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CONSTRUCTIVE COMMUNITY AND PERSONAL HYGIENE[1]

I. THE COMMUNITY

THE need of constructive work in medicine applies to the community as well as to the individual. The steady growth of American cities—in fact, of the cities of the world—indicates that we are to become in the not far distant future predominantly a city people. The accompanying diagram (*A*) shows how the rural population has been steadily falling and the urban population steadily rising since 1880 in all five census divisions of the United States. In Massachusetts, during the same period, there has been an absolute decrease of some thirty thousand in the rural population, while the urban population has increased by over one million. This is shown in graphic form in diagram *B*. The remarkable growth of the cities appears more graphically still in the diagram (*C*) showing the growth in the urban proportion of the population during the past eleven decades.

The causes of this steady urbanization of our kind are not far to seek. Three sets of causes may be read by him who runs. First is the *economic* cause. Owing to the use of machinery, an ever smaller fraction of our people can be engaged in the production of enough raw material to supply the needs of the world. To produce more than this is to invite economic disaster. Hence a progressively large fraction of the people will be engaged in

[1] An address delivered at the College of Physicians and Surgeons, New York City, April 14, 1909, in the course of Columbia University lectures on sanitary science and public health.

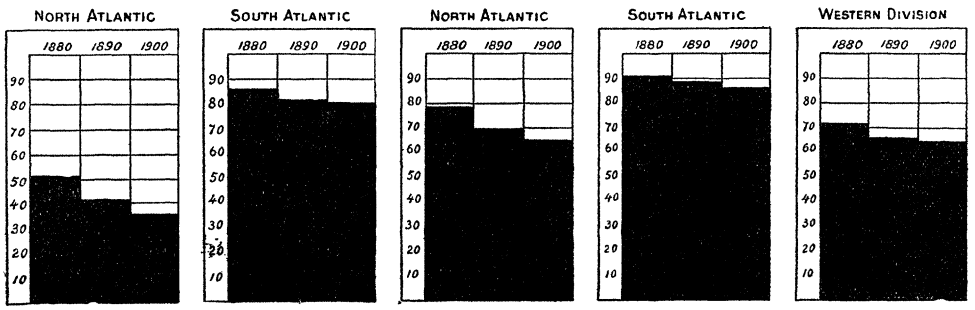

FIG. A. Diagrams showing the increase in the per cent. of urban population and the decrease in the per cent. of rural population in the five census divisions of the country from the census of 1880 to that of 1900. The portion in outline represents the urban population and that in black the rural population in each case.

the elaboration of this raw material. This means cooperation, and cooperation means in the main community life.

Second, *social*. We are primarily social in our interests, and in the main like to live near enough together to enjoy each other's society. The chief rewards and the chief penalties of society are social in their nature. The severest penalty is that of solitary confinement, and the greatest joys are those which are associated with friendship.

Third, *cooperation*. By means of cooperation we can secure for ourselves comforts and pleasures of many kinds which it is quite impossible for the individual family to secure for itself.

The fact of this progressive urbanization would justify a most dismal outlook for the future of the world, did the prevailing opinions regarding the nature of city and country life represent the actual facts in the case. I can not better indicate the present status of public opinion, and even of expert scientific opinion, than by quoting Theodore Roosevelt and the eminent Dr. Ogle. Theodore Roosevelt in *The Outlook* under date of April 19 says:

> The men and women on the farms stand for what is fundamentally best and most needed in our American life. Upon the development of country life rests ultimately our ability . . . to supply the city with fresh blood, clean bodies and clear brains that can endure the terrible strains of modern life; we need the development of men in the open country, who will be in the future, as in the past, the stay and strength of the nation in time of war, and its guiding and controlling spirit in time of peace.

Dr. Ogle characterizes the city as "a mighty vampire, continually sucking the strongest blood of the county to keep up the abnormal supply of energy it has to give out in the excitement of a too fast and unwholesome life."

There is, however, another point of view, another set of facts, which I believe warrants a readjustment of opinion. Let us look at the death rate, that measure of vitality in which is summed up all of the influences that bear upon human life. Here is a diagram (*D*) which shows clearly the changing character of the death rate in the city and in the country.

An analysis of this set of figures is quite beyond the possibility of presentation in a brief argument; but although the problem is complex, there seem to be clear indications that the death rates in cities are lowering; that infant mortality, particularly in cities, is becoming less serious; and that in many cases [city] death rates and infant mortality are lowering at a

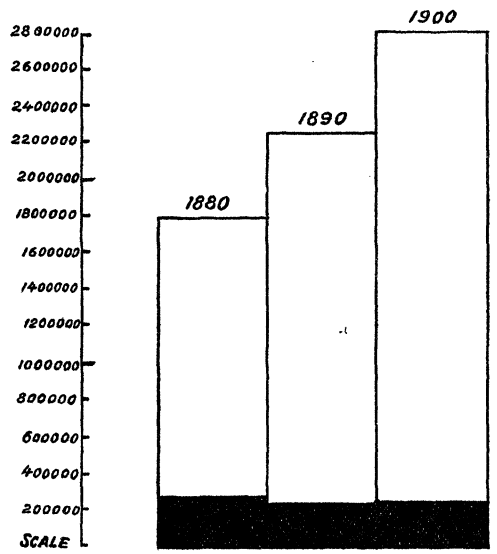

FIG. B. Urban and rural population in Massachusetts as shown by the censuses of 1880, 1890 and 1900. Urban population in outline and rural in black.

more rapid rate in urban communities than in rural districts.

Let us turn now from this statistical consideration to certain facts of general knowledge and observation which indicate not merely that we are gradually being forced to live together and are suffering thereby, but that we are learning to live together with increasing success and in some cases have already accomplished a result which places city life not only on a par with country life in healthfulness, but superior to it.

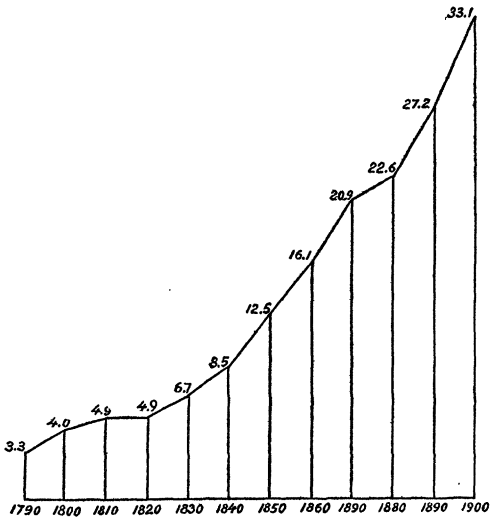

FIG. C. Diagram showing the increases in the per cent. of urban population in United States from 1790 to 1900.

Water supply and sewage disposal are fundamental elements of wholesome living. In the very early days when the water supply was taken from pools or

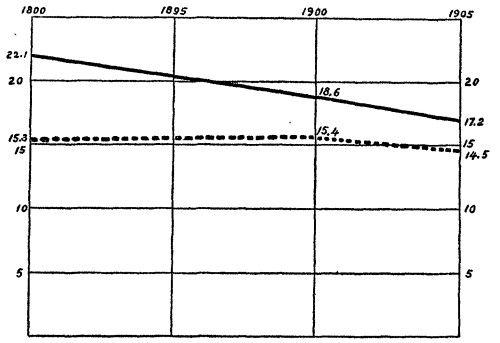

FIG. D. Diagram showing the death rates in registration states from 1890 to 1905. The solid line represents the urban rate and the dotted line the rural rate. Note that the death rate is falling much more rapidly in the cities than in the country.

running streams, and when human waste was either thrown on the land or into the water, it was necessary for families to live at considerable distances from each other if they were to be safe from disease; and even then there was a large degree of sickness in the individual family, due to the family waste. The location of privies in relation to wells has been so thoroughly exploited as to only need mention. Gradually we have come to live closer and closer together. To-day in our well-administered cities we have better conditions on the average than formerly obtained in the country, with respect to these two things. Our city water supply is safer than that of country districts, which is

drawn from streams and pools. This statement is true even when we compare the present city conditions with the country when it was sparsely settled and when the family lived quite by itself. The same is to be said in regard to the disposal of sewage. That is, these are purely mechanical problems which have been solved by our sanitary engineers. By using water from a good city water supply we are in less danger of contracting disease than in using country water; we are in less danger from the pollution and contagion resulting from sewage in the city than we are in the country.

This is not the only respect in which preventive medicine has been not merely remedying the evils of close dwelling together, but making them a positive good. It would take an extensive survey of widely connected groups of facts to show the relation of food supply in the city to the food supply on the old, isolated country farm. I do not think it is open to the danger of much serious criticism to say that the food supply available in our cities is more varied and better suited to support life and to make eating a pleasure, than it is in the country. The day of the all-round country farm has nearly disappeared. Those who come to the farms in summer find that the farms are to a considerable extent dependent upon the same sources of food supply as are the cities. It is not a fact that many of our farms have regular supplies of fresh vegetables to be consumed during the various seasons of the year. This is far less true in the city, where the food supply is made up of products drawn from various parts of the country and other parts of the world. By living together in communities we are able to have fresh meat regularly; this is rarely the case on the farm. I do not think it is too much to say that the milk supply of a modern, well-regulated city is better than the milk supply of the average farm where the dairy is unsupervised, the udders of the cattle unwashed, and the hands of the milkman in a not easily described condition. My own experience as a boy working on a farm and in a dairy forms the basis for some of these judgments. In regard, then, to milk, butter, eggs, meat, fresh vegetables and fish—those of us who live in cities are on the average better off than those who live in the country, who are largely dependent upon what they themselves raise. These, again, are largely problems of health, and the end of improvement is not yet in sight.

The chief objections made against the massing of people in cities, and indeed of city life itself, are that the city does away with privacy; that it creates dirt, darkness and bad ventilation in our dwellings; that recreation is unwholesome; and, in general, that the pace of life is too fast. The science of medicine has a profound bearing upon these problems. Let us consider first the problem of ventilation. The most extreme conditions of artificial ventilation are those which the submarine diver must face. Fresh air is forced to him. The air he breathes can be and is kept as fresh as that which is breathed by those who are in the open. It is true that people working out-of-doors in country districts breathe good air. It is very doubtful whether the habits of country people with reference to the ventilation of sleeping rooms are such as to give them any manifest advantage over the rest of us during sleeping hours. The problem of securing good air is purely a problem of sanitary engineering. It is not a problem of space. It is possible to so ventilate a room of any dimensions that it shall be entirely suitable as a place for working or sleeping. The tenement as such does not render it

necessary that the rooms shall be ill-ventilated. It is possible to have large numbers of small rooms, adequately and automatically ventilated. The air can be kept free from dust and at suitable temperatures, having at the same time the proper amount of humidity.

The problem of dirt is a similar one. The cleanliness of a room does not depend upon its size. The rooms of a tenement may be kept as clean as those in a well-administered office or even hospital building. It is a problem of adequate care, not a problem of congestion. Because a building is situated in the country is no evidence that it is cleaner than a building situated in the city.

The same problem presents itself regarding darkness. It is true that there are in the city many tenements with dark rooms. It is not true that this condition is necessary. Tenements with light rooms are now being built. We do not yet know to any full extent the character and effect of natural and artificial light upon human life. Important and interesting investigations have been made with reference to the effect of artificial light upon the growth of plants. We may discover that natural light is not necessary to any such extent as is at present believed. We do not know the possibilities even from the hygienic standpoint of indirect artificial lighting. The problem awaits the investigations of the sanitary engineer and physician.

The problem of privacy is the problem of the expensiveness of space in the city. Because we are dependent upon natural ventilation and natural lighting, and because we have in the main patterned our dwellings after those which evolved under conditions of rural life, all our feelings are to the effect that large rooms are better than small rooms. With the building of comparatively large rooms and the influx of larger numbers of inhabitants than was expected, there has developed the vicious habit of having a number of persons inhabit the same room. This condition can be partly met by the use of smaller rooms and forced ventilation.

The evolution of the city kitchen is one of the straws which shows the direction of present practise. Some years ago in building a house, the plan was altered so as to enable us to have a larger kitchen. We now see that this was due to a mistaken notion which has come down to us from the time when the kitchen was the center of the family life, when food was eaten in the place in which it was cooked, and the partaking of food together was a symbol of friendship. This larger kitchen proved a nuisance, for it involved too much walking from one part of the room to the other. The modern apartment house kitchen, which is exceedingly small, filled with space- and time-saving devices, is easily kept clean, is more convenient, permits more rapid operation, and is in every way better than the old style kitchen.

We do not yet know the feasible and even desirable limitations of space for various social and family uses. The disappearance of the trades from the home, the development of outside institutions as places for social life, and other changes have altered the basic space necessities of domestic life; but the traditions of the former conditions remain.

This whole group of problems needs to be attacked by the social worker who is equipped with the tools of sanitary science. The great work of constructive medicine or "biological engineering" consists not in the futile effort to turn back the hands of the clock which marks human progress, in the attempt to restore rural conditions, but in the study of the specific

conditions that are presented, in order that our cities may be more healthful abodes than human kind has as yet possessed.

Large steps in this direction have already been taken, quite aside from the fundamental ones of securing a varied food supply, good water and ventilation, adequate disposal of sewage; doing away with dirt and darkness, and the conserving of privacy, which have already been mentioned. We are awakening to the fact that there is a large group of elements in the situation which can only be attacked by the community as a whole. There are problems before which the individual family is helpless. I refer to such matters as the provision of adequate open air spaces for parks and playgrounds, places where wholesome social life may be carried on. We have already begun to realize that the average homes of our large cities are inadequate as social centers. We have watched with dismay the development of the saloon as a place where men may come together for social purposes; the dance hall, connected with the saloon, where young people come together and dance—a form of recreation which in itself is thoroughly wholesome, but which under prevailing conditions is a menace to both young men and young women. We need places where the children can play freely and in a wholesome way, without being imperilled by or hindering the traffic of the streets. We have in our municipalities ordinances against children playing in the streets, and this is right. We are commencing to take the steps which should go with the enactment of such laws, that is, steps for the provision of places where children can play. The open spaces are being increasingly built up or fenced in.

It was not many years ago that the city of Boston instituted its first public playground. In 1908 the state of Massachusetts passed a law which requires every city and town of ten thousand inhabitants and over to vote upon the question as to whether they shall have playgrounds purchased, equipped and maintained out of public taxes. Forty-two of these cities and towns voted during the following fall and winter. Of this number forty voted in the affirmative and two in the negative. The total vote cast in the affirmative was 154,495; the total vote in the negative was 33,886. Thus that state in the United States which is the least inclined perhaps of any toward socialism, which has had the most experience with playgrounds, has declared in a way that is almost unparalleled in the history of the referendum, that the city itself must provide not only places for children to play in, but competent leadership in those plays and games which shall make for wholesome physical and moral development.

Massachusetts does not stand alone. In 1907 there were ninety cities in America that were maintaining children's playgrounds supported at least partly by public taxation. The number has increased since that time, so that in 1909 there were upwards of 336, while over 118 additional communities are now taking steps toward the development of playgrounds or playground systems. The city of Philadelphia, not content with its exceedingly active but sporadic work, has recently appropriated five thousand dollars for a preliminary investigation as to the needs of the young people of the community concerning matters of recreation, and for the presentation of a policy and plan for the future development of recreation in the city. New York city, while it has not proceeded as far as to make any general plan for the development of the city and the provision for its needs, has already spent over eleven million dollars on children's play-

grounds, while Chicago has spent fifteen million dollars on a system of public playgrounds. I am told that the indirect expenditure upon these Chicago playgrounds runs upwards of forty millions.

These are all problems in community hygiene. Their initiative and direction depend upon the technical expert, who shall be trained in a way that is not yet possible in any school in America. The old forms of athletic exercise are no longer suited to the conditions of large schools with limited playgrounds. We need men who are trained with reference to the needs of the growing organism, who have intimate acquaintance with the nature of boys' instinct feelings, who will devise types and forms of athletics which will embrace the great mass of boys instead of the favored few that are brought forward under the conditions of interscholastic athletics which obtain at present.

The cities with their elaborate water supply are able to make provision for public baths in a way impossible in the country. Unlike the great European cities, the municipalities of the United States had done practically nothing for public baths before 1890. Since the agitation started at that time by Dr. Simon Baruch, a great deal has been done, though we are still far behind the other nations, owing in part to the common though quite erroneous impression that the majority of people have access to private baths. In 1904 the National Bureau of Labor published a comprehensive account of the public baths then existing in the United States, with a showing of thirty-seven municipalities, providing bathing facilities in a wide range of number and efficiency. There is no uniformity in the legal provision for baths. Massachusetts has had a permissive law since 1874, and New York a mandatory law since 1895, for cities of 50,000 and over. The control of the baths is variously exercised by the departments of public buildings, of parks, of education, etc. Though school baths are not compulsory, as in many European cities, they are a growing factor in the educational systems. The character of the baths provided is rapidly changing; the floating baths are becoming impracticable on account of the difficulty of keeping the water near large cities uncontaminated; tub baths are nearly out of use, while shower or rain baths are universal, being superior in cleanliness, ease of administration and economy. A few favored localities have swimming tanks. The baths are mostly free, though a few places charge for soap and towels.

As in our other public institutions, the psychological and social elements in the public baths are increasingly being recognized, so that with their growing attractiveness in form, there is also development in function. Thus in the latest buildings, gymnasiums, playgrounds and rest rooms are provided for comfort and recreation, while well-equipped laundries shorten the hours of labor for the women and at the same time form a natural social gathering place, like the old time village washing pool. The field houses of Chicago and other places give promise of meeting some such need as was met by the Greek palæstra and the Roman baths.

To mention a single instance, New York city at the present time has eight interior baths, and supports fifteen floating baths in summer. In 1902, a committee appointed by the Association for Improving the Condition of the Poor estimated that at least seventeen interior baths were needed in Manhattan alone. The eight baths now in operation vary in capacity and elaborateness from 154 showers and two large swimming tanks to eighty show-

ers. Two others are to be opened shortly and there is provision for four others. In 1908 the total attendance was 4,921,718, of which the Rivington and Centre Street baths counted 1,942,657, though the facilities there are less than in the others. There are a few schools provided with showers, and the Department of Parks maintains a few. Brooklyn has five interior baths and provision for two others, and seven floating baths. There are about a score of privately maintained free baths in New York and Brooklyn.

II. THE INDIVIDUAL

This need of constructive or preventive medicine as related to the community is no less important than its relation to the individual. It is not enough for the individual to have his disease cured, prevented, or even to render him immune. Something more is needed. Perhaps the case can be made clearer by an individual instance.

A young man, aged twenty-nine, came to a physician for advice. He had broken down from so-called "overwork." Successive visits to excellent sanitaria had put him on his feet temporarily, but when going back to his regular conditions of work and living, he again succumbed to them. A careful examination failed to indicate any particular pathological conditions demanding treatment, excepting those that are usually associated with consecutive fatigue. His heredity was excellent. The cardiac, pulmonary, digestive and excretory organs seemed to be normal, in both structure and function. Blood pressure was fair; the arteries were soft and elastic; reflexes were normal. But he was unable to think consecutively, or even to write a brief personal note, without producing mental confusion. In writing he was constantly obliged to refer to the first part of his sentence to see what he had said. In conversation he would frequently forget entirely all that had preceded and would have to be reminded of the subject. His history showed that his habits of work were injudicious. He had become so completely absorbed in his work as to keep it before him during meal times; he would take it home with him, carry it on Sundays and holidays. The problem consisted not merely or mainly in inducing him to take such steps as would lead to a recovery from the fatigue, but in discovering those habits of life under which he would work most effectively; in discovering what hours of labor would produce the best results; what kind and quantity of recreation, as well as intellectual interests, he should cultivate; and discovering how under his particular conditions it was possible for him to establish and maintain these habits.

A course of ordinary sanitarium treatment was established at first, his physician being daily, and at times almost constantly with him, for at this period it was not possible for him to develop sufficient initiative to carry out the details of his prescribed activities. He was given gentle, outdoor exercise for considerable and definite periods each day. His dietary was studied with reference to his own idiosyncrasies which were rather definite, but which up to that time were unknown to himself. As he recovered from his fatigue, he was given courses in reading, at first fifteen minutes twice a day. It was reading of a kind that involved definite attention and logical thought, but of a character wholly different from that required by his regular occupation. At the end of three months he was in a normal condition; but if he had been allowed to return to his work at that time, he would have been in the same condition as he had

been after previous experiences in sanitaria.

Consequently he was allowed to resume his professional work in progressive doses. At first he was allowed to work an hour per day. With increasing strength and adjustment the amount was steadily increased, until he was doing as much work per day as he had ever done, but was doing it in fewer hours. He had established other intellectual interests. He had learned how to play, had learned the fundamental necessity of attention to the essentials of good living, namely regular and wholesome eating, sleeping, exercise, etc. He was kept under observation for about six months. This happened eighteen years ago; he has carried his work successfully ever since.

This case is mentioned, not because it is exceptional, but because it is not exceptional. People do not know how to live. This man needed, as most people do need, the help of the physician—not only in times of disease, to aid in recovery, not only that they may be preserved from accident, contagion and other sources of disability. People need to be taught how to administer their time so as to live wholesomely and effectively, how to live so that life shall be a joy and not a burden, how to use their leisure time so that it may contribute to strength rather than to exhaustion through dissipation—how to manage efficiently the machinery of life. This is the problem of the biological engineer.

Let me mention another case. It is that of a man who died recently at the age of forty-seven. The immediate cause of death was cerebral hemorrhage, due to arterial sclerosis, with its usual degenerative conditions of the kidneys. There appeared to be no adequate reason for the loss of this man to himself, to his family, to his community, excepting that he did not know how to live. He was unwise in his eating, unwise in his manner of work. He did not know the significance of recreation, nor did he know the particular idiosyncrasies of his personal makeup.

We are told that every man is a fool or his own physician at forty. But the human organism is too complex to permit of adequate self-knowledge gained merely through common sense and personal experience. To this must be added that wisdom which can only come from the study of large numbers of cases and the putting together of extensive experiences. It is a conservative statement to say that the average efficiency and happiness of American men and women could be doubled by judicious attention to these matters of health. I do not mean merely the rigid observance of general rules of hygienic living. I mean specifically that conduct which is based upon an expert knowledge of the individual's peculiarities, and of the environment under which he is living and must work.

This study of individual differences, of individual environment, is one which gives scope to the largest powers and gives rewards of the highest character. We all know that it is foolish to tell the overworked bank clerk that he must take a vacation, go off to Florida or Europe for six months, when he is without financial resources. It is foolish to tell an engineer who is in the middle of a large piece of work that he must stop and take a vacation. It is necessary for him to complete his work. The problem is to find out how that particular man, with his particular makeup, under the particular environment in which he lives, may so conduct himself as to get the maximum of life, efficiency and happiness out of himself.

It is a problem of discovering the kind of habits that the individual ought to

form, of finding out how he can form those habits, and then standing by him until the habits are formed and the new life fairly on its way. It is not enough for us that we shall be protected from the contagion of smallpox, that we shall not be inoculated with the plague, that we shall not have our water supply contaminated with the typhoid bacillus. It is not enough even that the tissues of our bodies shall be highly resistant to various diseases. There is the great positive constructive side which relates to life's habits that needs attention, and without such attention the individual is helpless in securing for himself that high degree of efficiency which every skilled engineer demands from a good piece of machinery.

This phase of medical practise is gradually coming to be recognized by the laity and is being met by the profession. It is obvious that equipment for such practise involves, as does every other medical specialty, the classic studies of the regular medical curriculum. This specialty also, like every other specialty, demands its own kind of aptitude, as well as that specialization in study and experience which belongs to a specialty. It consists essentially in bringing medical science to bear upon the whole life of the patient, so that it may be raised and kept on the highest attainable level of efficiency and wholesomeness.

III. CONCLUSION

This is not the place to discuss other great problems that are incident to the life of the city or to that of the individual. I have tried merely to show that community life is of necessity increasing; that the conditions that are deleterious to health can be and are being met; that the prospect is already clearly in view that urban conditions will be more favorable to human life than rural conditions; that the desire of our kind to live in close relations can be gratified with a gain, instead of a loss of human life and vitality.

It is not enough that medical science shall be increasingly successful in combating and curing disease by means of drugs, surgery, suggestion and hygienic measures. It is not enough that the great sources of disease shall be eliminated by providing freedom from contagion and infection through uncontaminated water, pure food, fresh air. It is not enough that by means of these or other measures we shall be rendered immune to any or even all diseases. It is not enough that we look forward with firm confidence to the control of tuberculosis, and even pneumonia, cancer and arteriosclerosis.

The science of medicine needs and is developing groups of specialists who are raising the efficiency of individuals by discovering the precise ways in which those individuals, with their particular constitutions, may best live in their particular environment. There are also developing other groups that are solving the problems of how human kind shall live in the new and glorious era that we are so fast entering, the era of living together, the era of the city.

Luther Halsey Gulick

THE RESEARCH LABORATORY OF PHYSICAL CHEMISTRY OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

During the past year thirteen men, including four candidates for the Ph.D. degree, have been working in this laboratory upon researches in theoretical and physical chemistry.

One of the main lines of work is the continuation of the research upon the properties of salt solutions in relation to the Ionic Theory, which, with the view of developing that theory, has been carried on for a number of years under the direction of Professor A.