moval of those who have a body incapable of that work, and that it is directly produced by the habits and surroundings that tend to reduce the breathing capacity below a certain point in proportion to the remainder of the body. Obviously, the first thing that has to be done is to prevent the production of this disease, and for that purpose we must see that the body is used to the extent its size demands, and that the work it has to perform is carried on under conditions that are favorable to the body, — that is to say, we must so arrange our habits and surroundings that their tendency as a whole is to develop the lungs. Each act of man, each factor in his environment, tends either in his favor or against him. We must avoid as far as possible — and where that is not practicable we must counteract their action — those that tend to reduce the breathing capacity. Close, badly-ventilated, or hot rooms, the inhalation of any kind of dust, the habit of taking small quantities of alcohol (termed "nipping"), stooping, positions that cramp or impede the full and free movement of the chest, the corset or tight-fitting clothes, overloading the body with clothes, etc., are examples of such conditions. And we must place ourselves as far as possible under the conditions that tend to develop the lungs. We should spend as much time as possible in some form of active exercise in the open air, live in rooms that are in direct free communication with the external air night and day, summer and winter, and keep their temperature down. We ought to have the clothing quite easy over the chest at full inspiration, wear wool next the skin, take a tub daily, hold the body erect with the chest thrown well forward and the shoulders held well back, get into the habit of taking deep inspirations followed by full expirations, and breathe through the nose. And we should go in for singing, swimming, gymnastics, — Ling's system by preference, — and for one or, better still, several forms of athletic sports, rise early, and maintain the temperature of the body by muscular exercise. I have briefly indicated the conditions that are favorable or unfavorable to lung development, and to that I will only add that measurements by the tape, the spirometer, and the manometer should be regularly taken, recorded, and compared with the standards that indicate a fully developed chest, and that it is the plain duty of each one of us to see that he stands well in that respect, for we can protect ourselves from the possibility of an attack of consumption by securing and maintaining a lung capacity far above the point at which the disease originates.

The second direction in which we must take action, if we mean to remove this curse of civilization from our midst, is to recognize early, and that promptly and adequately, those who have the great misfortune to be its victims. This is the state with which we have to deal here. The lungs are being progressively destroyed by a process of irritation caused by more work being thrown upon them than they are able to effect, and this inability has been produced by their having been and still being subject to conditions that tend to reduce their capacity; and, further, during the progress of these events, the other organs have become involved by attempting to perform compensatory work, with the result that the general health is more or less seriously compromised. Consequently, in order to adequately deal with this state of things, we must treat consumption upon the following principles: To establish an equilibrium between the amount of interchange required to be effected and that effected, to enable the other organs of the body to perform their ordinary functions, to restore to the lungs their power of adjustment to their external conditions, and to obtain the above without producing indications of friction. That is, in other words, we must arrest this process of irritation, restore the general health, and develop the lungs to the required amount, in order to effect the cure of consumption. I will now briefly indicate the method of applying the principles above laid down. We must, to arrest this process of irritation, remove the conditions that impede the effecting of those interchanges by placing the patient under conditions that tend to develop the lungs, and make good any deficiency that may remain by causing compensatory action by one or more of the other organs. We shall proceed with measures for the restoration of the functions of any organ that may have been deranged, and when we have obtained the arrest of the disease and effected an improvement of the general health we shall begin to develop the lungs. We must carefully select appropriate medicines and measures for each purpose we have in view, use them at the right time and to the right extent, and watch their effects, so that if there be any indication of friction we may at once effect the necessary modification or use some other medicines or measures for that purpose.

It is easy to cure consumption at the commencement, even when both lungs are affected. It can be cured when there is a large amount of disease, and it may at least be ameliorated when both lungs are extensively diseased. I speak from practical experience, and I for one will not attempt to place a limit upon the great power of Nature when all her forces are called forth and aided.

The links of evidence slowly forged by men who have gone and by others still with us I have put together. Test the chain thus formed where and how you please, and you will find that it is complete and unbreakable. We have performed our part of this work, and in the name of those who have taken part therein I now call upon you to give effect to it by uniting together in the great work of suppressing consumption.

PROGRESS OF PREVENTIVE MEDICINE.[1]

UNPRECEDENTED progress in human knowledge characterizes the present century, and has not been wanting in preventive medicine. It is, however, during the last half of it that advance has been most remarkable, whilst it is in a later part of that period that it has so established itself in the popular mind as to have passed from the region of doubt and speculation into that of certainty. It is now pretty generally understood that about one-fourth of all the mortality in England is caused by preventable disease, that the death-rate of large communities may be reduced much below that at which it has been wont to stand, that the average duration of life may be made to approximate nearer to the allotted fourscore, and that the conditions of living may be greatly ameliorated. The chief obstacles to improvement have been ignorance and want of belief. A better knowledge of the laws of life and health, a more rational comprehension of the nature and causes of disease, are gradually but surely entailing improvement in the conditions of living and in the value of life, and the diminution and mitigation, if not extinction, of morbid conditions which have in past times proved so injurious or destructive to life. Such are the subjects contemplated in the work of this section, and as far as time permits the most interesting of them will be discussed, Those selected are of great importance in their relations to public health; let us hope that observers who have formed their opinions from experience in other countries and under different circumstances may throw new light on them

In the brief space of time at my disposal it would be impossibl to give a continuous outline of the progress of preventive medicine during the past, or to trace its growth and development ou

[1] Abstract of the inaugural address before the Section of Preventive Medicine of the Congress of Hygiene, in London, England, Aug. 11, 1891, by Sir Joseph Fayrer, K.C.S.I., F.R.S., president of the section (from Nature Aug. 20).

of ignorance and superstition to its present well-established foundation on a scientific basis. It is of happy augury for mankind that the subject of public health is now fairly grasped by popular sentiment, and that, though ignorance, opposition, and vested interests still contest the ground, progress is sure, and the light of science is illuminating the dark places. It is now better appreciated than it ever has been, that the causes which induce disease and shorten life are greatly under our own control, and that we have it in our power to restrain and diminish them, and to remove that which has been called "the self-imposed curse of dying before the prime of life."

It is, indeed, only recently that the resources of medical science have been specially devoted to the prevention as distinguished from the cure of disease, and how far successfully I hope in a few words to show, whilst I trust the proceedings of the various sections of this congress will indicate how much remains to be done. Did time permit, I might illustrate the progress of preventive medicine by contrasting the state of England with its population of more than 29,000,000 during the Victorian age with the England of the Elizabethan age with its 4,000,000. I might remind you of the frightful epidemics which had devastated the land, in the forms of black-death, sweating sickness, plague, petechial typhus, eruptive fevers, small-pox, influenza, and other diseases, such as leprosy, scurvy, malarial fever, dysentery, etc., of the wretched mode of living, bad and insufficient food, filthy dwellings, and ill-built towns and villages, with a country uncultivated and covered with marshes and stagnant water (according to Defoe, one-fifteenth part of England consisted of standing lakes, stagnant water, and moist places, the land unreclaimed, and with the chill damp of marsh fever pervading all). The homes of the people were wooden or mud houses, small and dirty, without drainage or ventilation, the floors of earth covered with straw or rushes, which remained saturated with filth and emitting noxious miasmata. The streets were narrow and unpaved, with no drains but stagnant gutters and open cesspools, while the food was principally salted meat with little or no vegetables. To this may be added a large amount of intemperance and debauchery. As it is, I can only just allude to them. In such conditions disease found a continual nidus, and by a process of evolution assumed the various epidemic forms which proved so destructive to life. Some of these have gone, let us hope never to return, and the conditions which fostered if they did not cause them have gone also. Can we venture to hope that it will be the same with those that remain? Our immunity during the last diffusion of cholera gives some ground for thinking it may be so, if, indeed, the legislature and popular intelligence should be of accord on the subject.

If we turn to the present, we find that great improvements have gradually been made in the mode of living; the houses are better constructed, the drainage and ventilation are more complete, the land is better cultivated, and the subsoil better drained; marsh-fever and dysentery, at one period so rife, are unknown, and leprosy has long since disappeared. The death-rate is considerably reduced, and the expectancy of life enhanced. Water is purer, food is more varied and nutritious, clothing is better adapted to the climate, the noxious character of many occupations has been mitigated, and the mental, moral, and physical aspects of the people altogether improved; education is general, a better form of government prevails, and the social conditions are far in advance of what they have been; but still the state of our cities shows that improvement is demanded, and one object of this congress is to point out why and how this may be effected, not only in this country but throughout the world.

If we inquire into the effects of certain well-known diseases, we find that they are less severe in their incidence, if not less frequent in their recurrence. With regard to small-pox, since the passing of the first vaccination act in 1840, the death-rate has diminished from 57.2 to 6.5 per 100,000 for 1880–84, though for the five years 1870–74 it was 42.7, thus showing that there was still much to be learnt about vaccination. Enteric fever was not separated from typhus-fever before 1869, but since then the death-rate has decreased from 0.39 to 0.17 per 1,000, and it has been shown that this improvement was synchronous in different parts of England with the construction of proper drains. The diminution in the death-rate from typhus-fever is quite as striking, and this also is shown to have run parallel with improved sanitation in more than one large town. The death-rate from scarlatina fluctuated between 97 and 72 per 100,000 between the years 1851 and 1880, and though it has diminished considerably of late years (17 per 100,000 in 1886), a corresponding increase in the death-rate from diphtheria has taken place. This may be due in part to a better differentiation of the two diseases. In 1858 it was reported that phthisis killed annually more than 50,000 people. The death-rate from this disease has not decreased very much for England and Wales, but it has done so in some large towns, notably in Liverpool; and Dr. Buchanan and Dr. Bowditch of Massachusetts both showed a striking parallelism between the diminution of the death-rate from this cause and the drying of the soil resulting from the construction of sewerage works.

Cholera first appeared in England in 1831, and there were epidemics of it in 1848–49, 1853–54, and 1865–66, but the number of deaths diminished each time it appeared, and though it has been present since, it has never reached the height of an epidemic. This is fairly attributable to local sanitary rather than to coercive measures. Preventable disease still kills yearly about 125,000. Towns, villages, and houses are still built in an insanitary way; the death-rate is still higher and the expectance of life lower than it should be, and though we have got rid of the terrible plagues of the middle ages, yet in this century, now closing, other epidemics have made their appearance. Cholera has four times visited us; fevers, eruptive diseases, and diphtheria have prevailed; influenza has appeared several times, even recently, and after leaving us last year, only to return with renewed virulence, caused in the United States a mortality almost equal to that of the plague.

Much has been done, and a great deal of it in what has been called the pre-sanitary age, but much remains to be effected. Let us hope that the future may be more prolific of improvement than the past; international philanthropy seems to say it shall be so. That we can exterminate zymotic disease altogether is not to be expected, but there cannot be a doubt that we may diminish its incidence, and though we may never be able to reach the "*fons et origo mali*," yet we can make the soil upon which its seed is sown so inhospitable as to render it sterile.

The scope and objects of preventive medicine are not limited to the removing of conditions which give rise to zymotic disease, nor even of those which compromise otherwise the physical welfare of mankind, but should extend as well to a consideration of the best means of controlling or obviating those which, attending the strain and struggle for existence, involve over competition in various occupations, whether political, professional, or mercantile, by which wealth or fame is acquired or even a bare livelihood is obtained, and under the pressure of which so many succumb, if not from complete mental alienation, from breakdown and exhaustion of the nervous system, which give rise to many forms of neurotic disease and add largely to the numbers of those laid aside and rendered unfitted to take their due share in the natural and inevitable struggle for existence. Or I might point to the recrudescence of those psychical phenomena manifested by the so-called hypnotism or Braidism, morbid conditions arising out of the influence of one mind upon another. This is a subject which demands not only further investigation, but great precaution as to its application, and claims the watchful notice of preventive medicine on account of the dangerous consequences which may ensue from it.

Again, the abuse of alcohol, opium, chloral, and other stimulants and narcotics, and the evil consequences which may result therefrom, is also a subject worthy of consideration.

The possible deleterious influence of mistaken notions of education, as evinced in the over-pressure which is exercised upon the young, the predominance of examinations, their increasing multiplication and severity, and the encouragement of the idea that they are the best test of knowledge, whilst true mental culture is in danger of being neglected, and physical training, if not ignored, left so much to individual inclination, — this is another subject which demands the jealous scrutiny of preventive medicine, whose

duty it is to safeguard the human race from all avoidable causes of either physical or mental disease.

Though preventive medicine in some form has been practised since the days of Moses, yet it has received but little recognition until a comparatively recent period. When science developed and observation extended, medical men and others became impressed with the influence of certain conditions in producing disease, and thus it was forced upon the public conscience that something must be done; and when philanthropists like John Howard devoted life and property to the amelioration of such awful conditions as existed, — e.g., in our jails, where the prisoners not only died of putrid fever, the result of ochletic causes, but actually infected the judges before whom they came reeking with the contagion of the prisons, — rude sanitary measures gradually came into operation and partially obviated these evil conditions. But it was not before the middle of this century that any scientific progress was made; it was when Chadwick, Parkes, and others initiated the work by which they have earned the lasting gratitude of the human race that preventive medicine became a distinct branch of medical science.

The sanitary condition of towns and communities is not dependent on the views or exertions of individuals alone, for they are and have been for the last fifty years largely cared for by the legislature, and a variety of acts have been passed which deal with questions concerning the public health. Indeed, were all the provisions enforced, little would remain to be desired on the part of the executive government; but as many of them are permissive, not compulsory, the benefit is less complete than it might be. The old difficulty of prejudice combined with ignorance still too often stands in the way, and, despite evidence which on any other subject would be conclusive, the most obvious sanitary requirements are often ignored or neglected. Many thousands of lives have been saved by the sanitary acts now in force; but there is little doubt that more thorough organization under State control, as under a minister of public health, would have most beneficial results, and would save a great many more. We must acknowledge, however, that we are much indebted to the action of the Local Government Board, under whose able administration the most crying evils are gradually being rectified. Through the wise precautions enacted by it against the importation and diffusion of epidemic disease, when other parts of Europe were affected by cholera, this country escaped, or so nearly so as to suggest that it was to sanitary measures we owed our immunity. That there is something in the nature of epidemics which brings them under the dominion of a common law as to their extension seems certain; that there is something about them we do not yet grasp is equally true, but it is as surely the case that local sanitation is the preventive remedy as it is that coercive measures to arrest their progress are unavailing.

Under the improved system of sanitary administration which now obtains, and is gradually developing to a greater state of perfection, the sanitary administration of every district in the country is intrusted to the care of duly qualified health officers — a system from which excellent results have already accrued, and from which better still may be anticipated. The records of the past fifty years prove the influence exerted by sanitary measures on vital statistics. The first reliable tables from which expectancy of life may be derived show that in 1838 to 1854 it was, for males 39.91 years, for females 41.85 years; by the tables of 1871 to 1880 it had increased to 41.35 for males and 44.66 for females. It is shown also that the expectation of life increases every year up to the fourth year, and decreases after that age. For males up to nineteen years it is higher by the last tables, but after that age it is higher by the old table; for females it is greater by the new table up to forty-five, but after that age it is less. The improved sanitation saves more children's lives, but the conditions of gaining a living are harder than they were at the time of the first table, which accounts for the expectancy of life for adult men being less. Women remain more at home, where the better sanitation tells, and are not subject to quite the same conditions as men, so that their expectancy of life is greater than by the old tables up to the age of forty-five. A further proof of the effects of sanitary work is a decreased death-rate. Let us compare the death-rates of England during the past times with the present; whether they be equally significant for other countries I cannot say, but these, at all events, sufficiently prove the point in question: 1660–79, 80 per 1,000; 1681–90, 42.1; 1746–55, 35.5; 1846–55, 24.9; 1866-70, 22.4; 1870-75, 20.9; 1875–80, 20.0; 1880–85, 19.3; 1885–88, 18.7; 1889, 17.85. In some parts of England, where the main object is the recovery or maintenance of health, the death-rate is down to 9 per 1,000, while in others, where the main object is manufacture and money-making, it is as high as 30 per 1,000.

Nowhere, I think, have the beneficial results of sanitary work been better illustrated than in India during the past thirty years. A royal commission was appointed after the Crimean war to inquire into the sanitary condition of the British army, and this in 1859 was extended to India. The European army was the special subject of it, but the native troops were referred to incidentally. Here the inquiry had to deal with a large body of men, concerning whom, their conditions of existence being well known, reliable information was accessible. It was ascertained that up to that time the annual death-rate over a long period had stood at 69 per 1,000. The inquiry resulted in certain changes and improvements in the housing, clothing, food, and occupation of the soldier. Since those have been carried out there has been a steady decline in the death-rate, and the annual reports of the sanitary commissioners to the government of India gave the rates as, in 1886, 15.18 per 1,000; 1887, 14.20; 1888, 14.84. During some years it has been even lower, down to 10 per 1,000, while the general efficiency of the troops has increased. As to native soldiers with whom the European troops may be compared, I find that the death-rate was, in 1886, 13.27 per 1,000; 1887, 11.68; 1888, 12.84. Famine, cholera, and other epidemic visitations, in some years disturb the regularity of the death-rate; under less favorable conditions of living, as in the case of prisoners in the jails, it is somewhat higher. In the Indian jails, for example, it was, in 1886, 31.85 per 1,000; 1887, 34.15; 1888, 35.57.

On the whole, all this indicates improvement, and as regards the civil population progress also is being made; but here, from so many disturbing causes, the figures are neither so easily obtained nor so reliable. The comparatively large mortality is due to neglect of the common sanitary laws, added to extremes of climate which favor the incidence and diffusion of epidemic disease, and intensify it when it has once appeared. A sanitary department has existed in India since 1866, and every effort is made by government, at no small cost, to give effect to sanitary laws. There can be little doubt that the results, so far, are good, that disease generally is diminishing, and that life is of longer duration.

An important result of the observations of the able medical officers of the sanitary service of India has been to show that cholera is to be prevented or diminished by sanitary proceedings alone, and that all coercive measures of quarantine or forcible isolation are futile and hurtful. Here I may say that, large as may appear the death-rate from cholera in India (i e , in 1888, 1.99 per 1,000 for the European army, and 1.35 for the civil population), it is small compared with that of fevers, which caused in 1889, 4.48 per 1,000 in the European army and 17.09 in the civil population; but there is every reason to believe that these also are becoming less fatal under the influence of sanitary measures.

In preventive as in curative medicine, knowledge of causation is essential. It is obvious that any rational system of proceeding must have this for its basis. A certain empirical knowledge may be useful as a guide, but no real advance can be expected without the exactitude which results from careful scientific observation and induction; the spirit of experimental research, however, is now dominant, and progress is inevitable. How much we owe to it is already well known, whilst under its guidance the reproach of uncertainty which attaches to medicine as a science is disappearing. Recent advances in physiology, chemistry, histology, and pharmacology have done much to throw light on the nature and causes of, and also on the means of proventing or of dealing with, disease. It is impossible to exaggerate the value of the scientific researches which have led to antiseptic methods of preventing the morbific action of micro-organic life, whether the toxic effects produced by them, or those induced autogenetically in the indi-

vidual. Theory has here been closely followed by its practical application in prevention and treatment of disease, whilst the study of bacteriology, which is of such remarkable pre-eminence at the present time, is opening out sources from which may flow results of incalculable importance in their bearing on life and health. That the conclusions arrived at are always to be depended on I doubt, and it seems that scientific zeal may perhaps sometimes outrun discretion. That it might be wiser to postpone generalization has, I think, been more than once apparent, whilst the expediency of further investigation before arriving at conclusions which may subsequently prove to be erroneous should not be lost sight of; but it has probably ever been so in the course of scientific progress, that in the enthusiasm of research, which is rewarded by such brilliant results, early generalization has too often been followed by disappointment, and it may be by temporary discouragement of hopes which seemed so promising.

It would be well to bear in mind a caution recently given by the Duke of Argyll, "that we should be awake to the retarding effect of a superstitious dependence on the authority of great men, and to the constant liability of even the greatest observers to found fallacious generalizations on a few selected facts" (*Nineteenth Century*, April, 1891). Still, it is in the region of scientific research by experiment that we look for real progress, and we can only deplore the mistaken sentiment, the false estimate, and the misconstruction of its aspirations and purposes, which have placed an embargo on experiment on living animals, rendering the pursuit of knowledge in this direction well-nigh impossible, if not criminal; whilst for any other purpose, whether of food, clothing, ornament, or sport, a thousandfold the pain may be inflicted without question. The inconsistency of the sentiment which finds unwarrantable suffering in an operation performed on a rabbit, when the object is to preserve human or animal life or prevent suffering, but which raises no objection to the same animal being slowly tortured to death in a trap, or hunted or worried by a dog, needs no comment; whilst the spirit which withholds from the man of science what it readily concedes to the hunter is, to say the least, as much to be regretted as it is to be deprecated.

It must be remembered that, important as are the researches into microbiology, there are other factors to reckon with before we can hope to gain a knowledge of the ultimate causation of disease. It is not by any one path, however closely or carefully it may be followed, that we shall arrive at a full comprehension of all that is concerned in its etiology and prevention, for there are many conditions, dynamical and material, around and within us which have to be considered in their mutual relations and bearings before we can hope to do so; still, I believe we may feel satisfied that the causes of disease are now being more thoroughly sought out than they ever have been,—all honor to those who are prosecuting the research so vigorously,—and that though individual predilection may seem sometimes to dwell too exclusively on specific objects, yet the tendency is to investigate everything that bears upon the subject, and to emphasize all that is implied in the aphorism, *Salus populi, suprema lex.*

NOTES AND NEWS.

AT the meeting of the committee on organization of the National Association of Government Geologists, Aug. 29, the secretary, Mr. Arthur Winslow, was instructed to draft a constitution and by-laws to be submitted to the committee at a meeting to be called in connection with the annual meeting of the Geological Society in December next. The secretary was further requested to notify all State geologists of this movement towards organization, and to invite them to be present at the next meeting.

— At the monthly meeting of the Field Naturalists' Club of Victoria, held on July 13 last, as we learn from *Nature*, Messrs. Luehman and French read a note and exhibited the skin of a tree-climbing kangaroo from northern Queensland, new to science, to which they gave the name of *Dendrolagus muelleri*. This remarkable marsupial has a body about two feet in length, with a tail somewhat exceeding two feet. The disproportion between the fore-legs and the hind-legs is not nearly so great as that of the ordinary kangaroo and wallaby; the toes are strong and curved, to enable it to climb tall and straight trees, on the leaves of which it exists. This tree-kangaroo is more nearly allied to the species which was discovered a few years ago in Queensland than to the two species from New Guinea. The specimen described was got from a straight tree, about ninety feet above the ground.

— M. Imfeld, the Swiss engineer, who has been engaged to examine the nature of the summit of Mont Blanc for the construction there of M. Janssen's proposed observatory, recounts in a Zürich journal the difficulties he is experiencing in his preliminary survey. *Nature* states that M. Imfeld is staying with eight workmen and two doctors at M. Vallot's observatory, which has an altitude of 4,400 metres, and thence they proceed daily to the summit, where they work for several hours a day in the endeavor to ascertain the depth of the snow for the purpose of getting the necessary foundation for the building. M. Eiffel has expressed the opinion that the construction of an observatory will only be possible if the snow does not exceed a depth of twelve metres. M. Imfeld states that they have encountered traces of a ridge of rock eighteen to twenty metres below the summit, and covered with about one metre of snow. They have therefore commenced to make a series of lateral tunnels on three sides, at a distance equal to twelve metres below the summit, to ascertain if the ridge extends to that height. Progress is necessarily slow. Most of the men are suffering from *mal de montagne*. Some, however, who are engaged at M. Valiot's cabin, are able to work almost as long as in the valley, and they also eat and sleep well. In spite of two coke stoves, the thermometer of the cabin never rises above zero; even ink freezes, and water boils at 83°, and they cannot properly cook meat. For a day or two they were disturbed by violent storms.

— In a bulletin recently published by the Pennsylvania Experiment Station (State College, Centre County), Professor William A. Buckhout gives some valuable information relative to the culture of the chestnut. The chestnut cannot be grown successfully on heavy clays, wet soils, or limestone land. It prefers loose, sandy soils, or such as has been derived from the decomposition of slates and shales. In Ohio it is found native on the sand ridges which border on the lake shore, and on the shaly hillsides of some of the hill counties in the southern portion of the State, but never on the limestones which cover the western and south-western portions of the State, nor can it be cultivated in this region with any prospect of success. The chestnut grows readily from the seed, but the greatest care must be exercised not to permit the nuts to become dry. To accomplish this they must be planted as soon as gathered, or else must be kept in moist sand until ready to plant. If possible the nuts should be planted where the tree is to stand, as the chestnut has a long tap-root which renders transplanting difficult. Our native chestnut is practically of but one variety; the European chestnut is not only much larger and finer than the American, but has produced, under cultivation, a number of varieties, some of which are highly esteemed for the superior quality of their fruit. The trees do not grow so large as the American, and come into bearing more quickly; the latter does not usually fruit until ten or twelve years old. Within the past few years species from Japan have been introduced into the United States. Unfortunately they do not appear to be entirely hardy, except in the South and some favored localities in the Middle States. They are quite dwarf in habit, produce nuts larger even than the European, and begin to fruit when they are but four or five years old. These two characters, small size and early fruitfulness, give them special value, and if they can be worked upon stocks of the American species we can secure trees which will bear earlier and produce larger nuts than our native species. The supply of chestnuts never equals the demand in this country, and many districts in which the trees are abundant derive a very respectable income from the sale of the nuts. It is therefore obvious that this is an industry which can be made far more productive and profitable than it now is, since very little effort has been made towards cultivation.