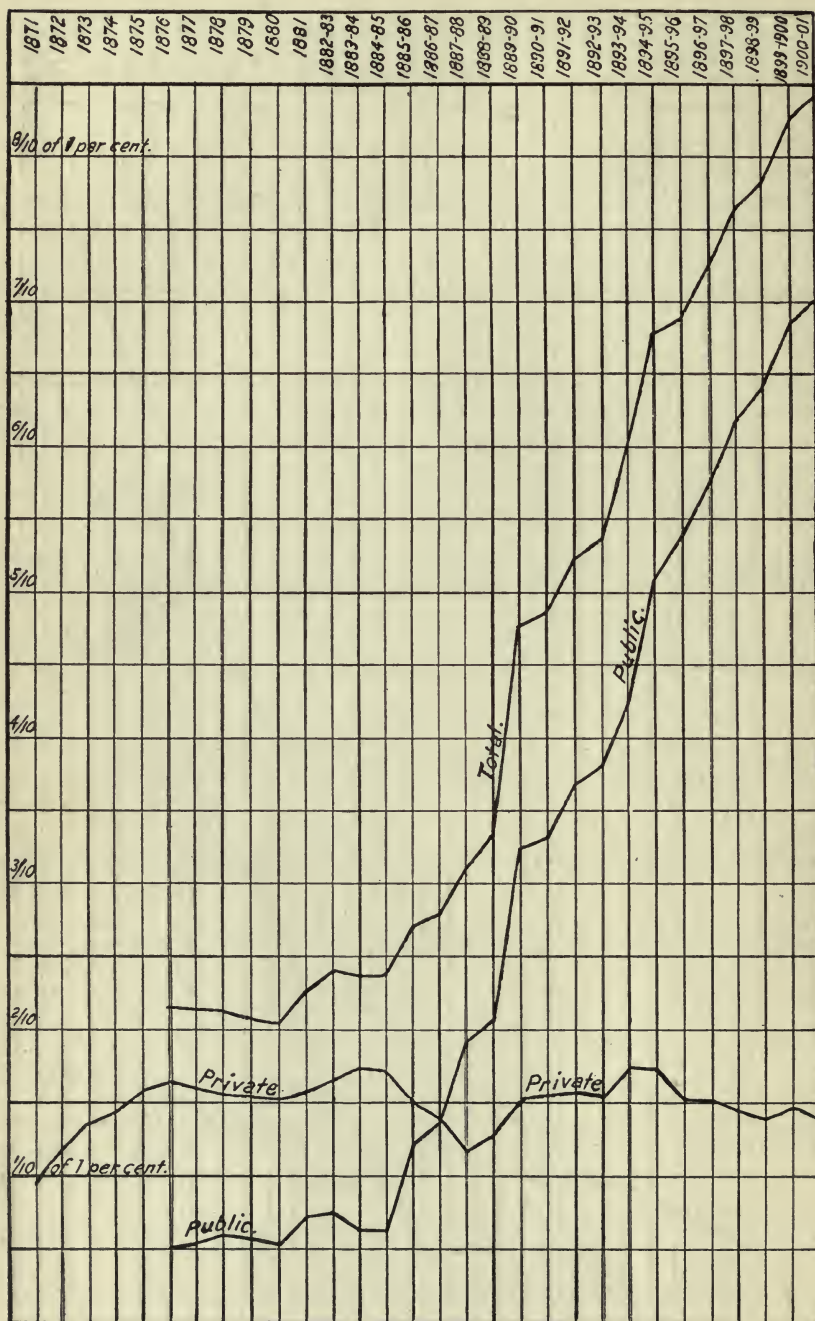


DIAGRAM 5.—Percentage of the population enrolled as secondary students in public and private secondary schools.



II. Secondary pupils in the United States.

Institutions.	Male.	Female.	Total.
Public high schools.....	224,584	317,146	541,730
Public normal schools.....	2,749	4,404	7,153
Public universities and colleges.....	7,287	2,570	9,857
Private high schools.....	53,813	54,408	108,221
Private normal schools.....	4,408	2,809	7,217
Private universities and colleges.....	30,016	14,785	44,801
Private colleges for women.....	5,614	5,614
Manual training schools.....	6,818	4,589	11,407
Total.....	329,675	406,825	726,000

The 736,000 secondary students comprised 4.25 per cent of the entire school enrollment of the country, which was 17,299,230. Almost 1 per cent of the whole population was receiving secondary instruction. In the last ten years the rate of increase of secondary students has been more rapid than the rate of increase in population. The number of secondary students in private institutions has very nearly kept pace with the growth of population from year to year, while the number of such students in public institutions has increased from about 3,500 to the million in 1891 to about 7,200 to the million in 1901. In 1891 the total number of public and private secondary students was about 5,800 to the million, while the number in 1901 was about 9,500 to the million.

Leaving out of consideration the secondary students in preparatory departments of colleges and in other institutions, the following table will illustrate the growth of public and private high schools proper since 1890:

Public and private High Schools since 1889-90.

Year reported.	Public.			Private.			Total.		
	Schools.	Teachers.	Students.	Schools.	Teachers.	Students.	Schools.	Teachers.	Students.
1889-90.....	2,526	9,120	202,963	1,632	7,209	94,931	4,158	16,329	297,894
1890-91.....	2,771	8,270	211,596	1,714	6,231	98,400	4,485	14,501	309,996
1891-92.....	3,035	9,564	239,556	1,550	7,093	100,739	4,585	16,657	340,295
1892-93.....	3,218	10,141	254,023	1,575	7,199	102,375	4,793	17,340	356,398
1893-94.....	3,964	12,120	289,274	1,982	8,009	118,645	5,946	20,129	407,919
1894-95.....	4,712	14,122	350,099	2,180	8,559	118,347	6,892	22,681	468,446
1895-96.....	4,974	15,700	380,493	2,106	8,752	106,654	7,080	24,452	487,147
1896-97.....	5,109	16,809	409,433	2,100	9,574	107,633	7,209	26,383	517,066
1897-98.....	5,315	17,941	449,600	1,990	9,357	105,225	7,305	27,298	554,825
1898-99.....	5,495	18,718	476,227	1,957	9,410	103,838	7,452	28,128	580,065
1899-1900.....	6,005	20,372	519,251	1,978	10,117	110,797	7,983	30,489	630,048
1900-1901.....	6,318	21,778	541,730	1,892	9,775	108,221	8,210	31,553	649,951

In the last dozen years there has been a steady increase in the proportion of High School students in certain leading secondary studies. In 1890 less than 34 per cent of the students were studying Latin, while in 1901 the per cent was about 50. The per cent studying algebra increased from nearly 43 in 1890 to nearly 56 in 1901. The following synopsis exhibits these percentages for each of the twelve years in certain studies:

Per cent. of the total number of secondary students in public and private high schools and academies in certain courses and studies, etc.

Students and studies.	1889-1890.	1890-1891.	1891-1892.	1892-1893.	1893-1894.	1894-1895.	1895-1896.	1896-1897.	1897-1898.	1898-1899.	1899-1900.	1900-1901.
Males	45.03	43.67	44.01	43.62	43.39	43.00	43.40	43.84	43.50	42.93	43.16	42.83
Females	54.97	56.33	55.99	56.38	56.61	57.00	56.60	56.16	56.50	57.07	56.84	57.17
Preparing for college, classical course.....	10.61	8.45	9.18	9.90	10.34	10.00	10.05	8.94	7.99	7.87	8.32	8.30
Preparing for college, scientific courses.....	8.05	6.38	7.59	8.22	7.33	7.11	7.16	6.57	6.03	6.18	6.21	6.54
Total preparing for college.....	18.66	14.83	16.77	18.12	17.67	17.11	17.21	15.51	14.02	14.05	14.53	14.84
Graduates	10.05	10.51	10.87	11.46	11.88	11.60	11.73	11.95	11.75	11.78	11.74	11.95
Graduates prepared for college (a).....		35.74	39.15	36.62	30.92	32.44	32.69	32.60	30.60	31.61	32.95	33.48
Studying—												
Latin	33.62	39.80	38.80	41.94	43.59	43.76	46.22	48.01	49.44	50.29	49.97	49.93
Greek	4.32	4.65	4.68	4.92	4.99	4.73	4.58	4.60	4.50	4.27	3.95	3.58
French	9.41	9.06	8.59	9.94	10.31	9.77	10.13	9.98	10.48	10.68	10.43	10.75
German	11.48	15.68	11.61	13.00	12.78	12.58	13.20	13.76	14.24	14.91	15.06	16.09
Algebra	42.77	49.89	47.65	49.92	52.71	52.40	53.46	54.22	55.29	56.21	55.08	55.66
Geometry	20.07	23.04	22.52	24.36	25.25	24.51	25.71	26.24	26.59	27.36	26.75	27.26
Trigonometry			2.96	3.61	3.80	3.25	3.15	3.08	2.83	2.58	2.42	2.54
Physics	21.36	23.06	22.04	22.25	24.02	22.15	21.85	20.89	20.48	19.97	18.88	18.24
Chemistry	9.62	10.37	10.08	9.98	10.31	9.31	9.15	9.18	8.55	8.64	8.00	7.86
Physical geography						22.44	24.93	24.64	24.33	23.75	22.88	22.42
Physiology.....						28.03	31.08	29.98	29.38	28.62	26.96	26.27
Rhetoric						31.31	32.27	33.78	35.30	36.70	37.70	39.69
English literature.....									38.90	40.60	41.19	43.90
History (other than U. S.).....	27.83	29.77	31.35	33.46	35.78	34.65	35.73	36.08	37.68	38.32	37.80	38.41

(a) Per cent. of total number of graduates.

THE "NATURE-STUDY" EXHIBITION IN LONDON.

Complete success seems to have attended this inauguration of a new movement toward the introduction of a better system of instruction in elementary schools. Through the courtesy of the Royal Botanic Society of London an exhibition was held last Fall of appliances and methods employed in nature-study. In connection with the exhibition a series of conferences was held, at which a number of valuable addresses were given. A few extracts are here given:

Mr. Hanbury, President of the Board of Agriculture, presided at the first of the meetings on July 24 and spoke of the general educational value of nature-study and of the special dependence of agricultural industry upon habits of careful observation.

Lord Avebury took as the subject of the first address "The Study of Nature." He attributed a most curious ignorance of common things to the fact that great public schools omit the subject altogether, or devote to it only an hour or two in the week snatched from the insatiable demands of Latin and Greek. Oxford and Cambridge have most excellent science schools, but prizes and fellowships are still mainly given to classics and mathematics; degrees are given there, and now, alas! even at the University of London, without requiring any knowledge of the world in which we live.

Mr. Henry Hobhouse, M. P., read a paper on "How County Councils may encourage Nature-Study."

As it was not to be expected, he said, that every village schoolmistress would be able to teach nature-study, an arrangement would have to be made for peripatetic teachers to visit groups of small schools; school gardens and school museums would also have to be organized.

Prof. Geddes was unable to be present, and his paper was taken as read; its vital points are (1) that nature is a moving unity or pageant of the seasons, not an abstract syllabus of "object lessons" or even dissected "types;" (2) that the essential strategic point for the nature teacher is to give the pupil the joy of nature before the intellectual analysis of it; (3) among immediate practical possibilities, and taking excursions for granted, the essential desideratum to be secured for country and suburban schools without delay and for town schools so far as possible is the school garden, always provided this is designed to show to the full, the living seasonal beauty of its chosen plants and be not a cats' graveyard of labels, however orderly. The introduction of a flower border, however small, into the present desert playground is pleaded for on all grounds, moral as well as intellectual and æsthetic.

Prof. J. Arthur Thomson began his most interesting and suggestive paper by quoting the definition of nature-study given by his friend Prof. Geddes: it is "the habit of observing and thinking for one's self and at one's best, without books or helps, in the presence of the facts and in the open air." Prof. Thomson had next a word to say on the danger of doing nature-study teaching badly and distorting the child's outlook on the world. Given a man or woman with the mood of the naturalist, the country schoolmaster who knows and loves the birds, or the country schoolmistress who knows and loves the flowers, then the course of nature-study—now compulsory—is sure to be healthful. Given, however, a teacher who, through overwork, or preoccupation with other disciplines, or lack of early training, is only coercively, not organically, interested in nature-lore, then Prof. Thomson feared that the result would be very bad, indeed. The title of the paper was the "Seasonal Study of Natural History," and a sketch of a seasonal course was given, arranged so that the scholars faced appropriate problems at appropriate times. It was argued that the seasonal order and method of study, though not the easiest, was the most natural. It was the most primitive method, yet the exhibits seem to show that it was capable of being the most evolved. It followed up the pre-school education of the child, and was justified by physiological and psychological facts. Furthermore, the seasonal method worked exceedingly well in practice, being always relevant to what the pupils are seeing and feeling out of school, facilitating the desirable co-operation of the class in securing the specimens for the actual work, and being readily correlated with other school studies.

Mr. H. Coates illustrated the subject of local museums as aids in the teaching of nature with reference to Perth Museum, in connection with which children's essay competitions are most successfully held.

Lord Strathcona, as chairman at the second conference on July 28, gave an account of work in Canada carried out by the generosity of Sir William McDonald, who has given three-quarters of a million of money. Model farms were touched

upon, and Lord Strathcona gave a particularly interesting account of his own work in introducing vegetable culture into Labrador, which had previously been unknown.

Prof. Lloyd Morgan had also a definition to give when dealing with nature-study in elementary education. He said that it was "a means by which simple natural objects and processes acquire *meaning*." Like Prof. Thomson's paper, the whole question is so carefully considered that no brief notice could do it justice. The movement which the meeting was to foster and develop, according to the speaker, is part of that reform educational procedure which has been in progress for many years. One of the points to be regarded is the patchiness of a child's mind, to whom even the beginnings of science are impossible. The teacher, say a scientific botanist, must not, therefore, get tired of fostering the powers of observation and affording facilities for simple investigation, and instead endeavor to inculcate general laws and principles beyond the comprehension of the child. Technical terms where they are simple nouns and not descriptions are allowable, but after reading a long description of the dandelion taken from a nature-study book Prof. Morgan begged his hearers to stop before they got to "anthers syngeneisus."

On Tuesday, July 29, the chair was taken by the Lord Balfour of Burleigh, K. T., Secretary for Scotland. He gave an account of the excellent progress of the "nature-study" movement started several years ago across the border. "Nature-study," he said, "must be rather looked upon by the children as recreation; their minds must not be filled with facts, but must be taught to make observations and to investigate. If this were done it would redound to the credit of education in all countries."—*Nature*, July 31, 1902.

REPORT OF A BRITISH COMMITTEE OF TEACHERS ON THE TEACHING OF MATHEMATICS.

Since Prof. Perry brought forward the subject of "The Teaching of Mathematics" at the meeting of the British Association last September, several associations of teachers have discussed the reforms suggested or appointed committees to report upon the matter. A committee of the Assistant Masters' Association has had the subject under consideration, and a preliminary report has been drawn up, from which it appears that masters in secondary schools are in favor of most of the reforms advocated by speakers at the British Association meeting. The report is as follows: I. *Arithmetic*. (1) The method of teaching in the early stages should be inductive and concrete. Actual measuring and weighing should be introduced as early as possible. (2) Decimals should be treated as an extension of the ordinary notation, their nature being illustrated by actual metric weights and measures. Multiplication and division of a decimal by a decimal would, we think, have to follow vulgar fractions. (3) The decimalization of English money and English weights and measures should be practiced frequently. (4) Approximate methods should be gradually introduced after the treatment of finite decimals. They should be taught with due regard to rigidity of proof. Appreciation of the degree of approximation should be continually insisted upon. (5) If "commercial arithmetic" is to be taught at all, the subject-matter should receive more ade-

quate and correct treatment, and the examples should be drawn from transactions as they actually occur. II. *Algebra*. (1) The foundation of algebra should be "literal arithmetic," i. e., algebra should at first be arithmetic generalized. (2) The minus sign should receive its extended meaning from copious illustrations; and illustrations, not rigid proof, should also be resorted to for the purpose of the "rule of signs." (3) Algebra should often be applied to geometry. (4) Logarithms should form an important section of the subject. We believe that the graphic method could be very usefully employed in this connection. (5) We desire to deprecate the waste of time so commonly practiced in mere manipulation of symbols. III. *Geometry*. (1) We are strongly of opinion that the ordinary deductive geometry should be preceded and continually supplemented by concrete and inductive work. (2) Whilst "mensuration" might possibly be taught in connection with physics and arithmetic, we believe that the value of geometry would be enhanced by practical applications of the propositions as they occur. (3) We feel very strongly that Euclid's text is very unsuitable for teaching geometry. But we are impressed with the difficulty of abolishing its use in the face of external examinations. In the circumstances, we can only hope that examining bodies, even if they insist on Euclid's sequence, will allow greater latitude in methods of proof, and give greater prominence to easy "riders" and applications of geometry.—*Nature*, July 31, 1902.

SOME CONCLUSIONS AND SUGGESTIONS FROM EXPERIMENTS ON SPELLING IN THE CHICAGO SCHOOLS. (1)

1. In these tests of memory an attempt has been made to divest the matter to be memorized of as many associations as possible, and so to measure the native strength of the memory. The power thus measured is passive; it is blind; it attempts to take and give back without change, to return an echo of the sensations. It shows what the child can apprehend, not what he can comprehend. Good teaching attempts to make the mind active and alert, causing it to compare, associate and classify. It is the province of the school to discipline this native power of memory; to bring forth skill where originally there is only strength. The teacher should aim to develop from the native sense memory an organized rational memory. It is said that English spelling is illogical, but this is true in part only, and the teacher should use every available opportunity to see that the child uses his rational memory instead of depending too largely on the native force of his sense memory.

2. Those with superior memory power being in superior physical condition, as shown by the anthropometric tests, clearly indicates that the immediate sense memory is dependent upon good brain formation and nutrition. The skillful and rational use of this memory power is dependent upon habitual use, hence on education and experience. All these factors are significant in learning to spell.

(1) Report of Fred Warren Smedley, Director of the Department of Child-Study and Pedagogic Investigation, Chicago Public Schools, Report No. 3, 1900-1901.

3. Where the matter memorized has been divested of associations, repetition is necessary for the securing of deep and lasting impressions. Wherever logical association is possible, there can be a more efficacious method of study. In studying, the child should be habituated to depend upon comparing and classifying, rather than upon mere repetition. Children are so prone to depend upon blind repetition that they sometimes put forth as much effort in studying the words that they have long thoroughly known as they do upon unfamiliar words, and use as much energy in studying the parts of a word that present no difficulty as they do upon the unknown portions. A wise direction of the child's energies would greatly shorten the time necessary for the mastery of English orthography.

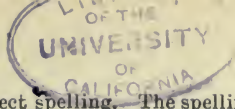
4. While usually the better spellers are possessed of better memory power than are the poor spellers, yet there are bad spellers with a high development of memory. Superior memory may make the acquisition of spelling easy, yet it by no means removes the necessity for some intelligent application on the part of the pupil. While most good spellers tend toward the visual type, still there are both good and bad spellers of each type.

5. The fact that children have the ear memory stronger during the early years suggests at once that the teaching of spelling to the young will be effective if the ear is appealed to; that there is probably a place for oral spelling; that there should be some pronunciation of syllables with the spelling; that the words presented to the child at first should be, as far as possible, phonetic in their spelling, leaving the "more cruel and unusual" forms of English orthography to be learned in later years when the eye memory has become stronger.

6. The investigation shows that there is no "memory period," no period in early school life when the memory is stronger than it is at any later portion of the child's life, a period especially adapted for learning to spell. While there are no memory stages, there are undoubtedly periods of interest that are especially favorable for the child's learning to spell; times when, through the influence of companions or teachers, the child is aroused from indifference or from a feeling that spelling is a small part of life to a recognition that is important.

7. It has been pointed out that during early school life the auditory memory is the stronger, and later that the visual memory is stronger. During the whole of school life the audio-visual memory is stronger than either the auditory or visual; that is, a simultaneous appeal to both sight and hearing produces a richer and more usable image than is brought about by an appeal to either sense alone. This fact is very far-reaching in its application to teaching. The audio-visual-articulatory memory, in which the impression is produced by an appeal to the hearing, sight and the muscle sense, is even stronger than the audio-visual. It would seem from this that the more senses we can appeal to, the deeper will be the impression. This fact should be made use of in spelling drills.

8. The aim in teaching spelling should be to render words of the most frequent use automatic, to have them so well known that in writing they will flow from the point of the pen, requiring but little thought as to their formation. Then there is a large class of words of less frequent occurrence which should be recalled on slight reflection. For the more unusual words the individual should have the dictionary habit so firmly fixed that he will conscientiously look up every word he



needs to write if in doubt about its correct spelling. The spelling of words is rendered automatic through practice in writing them. Though the first grasp of the word may well be made through other combinations of sense memories, yet the final retention of the spelling of most words should be through the audio-visual-hand-motor memory.

9. The per cent. of pupils having sight and hearing defects is greater among the poor spellers than among the good spellers; yet there are pupils with decided sensory defects among the very best spellers. While these sensory defects are handicaps in learning to spell, still they may be overcome, through careful application, by those pupils who have good memory power.

10. Much that has been said here concerning the teaching of spelling will apply with but slightly diminished force to instruction in the other branches of the curriculum.

SOME PEDAGOGIC CONCLUSIONS FROM THE REPORT OF 1899-1900. (1)

Many of the tests and measurements which this department has made are preliminary to other investigations, which, it is suggested, should be carried on in reference to different lines of mental development, methods of instruction, and school adjustments. It is believed that the utility of much of the work so far done will best appear as it forms a basis for these future investigations and compilations; yet there are certain truths important for educational theory and practice which have been so clearly foreshadowed as to warrant their being set forth here.

From the investigations of last year Dr. Christopher formulated the following deductions:

1. In general there is a distinct relationship in children between physical condition and intellectual capacity, the latter varying directly as the former.
2. The endurance (ergographic work) of boys is greater than that of girls at all ages, and the difference seems to increase after the age of nine.
3. There are certain anthropometric indications which warrant a careful and thorough investigation into the subject of co-education in the upper grammar grades.
4. Physical conditions should be made a factor in the grading of children for school work, and especially for the entrance into the first grade.
5. The great extremes in physical condition of pupils in the upper grammar grades, make it desirable to introduce great elasticity into the work of these grades.
6. The classes in Physical Culture should be graded on a physical instead of an intellectual basis.

The work this year, so far as it relates to them, confirmed these deductions, except as to the age, when great differentiation of the sexes in endurance begins. To these, certain other conclusions are added, not as settled beyond any possibility of modification, but yet as being fairly indicated by these tests.

1. The pubescent period is characterized by great and rapid changes in height, weight, strength of grip, vital capacity, and endurance. There seems

(1) Report No. 2 of Child-Study Department of the Chicago Public Schools.

to accompany this physical activity a corresponding intellectual and emotional activity. It is therefore a period when broad educational influences are most needed. From the pedagogic standpoint it is pre-eminently a time for character building.

2. The pubescent period is characterized by extensive range of all physical features of the individuals in it. Hence, although a period fit for great activity of the mass of children, it is also one of numerous individual exceptions to this general law. During this period a greater per cent. of individuals than usual pass beyond the range or normal limits set by the mass. It is a time, therefore, when the weak fail and the able forge to the front, and hence calls for a higher degree than usual of individualization of educational work and influence.

3. Unidexterity is a normal condition. Rapid and marked accentuation of unidexterity is a pubescent change. On the whole, there is a direct relationship between the degree of unidexterity and the intellectual progress of the pupil. At any given age of school life, bright or advanced pupils tend toward accentuated unidexterity, and dull or backward pupils tend toward ambidexterity. The pupils of the John Worthy (Bridewell) School are more nearly ambidextrous than even the backward pupils of the ordinary schools. Training in ambidexterity is training contrary to a law of child life.

4. Boys of school age at the Bridewell are inferior in all physical measurements to boys in the ordinary schools, and this inferiority seems to increase with age.

5. Defects of sight and hearing are more numerous among the dull and backward pupils. These defects should be taken into consideration in the seating of pupils. Only by removing the defects can the best advancement of the pupils be secured.

6. The number of eye and ear defects increases during the first years of school life. The causes of this increase should be investigated and as far as possible removed.

7. There are certain parts of the school day when pupils, on the average, have a higher storage of energy than at other periods. These periods should be utilized for the highest forms of educational work.

8. The stature of boys is greater than that of girls up to the age of eleven, when the girls surpass the boys and remain greater in stature up to the age of fourteen. After fourteen, girls increase in stature very slowly, and very slightly, while boys continue to increase rapidly until eighteen.

9. The weight of the girl surpasses that of the boy about a year later than her stature surpasses his and she maintains her superiority in weight to a later period of time than she maintains her superiority in height.

10. In height, sitting, girls surpass boys at the same age as in stature, viz., eleven years, but they maintain their superiority in this measurement for one year longer than they do in stature, which indicates that the more rapid growth of the boy at this age is in the lower extremities rather than in the trunk.

11. Commencing at the age of thirteen, strength of grip in boys shows a marked accentuation in its rate of increase, and this increase continues as far as our observations extend, viz., to the age of twenty. In girls no such great accel-

eration in muscular strength at puberty occurs, and after sixteen there is little increase in strength of grip. The well known muscular differentiation of the sexes practically begins at thirteen.

12. As with strength of grip, so with endurance as measured by the ergograph, boys surpass girls at all ages and this differentiation becomes very marked after the age of fourteen, after which age girls increase in strength and endurance but very slightly, while after fourteen boys acquire almost exactly half of the total power in these two features which they acquire in the first twenty years of life.

13. The development of vital capacity bears a striking resemblance to that of endurance, the curves representing the two being almost identical.

MEASUREMENTS OF PUPILS AT THE AGE OF PUBERTY AND ADOLESCENCE.

Dr. W. S. Christopher, of the Child Study Department of the Chicago Public Schools, aided by several experts, measured some 6,259 children of the Chicago schools, 2,788 boys and 3,471 girls. The charts and methods employed may be seen in the *Journal of the American Medical Association*, September 14, 1901. Some of the results were known before, but may be repeated here.

From the age of nine to eleven and twelve boys tend to show a period of relative quiescence in growth; from eleven to seventeen, however, there is a period of accelerated growth. The curve for girls shows a less well-marked quiescent period, a better marked and shorter growth. The sharp increase in growth of boys at eleven and twelve has a corresponding parallel in the growth of girls a year earlier.

There is an exaltation of life processes at the pubertal period which finds its expression not only in an increased rate of growth, but also in the development of physical power. This exaltation is preceded by a period of relative quiescence.

The range of the measurements show a normal variation of considerable extent in the growth of both boys and girls, but slightly more marked in the case of girls. The growth is not quite regular, showing considerable individuality in each case. The variation of range occurs a year earlier in the case of girls. While puberty is a period of great exaltation of life processes it is also a period of great individualization. It is a time when the weak fail and the able forge to the front.

The well-known law of Axel Key, that mortality and disease are less at puberty than at any other period of child life, is to be explained as the result of these accelerated life processes. The neuroses, psychoses, neurasthenias, the passions and the vaulting ambitions characteristic of puberty are the principal morbid manifestations of the rapid physical changes of the body. The lack of steady balance has its counterpart on the physical side. Rapid increase in stature associated with deficient nutritive supply is commonly productive of stoop, muscular atrophy, depression, fatigue, irritability and inability to sustain control exercised by others.

The article of Dr. Christopher is especially noteworthy for the emphasis it places on the great individualization of puberty as indicated by the great normal range of physical measurements at this period.

FATIGUE.

Dr. Giuseppe Bellei, of the Municipal Hygienic Department of Bologna, from his investigations, has arrived at results which correspond with other results obtained by similar researches in this country and abroad.

He examined carefully by the dictation method 460 pupils (average age eleven years and six months) belonging to the fifth elementary class in the public schools of that city. There were six dictations for each child, given at the various hours of the school day, taking from twenty to twenty-five minutes. The chief conclusions arrived at are as follows:

1. No evidence as to the diverse fatigue-influence of the various subjects of instruction is forthcoming.

2. The first lesson-hour is a useful mental exercise if the pupils during that time succeed in arousing themselves from the disattention under the influence of which they are when they enter school.

3. The morning school does not produce notable mental fatigue.

4. The noon rest is very useful to the pupil since it does not destroy the good effects produced by the mental exercise of the morning, and renders him capable of better work than he is able to give after a prolonged rest, as observed when entering school.

5. In spite of the fact that immediately after the noon rest the pupils are in the best conditions of mind, an hour or a little more of school in the afternoon is sufficient to induce so much mental fatigue as to cause, at the end of the afternoon's lessons the worst work of the whole day.

The general statement seems justifiable, therefore, that, if the morning school does not fatigue, it exhausts the mental resistance of which the pupil is capable to such an extent that he is unable to undergo even brief mental labor during the afternoon without exhibiting the most evident signs of notable fatigue.

It may be added that music seems admirably adapted as the first preliminary morning exercise to secure the mental attitude of attention for the morning's work and that motor exercises, manual training, etc., are displacing the usual recitation work. (1)

RURAL SCHOOLS.

(From Report of Professor Robertson, Commissioner of Agriculture for Ontario, on his investigation of the consolidation or centralization of rural schools in Ohio.)

Six years ago Gustavus township became the pioneer in that part of the United States in the consolidation of rural schools. There were nine school districts in the township and as many small schools. Then the districts were united into one, and a central school was erected at a cost of \$3,000. It is a frame building, containing four large, well-lighted class rooms, a small recitation room and cloak rooms. Instead of nine teachers in little isolated schools, there are now

(1) A. F. Chamberlain, in an article in the Pedagogical Seminary, June, 1901, on Some Recent Anthropometric Studies.

a principal at a salary of \$65 per month, and four assistant teachers at \$32 or \$30 per month in the united school. Nine nice-looking vans are used to convey the children from and to their homes. These wagons or school vans have comfortable seats, running lengthwise of the vehicle, waterproof canvas covers and spring gearings. Before consolidation the average attendance at the schools in that township was 125. On the day of the visit by the three Canadians it was 143 out of an enrollment of 162. The year before consolidation the cost of maintenance of the nine schools of the township was \$2,900. Four years afterwards the cost of the centralized schools, including the conveying of the children, was \$3,156, being an increase in expenditure by the township on its school system of \$256. However, the average attendance at the central school was so much greater than at the single district schools that the cost of education was decreased \$1.59 per pupil on the average attendance.

Moreover, three years of high-school work is carried on in the consolidated school, and the total cost of that is included in the \$3,156.

The contracts for conveying the children to and from the schools are given to responsible persons. These are under bond to provide comfortable covered wagons and to comply with the regulations of the school authorities. The vans hold from fifteen up to over twenty-five. The longest route traversed was about six miles. The vans arrive at the school at from ten to twenty minutes before 9 o'clock, the hour at which the forenoon session begins. The afternoon session closes at half-past 3 o'clock. At Johnston school, where the closing exercises were observed, the children were in the vans starting for their homes in less than five minutes afterwards. At Kinsman, the eight vans are engaged at an average cost of \$2.07 per school day; at Gustavus, the nine vans at an average of \$1.25, and at Johnston the ten vans at an average of \$1.27. The price of the vans was from \$100 to \$135 each. All the vans observed were drawn by two horses each. The drivers who were conversed with said they had not known of any injury to any child. They said the regulations required them to wait for the children at any house for a period not exceeding two minutes, that as a matter of fact it was rarely necessary to wait one minute, and that a case where the children missed the van or were left from being late was very uncommon. The average attendance at the schools confirmed all that.

About 5 per cent. of the pupils preferred walking to the old school rather than riding in a van to the new school. Almost without exception these were pupils who now have four to six miles of a drive in place of a former walk of one mile or less. At the same time these pupils expressed a decided preference for the work of the consolidated school. The evidence of both pupils and teachers goes to show that riding in the vans is alike comfortable and free from injury to even the youngest children. The increased enrollment of pupils and the very high percentage of regularity in attendance struck the visitors as remarkable. For the past three months the daily average attendance at the Kinsman school, which is in that respect typical, was 91 per cent. of the number of pupils enrolled. More striking in this connection is the fact that the percentage of regular attendance among the youngest pupils—those of five, six and seven years—was as high as that of any other class.

Although the weather was rainy and the roads as bad as three inches of snow mixed with mud could make them, the children jumped out of the vans at Kinsman school with dry clothing and dry feet. Little boys and girls of six years came three and four miles in comfort. The teachers said they came regularly in all weathers. Under the small district system in the township of Kinsman two years before, the enrollment at the schools was 110; under the consolidated system it has risen to 146, without any appreciable difference in the total enumeration of children in the township. The high percentage of young children (six to eight years) and the large proportion of older pupils (from fifteen to twenty years) were eloquent of the gains in education during the first two and the later years of school life in a rural district.

The large class and larger schools seemed to meet the social needs of the children better than the small isolated schools. The older boys and girls grown into young men and women had opportunities for going on with a high school education without going away from home. There was said to be, and there appeared to be, a great development of a spirit of co-operation and of mutual good will and friendship from the wider and closer acquaintance of the children of the locality, and from the new interests created and recognized as being common to all, and for the common good.

As far as could be learned, there was almost entire unanimity of opinion among the ratepayers respecting the marked success and superior advantages of consolidation. While the scheme was brought into effect under vigorous discussion and considerable opposition, the adverse criticism has been disarmed by the results of experience.

With few exceptions, the "kickers," as they are designated locally, were ratepayers without children, or persons who feared some depreciation in the value of their own property; or, worse still, some increase in the value of the property nearest to the centralized school. Experience has proven the former of these two fears to be groundless and childish.

Professor Robertson sums up some of the advantages afforded by the consolidation of rural schools and the free transportation of pupils:

1. It results in the attendance of a larger number of children in the locality, particularly of those under the age of eight years, and of those over fifteen years.

2. It brings about a more regular attendance of pupils of all grades of advancement.

3. It ensures the engagement and retention of some teachers of higher qualifications and longer experience in rural schools.

4. It creates conditions for a proper classification of pupils and for such a grading of the schools as permits the pupils to be placed where they can work to the best advantage for their own improvement.

5. It permits the time-table to be so arranged that teachers can give each class and every pupil in the class more direct help and supervision.

6. It provides the beneficial influences of fairly large classes of pupils of about equal advancement: (a) by more companionship; (b) by friendly rivalries to excel; (c) by children learning from each other; (d) co-operating under careful discipline, and (e) by class enthusiasms.

7. It makes it convenient for boys and girls in rural districts to obtain a high-school education without leaving home.

8. It leads to the erection of better school buildings and more satisfactory equipment in all the requisites of a good school.

9. It makes it practicable for rural schools to enrich their course for all pupils by nature study, manual training and household science, as well as by better music; and for advanced pupils by instruction in agriculture, horticulture and allied subjects.

10. It stimulates public interest in the schools and brings to the people of a township an institution in which all can have an equal interest and a worthy pride.

11. It may lead to an improvement of the public roads in the country parts.

12. It would facilitate the rural free delivery of mail.—Montreal Witness, Dec. 23, 1902. {

SOME NEW EDUCATIONAL THESES.

The address on the "American University" recently read by Professor J. McKeen Cattell, of Columbia University, before the Phi Beta Kappa of Johns Hopkins, has a combination of sense, audacity and breeziness that amounts almost to a gale. For example, he says: "Ten years of age is early enough to begin to read, write and calculate; primary education should be chiefly for the formation of motor habits; a child's head will not hold more miscellaneous facts than can be injected in a year or two; he can learn nearly as much of his present scholastic studies in two hours a day as in eight. If the required school attendance for each child were reduced to one-half or one-third, then, without additional expense, the fewer buildings and smaller equipment might be doubled or tripled in value, and the salaries of teachers might be doubled or tripled. The best trained teachers, more men than women, should be in charge of the younger children. If society must develop a class similar to the neuter insects, it should not have charge of the education of children. The boy should stay in the high school until he is eighteen, and then go to the university, or he should enter the college at sixteen and pass forward to the university in two years. The man should begin to take part in the real work of the world at twenty-one, but he should never regard his education as complete, and should for many years, if not always, continue to spend some time in work at the university. * * *

"In my opinion the university is, or should be, a group of professional schools, giving the best available preparation for each trade and profession. It is more feasible to give such training than to teach culture and research. These, like the building of character, are not the result of any particular kind of curriculum. Culture comes from daily and immediate association with the best that the world has; and this should be found at the university. * * *

"The chief difficulty in securing the right men for university chairs is the small field from which they must be drawn. When we have a hundred thousand men of university training teaching in the schools, there will be those deserving promotion. When we have more students doing research work at the universities, there will be more men of genius for the higher offices. * * * We should,

without delay, introduce the *privatdocent* system of Germany."—E. C. H., American Journal of Sociology, July, 1902.

MILITARY EXPENSES IN TERMS OF EDUCATION.

The meaning of the promised reduction of the military force in the Philippines to 18,000 men may be better appreciated, perhaps, when it is stated in terms of education. To support an American army on a peace footing costs something over a thousand dollars per man. Warlike operations, of course, cost more. Every regiment of a thousand men, therefore, is equivalent in expense to a university like Columbia. Nine thousand men on garrison duty in the Philippines, making no allowance for campaigns, use up as much money as all the colleges and universities in New England and the Middle States combined, including Harvard, Yale, Columbia, Cornell, Princeton, the University of Pennsylvania and Johns Hopkins. When the promised reduction is made we shall have brought home 52,000 men from our Philippine army in a little over two years. That means a saving two and a half times as great as the cost of maintaining all the universities and colleges in the United States, and one-third as great as the combined salaries of all the public school teachers in the country. Even those who are most convinced of the necessity of our presence in the Philippines will be glad to see this shrinkage in the bill. We are not a military people, and we think that we are particularly partial to education. It may surprise some of us to know that we spent last year in round numbers six times as much for the army, four times as much for the navy and seven times as much for pensions as for higher education, and that the aggregate of our expenditure for these three military objects was about twice our total outlay on education of every kind, from the kindergarten to the university.—Harper's Weekly.

REVIEWS OF IMPORTANT BOOKS.

J. A. Hobson, The Social Problem, New York, 1902 (James Pott).

In this work by J. A. Hobson, certainly the most original of political economists in England today, many new and rich suggestions are offered which have a decided bearing on educational theory, as well as on the problems of political economy. Only a few points can be emphasized here.

First, society is the maker of "values." The claims of Herbert Spencer and other "individualists" that property and other values are the results of the labor of individuals and therefore their rightful possession, are denied on the ground that such values are not the exclusive products of individuals, as such. They are not attained through merely individual agency. They are the result of the social labors of the past, of the aid rendered by social institutions, of the many co-laboring social agencies of which one particular individual is but the agent or expression. They, therefore, represent co-products. The family assists, the neighbors lend their aid, co-specialists are necessary in every unit of work. The "unearned increment" is due to the labor of others. The rise and fall of prices and the law of supply and demand are pre-eminently social factors. Inspiration, ambitions and ideals are factors, and very important ones at that, in the economic life of individuals. Whence their origin unless from community life, past and present, the life of social co-operation?

Secondly, property and rewards should, in the final analysis, be distributed not according to work done, but according to needs. To the individualist of the old school this is heresy indeed. If values are social products, if each man's product is a communal result, if, and this is the main point, the needs of society are paramount, then each laborer should be provided with just so much and no more, as will make that laborer most productive and most useful to the society in which he lives. How to elevate each producer to the highest degree of social efficiency, that is the problem. Has he worked for it? Have the pupils of our schools "earned" the educational facilities we afford them so generously? Have the poor and the inhabitants of our slum districts "earned" the provisions we make for their amelioration? That is not the question. *Social utility*, not only for the present, but also for the future, is the standard according to which all efforts, all reward, all remuneration must be gauged. Society has done this it is true heretofore, but unconsciously. We are now becoming deliberately conscious of our efforts with a much greater chance for more successful adaptation in the future. This same principle of distribution according to needs, not for charitable purposes, but for reasons of social utility, holds as well for other fields of human effort as for the field of economics. Criminal jurisprudence and school discipline must inevitably come under the sway of this great governing principle. The crime or offense must be punished, so runs the traditional judgment expressed in most emphatic terms. We forget that if a mother's tears or Christ's love do reform the

offender, they are sufficient punishment. If physical castigation is necessary to reform the criminal, then let it be "distributed according to his needs." If good food or industrial training is necessary, then let the "punishment" take that form. We plead for this principle as an ultimate standard. At the same time we are not forgetful that, as a secondary matter for consideration, the *means* employed in judging of the proper distribution of rewards may well be, in many cases, the actual services hitherto performed; but this is not always possible, as, for instance, in the education of the young or of the criminal.

Karl Groos, *The Play of Animals*, Appletons, New York, 1898. *The Play of Man*, New York, 1901.

These works were critically reviewed in the preceding number of the *Investigations*, but on account of their exceeding importance they are recommended very earnestly for perusal and study by all who have not yet had the pleasure of reading them. They mark an epoch in the scientific study of this important subject. Not content with bare speculative *a priori* statements, Prof. Groos has laid the foundations in an inductive study of the phenomena of play of one of the most important topics in the science of education, and also of a more solid superstructure in the realm of aesthetics. The mass of facts packed and arrayed in splendid numbers are sufficient of themselves to have gained for the author an enviable reputation, but in addition to this a most thorough discussion has arisen which promises to bear rich fruit in the future. None interested in the scientific study of education can talk intelligently on the subject without having read these two works.

Th. Ribot, *Evolution of General Ideas*. Open Court Pub. Co., Chicago, Ill.

This work of Ribot's, the best yet published on the subject of Concepts or general ideas, is psychological rather than logical. It is a worthy successor of Locke, Berkeley and Hume. It demonstrates clearly that there is no one imagination but many; that a concept may be of many kinds, auditory, visual, motor, olfactory, etc.; that a concept is symbolie in that the mental presentation in question is a sign or symbol of much potential knowledge, which may be aroused by association at any time. Ribot discusses the evolution of the concepts of number, time, space, cause, etc.

H. G. Wells, *Anticipations of the Reaction of Mechanical and Scientific Progress upon Human Life and Thought*. Harper & Bros., 1902.

Many forecasts are made of social evolution based generally on safe scientific grounds. Mr. Wells curbs his Haroun al Raschid imagination and deals with probabilities instead. It is fertile, suggestive reading and optimistic withal.

Increased facilities for locomotion in the twentieth century will be responsible for the probable diffusion of great cities. The general distribution of population in a country must always be directly dependent on transport facilities. Many incidental suggestions are made of a causal nature, such as the various reasons for the present form of railway power and transport. Many of the anticipations would have more promising validity if they had been backed up and supported by statistical studies of the actual growth of certain tendencies within recent times. Thus, *e. g.*, the utilization of nature's forces—the bringing in of mill-

ions of unseen slaves for the service of man—is well illustrated by the last U. S. census.

Judging by the amount of power used, manufacturing in the United States has almost doubled in ten years, and it is five times greater than it was thirty years ago. Here are the figures from the census reports:

Year.	Horse Power.
1900	11,300,000
1890	5,954,650
1880	3,410,837
1870	2,336,142

These vast amounts do not include the power used for other purposes than manufacturing, such as transportation and lighting. More than 1,000,000 horse power was used in the power houses of the 1,200 electric railroads in operation in 1900, and more than 1,500,000 horse power was used in generating electricity for the 3,300 lighting and power distributing stations. More than 350,000 horse power is employed for this purpose in New York City alone.

Of the total power used in manufactures during the census year steam engines furnished 8,742,416 horse power, or 77.4 per cent. of the aggregate; water wheels supplied 1,727,258 horse power, or 15.33 per cent.; electric motors, 311,016 horse power, or 2.7 per cent.; gas and gasoline engines, 143,850 horse power, or 1.3 per cent. and other forms of mechanical power 54,490 horse power, or five-tenths of 1 per cent. Rented power was used to the extent of 321,051 horse power, or 2.8 per cent. of the total. Of this rented power 183,682 horse power was electric and 137,369 horse power was from other sources of energy.

The modern office building, often housing a population equal to that of a small town, is almost wholly a creation of the last ten years, and the power required in these great structures forms a large item when the number of these buildings in the United States is taken into consideration, as about 1,000 horse power is required to operate the lighting plant, elevators, pumps, compressors and ventilators in a 16-story modern building containing 560 offices.

New York leads the list of states in the use of water power, having 368,456 horse power derived from this source in 1900, against 233,795 in 1890, an increase of 134,661 horse power, or 57.6 per cent. directly traceable to the great expansion of the wood pulp industry in the State.

The influence of mechanism on the serf, peasant and laboring classes, on transportation, political union, the organization and conduct of states, commerce, the growth of joint-stock companies and their necessary consequence, the trusts and municipal or social control, finance, growth of democracy, the growth of specialized classes, etc., etc., is all ingeniously investigated. The charm of a fine style adds its glamour to the natural fascination exercised over us by all anticipations.

American Engineering Competition, A Series of Articles Resulting from an Investigation by a Correspondent of the London "Times." Harper Bros., N. Y., 1901.

This series of letters published in The Times by an English engineer aroused very considerable comment on both sides of the water. The author describes the

size of the factories, the completeness of manufacturing plants, the way the men work, the enterprise of employers and the natural resources of the company. He points out those qualities in American business life which have practically won for them commercial supremacy. The whole work is full of excellent things. Few books are more conducive to the teaching of patriotism than this one. Future patriotism will be taught and inculcated by such scientific books as these rather than by the sentimental nonsense now so largely used.

Hodge, Nature Study and Life. Ginn & Co., 1902.

This is no common school-book. One seldom reads a book of greater genuine power and inspiration. Not one page is a conventional following of uncriticized inheritances; not a line but breathes of living original personal feeling; yet never once does the book fail to impress the reader with the authority of profound modern scholarship. "Nature-study," according to this book, "is learning those things in nature that are best worth knowing, to the end of doing those things that make life most worth the living." All through there is a full-breathed hardihood of optimism as unconscious as a child's health. The love of nature revealed here is of the true breed, free from affectation or afterthought, like a bird's song or a boy's whistle. There is a naive inward cleanliness about the book that reminds one of great poetic genius. One would say that the writer had in his own way come to the view of Wordsworth and of Shakespeare's *Cymbeline* and *Winter's Tale* that Nature can herself form hearts and winds more sweet, strong and perfect than the best art. "To apprehend thus draws us a profit from all things we see." "'Tis wonder that an invisible instinct should frame them to royalty unlearned, honour untaught, civility not seen from other, valour that wildly grows in them, but yields a crop as if it had been sow'd." Strength and gentleness for boys, gentleness and strength for girls, these rather than literary refinements, or emotional excitements are the end aimed at by "Nature-Study and Life." The author seems a magician making paradoxes easy. The word "practical" seems synonymous with "poetical" in his diction. There is an almost religious love for plants and insects breathing through the most matter-of-fact phrases, and one almost wonders whether the author knows the gift he brings to poorer souls.

One can imagine Wordsworth looking down upon this new movement with pride. His exquisite verses describing a girl formed by nature seem to be becoming accepted as a guide for school-teachers.

"She shall be sportive as the fawn,
That with wild glee across the lawn,
Or up the mountain springs;
And hers shall be the breathing balm,
And hers the silence and the calm
Of mute, insensate things.
The floating clouds their state shall lend
To her; for her the willow bend;
Nor shall she fail to see
Even in the motions of the storm,
Grace that shall mould the maiden's form
By silent sympathy.

The stars of midnight shall be dear
 To her; and she shall lean her ear
 In many a secret place,
 Where rivulets dance their wayward round,
 And beauty born of murmuring sound
 Shall pass into her face.
 And vital feelings of delight
 Shall rear her form to stately height,
 Her virgin bosom swell;
 Such thoughts to Lucy I will give
 While she and I together live
 Here in this happy dell."

So spake Nature according to her deepest interpreter: and one may say that Wordsworth's poetry and Hodge's idea of "life" coincide.

The book is different from any other on the subject. With the confidence of a scientist of acknowledged position the author has been as bold in discarding technical learning as Baldwin was in his *Story of the Mind*, in this book meant for children. It is the richest and most interesting book of the kind, the best adapted to the various periods of development in children, the most profoundly right in pedagogy, and the most free from the ineffective will-lessness of books straining after pretty literary effects, that one could desire. But to end where we began, the quality that makes this book a service to the republic is an amazing unconscious magic distilled out of a splendid original personality which sees no distinction between practical and poetical, between the common earth and sky and the divine being that it is, and that is it, and that therefore knows no divorce between sentiment and volition, and tends to reproduce itself in a race of gentle giants fit for all offices of an ideal land and race. A few more decades of this fruitful pedagogy and we shall begin to see our way out of the woods and the shadows of mediævalism and to boast of the beginning of a true Renaissance.

Commercial Geographics. (1)

Dr. H. R. Mill, President of the Geographical Section of the British Association for the Advancement of Science (1901), defines geography as "the science which deals with the forms of relief of the earth's crust, and with the influence which these forms exercise on the distribution of all other phenomena," and he divides the subject into: (1) Mathematical geography, which regards the earth as a spinning ball lighted and warmed according to a rigid succession of diurnal changes. (2) This merges into physical geography which is concerned with the contemporary changes in the crust and in the surrounding fluid envelopes. (3) Bio-geography or the geographical distribution of life, and finally (4) Anthropogeography or the relation of man to the earth's crust, a subject which must be separated for the more general third division on account of the number of exceptions it presents to the laws governing the distribution of the lower forms of animal life and on account of the exceptional powers possessed by man for modifying the conditions of the earth's surface.

(1) Adams, A Text-Book of Commercial Geography, Appleton's, N.Y., 1902. Olin, Commercial Geography, Crane & Co., Topeka, Kansas, 1902.

One of the most promising signs of the times is the newer and improved type of text books now being published by our leading firms. Outside the natural sciences the text books in geography probably have improved most rapidly. Physical geography has done good pioneering work and now comes commercial geography. A great advance has been made when a comparison is made with the older descriptive geographies. Causal conditions are now emphasized and a truer appreciation of the control exercised by economic factors in human history is becoming general throughout the population. A splendid future awaits the teaching of commercial geography in our schools.

At the same time improvements are certainly possible. For instance, instead of treating each country *seriatim* after the fashion of the older descriptive geographies, each industry might be considered more or less by itself with its various ramifications, dependent or superior industries, necessary conditions of growth or decay, etc. The life history of an industry with its social causes and effects and historical setting would be of inestimable value. Fewer industries could be treated and these more thoroughly. The encyclopædia-effect of certain text books would then be avoided. The causal habit would then be engendered and the memory left free for correlated facts. If such a method of treatment were adopted there would be a much closer connection established between pedagogic methods and the actual conditions of social life. The study of commercial geography would be one of the most humanistic of all studies.

Another suggestion which might be made is that as soon as possible some approach must be made to the laboratory method. Vast mountains of facts bewilder and confuse the students. Only that which is sought for and connected together in one system of search and thought tends to remain as useful acquisitions. Such a suggestion is, however, in the present state of geographical and historical equipment, more easily made than carried out.

Adams' book—one of the Twentieth Century text books—is certainly one of the best ever published. It is replete with the right kind of information and the author shows a very complete mastery of his subject. It is a decided improvement on its predecessors of a similar nature.

Olin's book is more elementary than that of Adams' but equally good. It is also arranged with great pedagogic insight. The author and publisher are to be congratulated on getting out such a suitable work.

Causal Geography. (1)

The light which geography throws upon history is being recognized more and more by our teachers, much to the benefit of pedagogies in general. The works of Ratzel, Ihering, Kirchhoff, Hann, Dorn and a score of other writers are enriched by another, Mr. H. B. George of Oxford. His present work is an attempt to provide still more data for the explanation of history, mainly political history, by means of geographical influences. Man cuts canals and tunnels mountains, drains marshes and constructs artificial harbors, but it must be admitted that these things are trifles compared to the steady operation of geographical causes

(1) H. B. George, *The Relations of Geography and History*, Oxford, Clarendon Press, 1901.

throughout all history. The book is another evidence of the irresistible march of *causal geography*, and as such it ought to be in the library of every High School and in the hands of every teacher of history. The following is a fair sample of the tenor of the whole book:

"The vast region of the Pinsk marshes protected a great part of Russia in 1812; if a new Napoleon invaded Russia now, he would not have his operations limited to a portion of the western frontier. The clearing of forests seems to have permanently affected climate in many regions. The construction of harbor works, besides assisting commerce, has modified geographical conditions under which maritime war is waged. The Kiel canal greatly increases the practical naval strength of Germany, by rendering it possible to move ships securely between the Baltic and the North Sea, instead of their being compelled to make the circuit of Jutland and pass through the Sound under the guns of a foreign, perhaps hostile, power. The cutting of the isthmus of Suez has almost revolutionized one-half of ocean commerce, and has modified profoundly many political conditions which depend on geographical facts. But for the Suez canal, England might, in view of the great improvement in speed of ocean voyages, have been content with the Cape route to India for all purposes except passenger traffic. As it is, she has been compelled to retain a hold on Egypt; and the whole balance of power in the Mediterranean, the geographical conditions affecting possible war in that sea, are deeply affected thereby."

J. Laurence Laughlin, *The Elements of Political Economy, with Some Applications to Questions of the Day*. American Book Co., 1902.

This is probably the best book for High Schools on Political Economy yet published for American schools. It presents in a plain and simple form the elementary principles of political economy. It leads the pupil to think causally and to investigate for himself. The treatment of the fundamental laws is clear and adequate and well illustrated by excellent example.

Scientific Memoirs. Edited by Joseph S. Ames, Professor of Physics and Director of the Physical Laboratory, Johns Hopkins University. Fifteen volumes, bound in cloth, about 150 pages each, prices varying from 60 cents to \$1.00 per volume. (New York: American Book Co., 1898 to 1902.)

This is a physical classic series, consisting of translations or reprints of memoirs of the discoverers in Physical Science from its rise to the present day. Each subject is treated in one volume and has a separate editor. The editor has selected memoirs and parts of memoirs bearing on the subject, adding notes from his own hand for connection and elucidation. Each volume also contains a short preface, chiefly historical, and a short biographical sketch of each of the writers from whose memoirs he has selected. References to allied papers are found in a bibliography at the end of each volume.

It is refreshing to note this departure. Excessive reliance upon text-books has been too much the order of the day instead of a liberal use of the scientific classics themselves. Probably the pressure of examinations has had a good deal to do with this unfortunate slavery to one text. Too much cannot be said in

praise of this series. It ought to be in the reference library of each High School and the property of each teacher of physics and chemistry.

The series offers no mathematical difficulties to the average reader and presents, on the whole, delightful reading to any one at all interested in the subjects treated. Following is a list of the memoirs:

The Free Expansion of Gases. Memoirs by Gay-Lussac, Joule, and Joule and Thomson. Edited by Dr. J. S. Ames, Johns Hopkins University.

Prismatic and Diffraction Spectra. Memoirs by Joseph von Fraunhofer. Translated and edited by Dr. J. S. Ames, Johns Hopkins University.

Roentgen Rays. Memoirs by Roentgen, Stokes, and J. J. Thomson. Translated and edited by Dr. George F. Barker, University of Pennsylvania.

The Modern Theory of Solution. M \acute{e} moires by Pfeffer, Van't Hoff, Arrhenius and Raoult. Translated and edited by Dr. H. C. Jones, Johns Hopkins University.

The Laws of Gases. Memoirs by Boyle and Amagat. Edited by Prof. Carl Barus, Brown University.

The Second Law of Thermodynamics. Memoirs by Carnot, Clausius and Thomson. Translated and edited by Prof. W. F. Magie, Princeton University.

The Fundamental Laws of Electrolytic Conduction. Memoirs by Faraday, Hit-
torf, and Kohlrausch. Edited by Dr. H. M. Goodwin, Mass. Institute of
Technology.

The Effects of a Magnetic Field on Radiation. Memoirs by Faraday, Kerr and Zeeman. Edited by Dr. E. P. Lewis, University of California.

The Laws of Gravitation. Memoirs by Newton, Bouguer, and Cavendish. Translated and edited by Prof. A. S. Mackenzie, Bryn Mawr College.

The Wave Theory of Light. Memoirs by Huygens, Young, and Fresnel. Translated and edited by Prof. Henry Crew, Northwestern University.

The Discovery of Induced Electric Currents. Vol. I. Memoir by Joseph Henry. Edited by Dr. J. S. Ames.

The Discovery of Induced Electric Currents. Vol. II. Memoir by Michael Faraday. Edited by Dr. J. S. Ames.

The Foundations of Stereo-Chemistry. Memoirs by Pasteur, Van't Hoff, Le Bel and Wislicenus. Translated and edited by Prof. G. M. Richardson, Leland Stanford, Jr., University.

The Expansion of Gases. Memoirs by Gay-Lussac and Regnault. Translated and edited by Dr. W. W. Randall, Mackenzie School.

The Laws of Radiation and Absorption. Memoirs by Pr \acute{e} vost, Stewart, Kirchhoff, and Bunsen. Edited by Prof. D. B. Brace, University of Nebraska.



Bancroft, Jessie H., School Gymnastics. Free Hand. D. C. Heath & Co., Boston, 1901; *Ibid*, School Gymnastics, with Light Apparatus. D. C. Heath & Co., Boston, 1901.

The place of gymnastics in the school curriculum seems to be well assured. In addition to the motor and mental training to be secured from manual training and from play activities there is certainly much to be acquired from a well-developed system of gymnastics. The field of gymnastics may possibly in the future be more limited when manual training is better developed and when play activities are more scientifically studied and scientifically controlled, but until that day gymnastic exercises can hardly be over-emphasized. As Miss Bancroft claims in her excellent introduction, three objects are to be attained by physical exercise: stimulation of nutritive functions, correction of posture, and a general, basic training of some of the psychological powers, particularly of the will.

This is largely defensive warfare, a combat with adverse influences and that is one of the weak points about gymnastic training. It is excellent from a pathological standpoint. The right kind of motor training is obviously, however, that kind of a training in which a social aim is to be achieved, in which there are necessarily involved adaptations of means to ends, and, finally, in which the instructive and developing characteristics of the child act as grooves along which training will take its way to the ideal.

Miss Bancroft has done most excellent work in these volumes. Neither the Swedish nor the German systems have been slavishly adopted, but the characteristics of these systems suitable for our American schools have been utilized.

The publishers have issued the books in perfect form.

Herbert Spencer, Facts and Comments. Appleton & Co., N. Y., 1902.

This, the last work to be issued by Herbert Spencer, has been called the swan-song of the philosopher. A truly gigantic worker has said his last word. Regret is merged into triumph, however, when one considers the great work accomplished and the amount of influence exerted by this one man. True he was the expression of his age, but still he was one of the few greatest men of that age.

Facts and Comments contains many valuable utterances and many suggestions for further thought. Mingled with these are views which, to say the least, are not in harmony with the age, but it may well be that in many cases the aged seer may be wiser than we know. Stern advocate as he is of *laissez-faire*, one is not surprised to see him deplore state education, vaccination, state-aided enterprises, party government, etc. These essays are well worth reading, nevertheless. They are full of suggestions. There runs throughout education at large the pestilent practice of starting with the abstract and ending with the concrete—a practice utterly at variance with the course of mental development, which starts with the concrete and ends with the abstract. The forcing grammar-lessons on children affords perhaps the most glaring illustration. But those whose mental culture is carried to a high stage may properly enter upon the study of grammar as a preliminary to the study of logic. Both concern the co-ordination of the ideas which constitute coherent thinking.

In matters of education we still consider his work on *Education* as one of the best books yet published on that subject. In a number of the essays here collected he returns to some of the subjects there discussed. In speaking of grammar he details the manner in which he was educated without any training in formal grammar, either in the mother tongue or in a foreign language, yet he claims that his works are as clear of grammatical defects as one would normally expect of any author. He says: "One who is clear-headed and who throughout early life has daily heard correct speech from those around, will speak correctly. But non-fulfillment of either condition will entail incorrectness. If his thoughts are so indistinct that he does not perceive clearly the relations among the elements of a statement he is making, or if throughout boyhood and youth he has perpetually heard words misused by parents and others, the learning of grammatical rules will not prevent him from making blunders. Of course grammar should have a place in a complete *curriculum*. That place, however, should be not at the beginning, but at the end.

C. R. Henderson. Introduction to the Study of the Dependent, Defective and Delinquent Classes. 2d Ed. 1901. D. C. Heath & Co., Boston.

The purpose and contents of this work, so useful for workers in social reform and so suitable as a text-book, is well stated by the author in the preface. It is an elementary introduction to the systematic study of the nature, condition and social relations of dependents, defectives and delinquents. The theoretical discussion of the first part describes and explains the facts connected with these forms of defective social life. The latter parts of the treatise are chiefly practical. They deal with social conduct, with institutions and organizations for betterment, alleviation and correction. The ethical basis of charity, and the social mechanism for attaining in larger measure what ought to be, are described. Social institutions are described; their adaptation to ends is judged and valued; better methods are proposed according to the teachings of scientific investigation and experience.

This second edition is much enlarged by the addition of very valuable matter. One point alone may be mentioned here, viz., a statement by Prof. Jacques Loeb in reference to the causation of crime. He makes the statement to the effect that the inherited physiological and psychical traits are of minor, even of insignificant, importance, as causes of crime, save in the rare and exceptional cases of depleting disease or insanity; that defective social conditions, economic, industrial, domestic and educational, are the supreme maleficent forces; that it is even positively misleading and harmful to dwell much, if at all, on bodily and mental traits, because we thus divert public attention away from social problems and amelioration which are within human power to control, and which alone are capable of preventing a criminal career.

Herbert N. Casson, Organized Self-Help. A History and Defence of the American Labor Movement, 5th Ed., 1902, paper 25c, cloth 75c Peter Eckler, New York.

This book is one which ought to be found on every man's table. It is a book which breathes on every page a spirit of fairness and justice and heart-felt inter-

est in the millions of the working classes. The book is a veritable cyclopedia of facts and data on the labor cause and a category of things accomplished by trade unionism in the way of shortening workdays, raising wages, lifting unjust burdens and forcing recognition for the wage-earners. It is an invaluable volume for the unionists themselves and for all who desire to understand, appreciate and aid them.

"At the time of writing (1901)," says Mr. Casson, "the American Federation of Labor has on its rolls 1,100,000 members and is increasing at the rate of 350,000 a year. It not only contains more citizens than any church denomination or society in the United States, but is the strongest non-military organization in the world. Yet the actual beginnings of the movement, which has resulted in this great formation, can be traced back to a period of little more than three-quarters of a century ago." The topics discussed show clearly the aim of the author:

The Trade Union as a legitimate business institution;

The Trade Union and prevention of lawlessness and revolution;

The Trade Union as the distributor of prosperity;

High-priced labor and commercial supremacy;

Trade Unions as the pioneers of social reform;

The Trade Union as the inevitable development of the American spirit;

The Trade Union and the promotion of morality and education.

The style of the author is crisp and bright, but it is the clear-cut thought and hard-headed way of driving home fact on fact which makes the book a notable one.

President A. C. Millar, Twentieth Century Educational Problems. Hinds and Noble, New York, 1901.

An excellent work full of common sense and scholarly judgment, bearing chiefly on the relation of the small college to the university on the one hand and the High Schools on the other. The excessive tendency of the young college professor to lecture and carry on "research work" is properly excoriated. The "teaching" function of the college is emphasized and the trend of certain colleges to over-capitalization along university lines properly condemned.

Smith's Text-book of Anatomy, Physiology and Hygiene, 2nd Ed. Jenkins, N. Y.

An excellent text book for preparatory students. It is well arranged and clear in expression. The author very properly urges the objective method of instruction through manikin, microscope, rough dissections, etc.

Bolton, H. C. Evolution of the Thermometer (1592-1743). The Chemical Publishing Co., Easton, Pa., \$1.00.

An attractive history of the different stages of development of the modern thermometer. Instruction in physics, especially in secondary schools, can increase its social value considerably by the use of such histories. If in addition the value to and effects on society of such instruments were emphasized the natural sciences might become more and more humanistic.

Bardeen, A Dictionary of Educational Biography. C. W. Bardeen, Syracuse, 1901.

Quite a handy work of reference for a teacher, full of interesting data and portraits and well printed. Quite an amazing omission, however, is that of Pres-

ident G. S. Hall from the list of modern biographies. The information contained is usually quite up to date.

Long, Wm. J. Ways of Wood Folk, Ginn & Co., Boston, 1902; Wilderness Ways,

Ginn & Co., Boston, 1901; Secrets of the Woods, Ginn & Co., Boston, 1902.

These delightful studies of wood-life cannot be too highly commended. Good for children they are good also for the so-called grown-up. The *Secrets of the Woods* must have had the fascination for the author which all boys have had at some stage in their development. The sketches are taken almost at random, so the author tells us, from old note-books and summer journals. About them gather a host of associations, of living-over-agains, that must have made it a delight to write them out and a delight to read them, associations of the winter woods, of apple blossoms and nest-building, of New England uplands and wilderness, rivers, of camps and canoes, of snow-shoes and trout rods, of sunrise on the hills, when one climbed from the eagle's nest, and twilight on the yellow, wind-swept beaches, where the surf sobbed far away, and wings twanged like reeds in the wind swooping down to decoys—all thronging about one, eager to be remembered.

Bretherton, Ralph H., The Child Mind. John Lane, New York, 1903.

A delightful presentation of the child mind in a manner half-autobiographical and wholly literary. It is charming from beginning to end and true to nature. The dainty description of certain phases of pathos, passion and wide-eyed wonder is excellent. The hard-headed and calloused adult is rejuvenated by a look behind the curtains at the real world of youth. It may incidentally do him good.

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