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AN ENQUIRY INTO CERTAIN PRINCIPLES OF ARCHITECTURAL PHYSIOLOGY,

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In addressing this learned Society, I cannot find a fitter apology for my intrusion into a province of science apart from my own, than the declaration of Cicero, in one of his orations, that all the arts designed for the welfare of man, have a close relationship with each other. "Omnes artes," he says, "quæ ad humanitatem pertinent habent *quoddam commune vinculum;* et quasi *cognatione quadam* inter se continentur."

The contemplation of this general alliance between the various industries which, like so many different coloured threads, are interwoven in the great loom of social life, naturally yielded him the keen intellectual pleasure, associated with the apprehension of a philosophical truth, and evidently enticed him into speculations as to the affinity of the arts, as well as to the tendency of each to elevate or depress the moral dignity of the human being. Civilization had not then awakened to the perception of the modern ethical maxim, that all labour is worthy of respect; and fettered by the narrow prejudices of class, the great orator indulged in illiberal comments upon various inferior handicrafts which he considered derogatory to the character of their professors. It is remarkable, however, that he selected architecture and medicine as worthy of special commendation, on account of the moral and intellectual excellence which they call forth. He brackets both arts together in their description, as "Artibus quibus aut major prudentia inest, aut non mediocris utilitas quæritur."

I will not presume to waste the time of my present audience in further quoting the opinions of Cicero as to the comparative merits of the two professions, or in comments on his ample means of forming a correct parallel, but proceed at once to a consideration of what must evidently have been in his mind, the nature of that *quoddam commune vinculum*, that particular technical bond of union between medicine and architecture, represented in the common purpose contemplated in the physician's prescription, and the architect's constructive skill. There can be no doubt that the members of any profession would be sometimes enlightened if they could occasionally divest themselves of their habitual modes of thinking, and take a view of their proceedings from the stand-point of a neighbouring art. As the physician would be helpless without the aid of the architect, so the architect might derive useful hints from the experience of the physician.

In the remarks which I now venture to make, I of course regard the functions of the architect from a medical point of view; but whilst assuming a freedom of discussion, necessary in the investigation of truth, I beg to disclaim any tone of dictation, and advance my statements and conclusions as so many questions to be answered by the fuller knowledge of my audience.

The means employed by the two professions are widely different, but the end is the same, namely, *to aid nature in preserving the natural standard of heat in the body, which is the primary essential attribute of life.* The infant, before birth, borrows its heat from the blood of its parent, it lives in a warm bath of 100° Fahr., but directly it comes in contact with the colder air the lungs are expanded, and a new function commences, that of supplying the balance of heat which is necessary to antagonize the refrigerating influence of the atmosphere; this task, as is well known, is accomplished in respiration by the absorption of oxygen, the exhalation of carbonic acid and the oxidation of the carbonaceous elements of the blood. The constant, never ceasing task of the breathing animal is, then, the generation of heat,

but this function cannot, under all circumstances, be sustained without the aid of art. The aboriginal man, whatever may have been his social condition, could not have maintained his existence without procuring shelter against the chilling radiation of the atmosphere, the pungency of the solar rays, or the sudden precipitation of aerial moisture.

In the primitive devices resorted to in such emergencies, is shadowed forth the first duty of the architect as the helper of nature, the primary essential work of producing a covering which shall be durable, opaque to heat, water-proof, and shall insure the prevalence of such a range of temperature and degree of dryness, in the abode of man, as may be consistent with the easy maintenance of the vital functions. In the fulfilment of this first purpose, he is limited in his efforts by certain indispensable conditions. Taking into account these several desiderata, I propose to arrange all the observations I have to make under six heads, some of which I shall very lightly dwell upon: 1. The nature of architectural covering. 2. The admission of air for respiration, and as an agent for the extrusion of gaseous impurities. 3. The admission of light. 4. The auxiliary use of clothing. 5. The uses of artificial heat. 6. The removal of liquid and solid exuviæ.

I here omit what I had intended to say on the modified nature of the architect's duty in hot climates, merely remarking that the same leading principle prevails, that of interposing a screen which shall intercept the passage of heat too rapidly, either from or towards the surface of the human frame, but in a manner consistent with the provisions which I have just pointed out.

Omitting any review of the exigencies which the architect may have to meet in his cosmopolitan character, I turn to that part of my subject, which I have most at heart, the sanitary state of our dwelling-houses in the great towns of this kingdom.

Ever since the severe animadversions of Erasmus, delivered three centuries ago, our habitations in England have maintained a bad reputation; but more especially the abodes of the poor, are notoriously deficient in the qualities becoming the home of a decent family. I shall now proceed to consider these deficiencies seriatim, under the several heads already indicated.

1st. With regard to architectural covering, it is well known that nine-tenths of our London houses are neither water-proof, nor sufficiently opaque to heat, to protect the inmates against the vicissitudes of heat and cold; porous unvitrified brick walls, of nine inch or less thickness, with thin slate roofs, are the best means used to keep the inhabitants dry and warm in winter, and dry and cool in summer. That this shortcoming is not due to want of constructive skill, but to the diversion of capital in other directions is evident, if we attend to the comparatively well built houses of the opulent and comfortable classes; but especially to the admirably designed and well finished store houses and other structures devoted to meet the exigencies of commerce. Those commanding piles, as seen in that handsome thoroughfare, Cannon Street, in some degree, redeem the character of London for street architecture.

I have here a table, formed by selections from the Registrar-General's returns, and which shows the deleterious effect upon life of the ill-built egg-shell habitations of the poor. The duration of life among the comfortable classes, is here contrasted with that of the mass of the other inhabitants in each of the parishes named. The average age at death, of the inmates of the better houses, reaches forty-five years, whilst that of the mass is only thirty-six, being a difference of nine years in the mean age of the two classes; a difference due, in a great degree, but not entirely, to the defects of the habitations.

In erecting a dwelling-house, I imagine, an architect should regard himself as founding a domestic fortress to endure for centuries, and to be an asylum suited for the accommodation of a family, or of a knot of families, under all the circumstances of life, for the contingencies of sickness or health, leizure or occupation, the rearing of children and the repose of old age. In the majority of cases, it should be perfected at such a cost that shelter within it should be within the means of the journeyman and petty-chapman class.

In old communities society cannot afford to supply a thoroughly good separate edifice for every family, and in the most ancient societies of Europe we find the practice adopted of agglomerating the homes of many families into the shape of a large conventual mansion under one roof.

An edifice thus imagined, should, of course, consist of strong and durable non-conducting materials, adapted to resist the action of chymical and physical forces, and equal to prevent the passage of heat in either direction. In these islands, the architect commands an abundance of means to effect his purpose. He can insure uniformity of temperature in the wine cellar and the ice-house; and in the formation of kilns he enables the manufacturer to collect and imprison an intense accumulation of calorific power, by surrounding the fire with walls of sufficient density. Why should not the same means assure, to the dwelling places of the people, the range of temperature prescribed for health and comfort?

The brick-bat is, probably, as a non-conductor, not inferior to stone, and in resistance to the chymical action of the air it is superior. Looking chiefly to London, it is the building material most eligible for the construction of a durable house. The brick I mean, however, is not the sham put into London walls, but such a cube as I have seen in Roman ruins, which have resisted time and tempest for two thousand years. Bricks, consisting of good terra-cotta ingredients, baked in close kilns, and glazed by the same vitrifying process as stone ware, might be a more costly material at first, but would be the cheapest in the long run, especially when the architect honestly intends his work to last. With such a tough opaque material I would build the outer walls of my house, at least two feet in thickness; and for moral and sanitary reasons, also all the interior partitions of the same substance. As the roof is always the weakest, as it is the ugliest part of every building, and also offers the least resistance to heat and cold, I would substitute for it the flat oriental terrace, called the Belvedere in Italy, and the Azotea in Spain, and, probably, introduced by the Saracens into the south of Europe.

Where economy of space is an object, the house should be square, and the flat terrace would also save us the loss of room which occurs in the angular gabled lofts; the symmetry of the topmost apartments would then equal that of the lowest. Contemplating the erection of an edifice suited for the accommodation of several families, and in which durability, salubrity and economy are to be insured, I would exclude, as far as possible, all building substances except brick, stone, and iron protected against oxidation by being electro-plated with copper. I would have no porous surfaces, no lath and plaster, no wooden floors, and for the doors and windows I would use wood, hardened in Kyan's patent Solution of Perchloride of Mercury. The ceilings, floors and walls, consisting of enamelled bricks and tiles, luted together with hard crystallised cement or mortar, and girdled with electro-plated iron, should present a continuously glazed or metallic surface, affording no cellular *nidus* for infectious malaria, and capable of being washed with water without creating humidity.

For securing perfect privacy, and in case of the occurrence of contagious maladies (such as small-pox, typhus, scarlet fever, &c.), for obtaining an effective quarantine, the construction of dense brick and mortar partitions, of the same excellence as the external walls, becomes indispensable.

2nd. The shell of a dwelling formed with such an architectural covering as is capable of resisting excessive radiation outwards, or the undue transmission of heat inwards, being once completed, it is still necessary, to the support of life in the occupiers, that inlets for air should be reserved. As I have already stated, the great source of heat is respiration, a function through which the carbon of the food is consumed by its combustion with oxygen. An abundant influx of air is necessary to supply this element of fuel. Dr. Meryon, in a recent publication, asserts that twenty cubic inches of air are inhaled at each inspiration—400 cubic inches per minute, during which period 150 oz. of blood are propelled through the lungs. Three hundred and sixty-six cubic feet of air, or 36 hogsheads, and 13,488 lbs. of blood permeate the lungs in 24 hours. By this process the demand of the human system for the

generation of heat is answered. Lavoisier, Laplace, Sir H. Davy, and other philosophers, have made experiments to ascertain the quantity of heat disengaged from certain animals in a given time, and have satisfied themselves, by measurement, that the oxidation of carbon and hydrogen, as manifested in the products of respiration, when properly protected by opaque inclosure, is sufficient to supply the waste of heat lost by radiation from the surface of the animal. This generation of heat, however, is attended with another effect, the contamination of the air, by the evolution of gaseous excrements, which, unless speedily removed, create a stagnant malaria round the body. Each adult spoils, by the action of the skin and lungs, 280 cubic inches of air per minute. Allowing a wide margin for accidental variations, we may state the amount at 360 cubic inches. The gaseous vapours given out from the skin and lungs consist principally of carbonic acid and watery vapour. M. Valentin found that the whole quantity lost by exhalation from the cutaneous and pulmonary surfaces of a healthy man, who consumed daily 40,000 grains of food and drink, to be 19,000 grains, or $3\frac{1}{2}$ lbs. Subtracting from this the pulmonary exhalation of 5,000 grains of carbonic acid exhaled over that of the equal volume of oxygen inspired, weighing 2,256 grains, the remaining 11,744 grains, or $2\frac{1}{2}$ lbs., represent an average of cutaneous exhalation in the day; all which must be swept away by ventilation. The balance of 21,000 grains are disposed of in the shape of the liquid and solid excrement. Liebig calculates the quantity of carbon alone eliminated from the lungs and skin, in the twenty-four hours, at not less than 13·9 oz. These gaseous vapors, if not displaced, are inhaled again; every inhalation of used air absorbs less and less carbonic acid from the system, and this excrement consequently remains in the blood, acting as a narcotic poison; the brain of the sleeper is stupified by the circulating carbon; in the morning, he feels languid, heavy and unrefreshed, and his breath is offensive. Such are the effects exhibited in most dormitories, of which the air is at the same time most repugnant to the sense of smell. The person is surrounded with a halo of impure vapour, which requires a steady stream of air to dispel it.

This is the true theory of ventilation; sufficient pure air must be afforded, not only to support respiration, but to supply such a stream as shall carry away all the excretions from the lungs and skin. But this service is to be performed in a manner consistent with the first purpose of the architect, namely, the preservation of the normal animal heat of 100° Fahr.; and the method must therefore vary according to the temperature of the air. The colder the weather, the less is the exhalation from the skin and lungs, and the less the excrementitious vapour to be swept away. Consequently the less rapid, and the less refrigerating, is the purifying current of air required. In hot weather, and in cases of fever, where it is often necessary to cool the surface of the body, by promoting evaporation and then condensing and dispelling it, the waves of the atmosphere must be made to pass more rapidly over the surface of the animal. Thus is defined the task of the architect: he must procure for us air in such quantities, and moving in currents of such velocity, as may be exactly adapted to sustain the normal warmth, whatever may be the temperature of the hour.

It has been calculated that the human being requires to be enveloped, as in a cloud, by an area of 1,600 cubic feet of respirable fluid, as a kind of menstruum in which the gaseous excrements are to be dissolved; but as this medium is in a state of constant passage through the apartments, probably, much less space would suffice for purity of respiration.

To maintain this continual change, I have reckoned that a volume of 3,600 cubic inches, or about two cubic feet per minute, would be enough to feed such a ventilating stream as is needed for one person. Dr. Arnott supplied the Marine Artillery Barracks, at Woolwich, by means of a steam pump, with air, at the rate of four cubic feet a minute for each man; and Dr. Boswell Reid propelled into the House of Commons not less than seven cubic feet per minute for every Member of Parliament.

To supply such ample volumes of air is perfectly impracticable in houses of ordinary mould, except

by admitting cold blasts through open windows, a proceeding, in the winter months, quite inconsistent with the architect's main purpose—the conservation, at a healthy standard, of the actual warmth of the apartment. According to the best medical opinions, this standard should be 60° for children's nurseries and sick chambers, and from 50° to 55° in rooms where persons are employed in sedentary occupations. Below this temperature, disease in the very young, and in the very old, is likely to be engendered.

The supply of air, that most essential pabulum of life, has scarcely won due attention from architects: it is only permitted to enter houses clandestinely, and it comes in in jets and draughts. I have thought that such an important purpose, as the supply of this food of the breath, is deserving of an especial provision, and have, therefore, taken the liberty to suggest, that between each storey of every house, a space should be reserved for the exclusive reception of air, and which should freely communicate with the external atmosphere. Between this intersolar reservoir (measuring twelve inches in depth) and each subjacent apartment, a ceiling should interpose, in which a quadrangular opening two feet wide, and reaching from end to end, should be left; and a diaphragm, or sliding hatch, moving on rollers like a sash-frame of a greenhouse, should be fitted to close this on occasion. This sliding partition should consist of three panels, each two feet wide, and which should equal in measure the long diameter of the underlying room. One panel should be imperforated, the second drilled with very small holes, and the third with apertures of a shade larger diameter. As this hatch is to move laterally on rollers, to such an extent, as to allow the quadrangular fissure to be entirely open on occasion, it will be in the power of the inmate below, by means of pulleys, to regulate the ventilation with the nicest regard to his feelings. He might shut out the air altogether, or graduate the quantity admitted to any degree, by sliding the hatch gradually over the air-way, *or atmode* proposed. A drawing in the lithographed sheet appended to this paper, displays the whole arrangement clearly. By this means, the impulse of the approaching air may be increased from a gentle wave-like motion to a brisk breeze, according to the desideratum of the moment; and the used air, ascending into the reservoir by the force of gravitation, would be carried off by the currents there prevailing.

In nurseries, infirmaries, &c., it is desirable that ventilation should be controlled and nicely measured, and I believe the power of producing this result is obtained by the conjoint use of the mode of admitting air which I have named the *atmode*, and of the horizontal smoke-sewer or *vomitorium*.

The means of accurate measurement is obtained by utilizing the evaporating property of air-currents. Evaporation and refrigeration are correlative, and the one is in fact an exact measurer of the other. Thus in Mr. Glaisher's arrangement of the wet-and-dry-bulb-thermometer, the temperature indicates the quantity of moisture in the air; the lower the temperature of the wet bulb the less is the moisture; but the velocity of the air current increases evaporation, and augmented evaporation lowers temperature.

By distinguishing the fall of temperature due to evaporation in the ordinary calm condition of the atmosphere, from the further effect due to air currents, we obtain a fine scale for noting degrees of air velocity. I take one of Glaisher's double thermometers, and protect it in a glass cylinder from the action of draughts, and I find the difference between the wet and dry bulb to indicate the humidity or dryness of the quiet air. By its side I place another double thermometer, and on the second wet bulb I find marked the further effect of evaporation produced by the moving air. The difference between the two wet bulbs exactly indicates the force of the draught. The difference between the temperature of the dry bulb, and the dew point, being divided into a scale of 100° the exact expression, for the force of calm evaporation, of the augmented evaporation due to air currents, and of the difference between the two, may be in a moment ascertained by a reference to Mr. Glaisher's tables, or by an easy calculation. (See lithograph drawing in the appendix).

The force of air current devoted to the expulsion of impure gases should be considerable, for such fluids have a kind of attraction to clothing and all porous surfaces, such as tapestry, lath and plaster walls, flock papers, and coarse deal boards. In these sinuosities, animal effluvia are decomposed, and produce and foster the *seminium* of fever, which under certain atmospheric accidents may become epidemic, and spread from the hut to the palace.

3rd. In England, the architect depends for his supply of air chiefly upon his windows; and, doubtless, there are times in the summer months when these defensive glass screens may be left open without detriment. In dormitories, in the absence of a better contrivance, it is found more prudent to resort to this simple expedient for purifying the apartments, than to inhale the offensive malaria with which they are filled.

Glass is so rapidly diathermal a substance that, in cold weather, the radiation from closed windows is so copious, that the temperature of apartments is often quickly lowered, and chilly currents of air are driven inwards from the surface of the glass. These avenues for light are also often too large for the room, and render it impossible to keep up an equable temperature. I have known many cases of fatal inflammation produced in persons sitting incautiously near closed windows, and continual relapses are induced in valetudinarians by the same imprudent act. The price of glass is now so much reduced that double-sashed windows could be supplied in the generality of houses; but where this protection cannot be obtained, the construction of windows of a size proportionate to that of the apartment, and the adoption of the invention which I have ventured to recommend, would diminish the force of the draughts thus created. Large windows and a bright light form a great luxury, and are, in some respects, salubrious, but heat is the want of every moment.

4th. In his efforts to aid nature in her struggle to uphold the normal heat of the blood, the architect has a right to expect that the inhabitants of houses should second him by protecting themselves, whilst indoors, with clothing suitable to the season. This is a care which, in England, is universally neglected; a kind of semi-nudity is practised in the house, especially by women, who often provoke the attacks of serious maladies by exposure to sudden chills in passages, halls and staircases. In the South of Europe, where often no fires are kindled in sitting rooms, the people are wiser, and invest themselves in as warm raiment indoors as in the open air. They, therefore, circulate with perfect impunity all over their houses.

To a person properly clad, a temperature of 50° would afford a genial sensation. This is a degree of warmth which is shewn, by this table, to be maintainable without difficulty where good architectural covering is aided by artificial temperature. These tables, shewing the influence of architectural covering in preserving and controlling temperature, and also the additional effect of fire, I have computed from observations, most carefully noted and recorded, for more than twenty years, at Chelsea, by the late Mr. Charles Soare, a retired Commissariat Officer, assisted by Mr. Bacon, a schoolmaster in the same neighbourhood. The neatness and accuracy displayed in these records furnish a pattern for all meteorologists, and would satisfy the exigencies even of Mr. Glaisher.

The comparative notations of indoor and outdoor temperature were made in a small house, situated in the King's Road, Chelsea, an average sixth class residence, displaying all the usual defects observable in such erections, yet the actual amount of retained heat was considerable, and the daily, monthly and yearly range of the thermometer was (as is seen) greatly lessened. From the facts demonstrated here, we may conclude, with certainty, that a house constructed on scientific principles, would insure the maintenance of a wholesome degree of warmth without much aid from artificial heat.

5th. One of the first physical conquests of the refugees from Eden must have been the invention of fire, which was soon discovered and applied by Abel in his sacrifices. Man is a cooking animal, and his digestive organs are not capable of assimilating many of the crude aliments presented by nature. The

sudden and capricious changes of the atmosphere, too, arising from the effect of heat and cold upon aqueous vapour, and generating the fluctuating aerial currents, called winds, must have soon suggested the expediency of adopting artificial heat, in addition to architectural covering, as a means of aiding the respiratory organs in their work, and in sustaining a wholesome range of temperature in the dwelling house. This is a subject which has much occupied the attention of architects and engineers, and an extraordinary amount of ingenuity has been displayed in the various suggestions promulgated, with a view to make combustion perfect; to distribute its radiation widely, and to carry off the chymical products of ignition. There are many gentlemen present more skilled in the treatment of these matters than I am, I shall therefore confine my attention to a few points with which I am familiar. Notwithstanding all that has been said in favour of warming inclosed spaces, with hot water, steam pipes, air flues, close stoves, &c., the open fire is still the favorite method in the popular mind. We continue to consume our fossil-fuel coal with an enormous waste of caloric and combustible matter. Large lumps, or ingots of coal, are placed in contact and subjected to ignition, the surfaces, which are immediately exposed to the active fire, are decomposed and consumed, but the adjacent strata are heated at the same time, in different degrees; some to a degree not adequate to sustain combustion, but quite sufficient to expel the carboniferous gas which escapes up the chimney unconsumed. It has been calculated that by these losses, and the heat carried away in the smoke, a waste of 80 per cent. is experienced.

To mitigate this great loss, and to obviate other inconveniences, Dr. Arnott has endeavoured, with some success, to impart to the fire-grate some of the properties of the gas-retort, and to retain for use the carburetted hydrogen gas, and the solid particles of fuel, which are otherwise lost in the current of the smoke. With the same object I contrived my "solid gas fire," named "the Atmopyre," which I was permitted to exhibit to this Society sixteen years ago. On that occasion, I had the pleasure of showing an artificial cinder made incandescent by the combustion of hydrogen in air; a fact, indicating, as I then thought, and as I still think, the possibility of applying the hydro-oxygen fire to common use. The difficulty of economically separating hydrogen from oxygen in the decomposition of water postpones that triumph of art to the future; and our immediate care must be directed to the better management of our most comfortable, but very unscientific coal-fire.

If Dr. Arnott's excellent idea of consuming smoke could be realized, there would still remain the need of carrying upwards the products of combustion, and the impediments which I experienced in applying my *Atmopyre* are still unsubdued in all chimneys of the usual character. In consequence of these impediments, my attention was early turned to the means of ventilating ordinary chimneys, in such a way, as to command the occurrence of a constant upward draught.

The ascent of the gases generated by combustion may be impeded by two different causes. First, in a still and humid state of the atmosphere, chimneys are filled with a body of air very nearly saturated with vapour, and, consequently, so conditioned as to resist the first feeble pressure of the rising smoke and its cognate gases. This hindrance can only exist during a perfect calm, and the first wave of air crossing the chimney-top dispels it. The most frequent and pertinacious obstacle to the easy escape of smoke, consists, secondly, in the disturbing effects of air-currents upon the chimney finials, which are generally terra cotta pots, or contorted zinc tubes. It is a law in pneumatics, the necessary consequence of the universal force of gravitation, that wide and strong currents of air over-rule and attract to themselves all minor breezes. The impulse of wind is simply its local weight, but a degree of rarefaction is produced on the edge of every current, which causes an influx of the adjacent quiet air, and exerts beneficially an exhaurient effect upon the draught of flues. Such a strong gust of wind approaching an ordinary stack of chimneys, of course, displaces, by its weight, the lighter atmosphere round about,

and, descending into the flue, drives down the ascending smoke. When undisturbed by such moving columns of air, the tranquil atmosphere permits the ascent of smoke, or rarer air, which obeys the law of gravitation as implicitly as floating bodies on the surface of water. It is by the lateral pressure of the colder air that the heated products of combustion shoot upwards into the sky. The proper function of the chimney is to convey the air and gases, rendered light by the heat of combustion, from the grate, where they are coerced by the atmospheric weight in the apartment, to the top of the flue, where they are immediately subjected to the lateral stress of the outer atmosphere, and either drawn away by the attraction of passing currents, or propelled upwards to the normal height suited to their levity. To the perfection of this effect, two circumstances are required, first, that the air of the warmed room shall be equal in barometric pressure to the air above: and, secondly, *that a body of air, protected from disturbing currents, shall always surround the upper aperture of the flue.* The first effect is secured by the adoption of the *atmode*, or air channel, already described; and the second result, I believe, may be always insured by another arrangement which I have invented.

I have found that, in my experiments with the atmopyre, wherever the orifice of my escape-pipe for the products of combustion entered, (a passage of some length and open at both ends), the currency of these gases remained perfect, and that in these passages there prevailed, invariably, a flow of air in one direction or the other. These facts suggested to me the idea of my *vomitorium*, or smoke *exode*, the principle of which, I think, is established by my experiments on lamps. In order that the column of smoke should disembogue itself freely from its channel of escape,—the chimney, it is necessary to prevent the rude contact of the wind with the immediate vent of the flue, and this object is achieved by the inclosure of the chimney vents in an oblong chamber, or ample tunnel,of which the calibre must rather exceed twice the sum of that of all the flues. The mouth of each flue should project, in the shape of a collar, into this receptacle, which would extend from one parapet to the other, and each end would be on opposite aspects of the house. Each mouth of the tunnel may be closed by a perforated door; and on either side, on a level below the collars of the flue, there should open several holes of a dimension proportionate to the number and size of the flues.

A careful observation shows that the phenomena exhibited in my apparatus, as well as by the experiments made on two small houses in Chelsea, occurs as follows, and are well displayed in the lithographed illustration. The chamber of the vomitorium is filled with air of the temperature and density of the atmosphere, and proceeding from the lateral holes, or from the foramina, at either end. This air is either in a state of gentle motion along the tunnel, or moves in a more rapid current from end to end, in which last case it exerts an exhaurient, or suctional force, upon the flues, and, consequently, vivifies combustion in the grates below. This is a power which can be utilised, in vigorously ventilating the abodes of the poor, in spite of their perverse hostility to the admission of air. The fires being kindled, the jets of smoke issuing from each flue rise to the arcaded roof, sustained by the cushion of cold air, already existing, and which is constantly fed from the sources described. Finally, the smoke escapes outwards along the roof of the vomitorium, and the superior apertures at the obturated ends; making its exit, sometimes at both ends, when the atmosphere is tranquil, sometimes at one or the other end, when the commanding current is active. This succession of effects seem due to the maintenance of an equilibrium between the air within, and the air without the house, and in theory, is as simple in principle as the adjustment of weights in the scales of a balance.

6th. I have shown what an important agent, in the production of animal heat, *oxygen* is, but its absorption into the blood would be absolutely sterile, unless it were chymically married in the latent recesses of the living frame with its consort, *carbon*, which can only emanate from the digestion of certain viands

by the stomach, and their nutritious principles being conveyed into the blood. It is the *charcoal burning* which occurs in the course of the circulation that generates the vital heat. The importance to health of a proper preparation of food is therefore patent. A deficiency of skill in the art of cookery is everywhere observable amongst the wives of our working men. Hence arise immense waste, discomfort and domestic contentions; and it is a consideration, I think, which may be urged on the architect and economist, whether, as experience proves, the erection of a house for an aggregate of families is more advantageous than the construction of a separate small dwelling for each family; the same principle does not indicate the establishment of general kitchens, where wholesomely cooked food may be purchased by all. I believe such undertakings would prove excellent speculations, would be a convenience to many middle class families, and, most certainly, greatly promote the cleanliness and comfort of poor householders.

7th. The invention of means for carrying off the solid and liquid excrements of the animal frame is, of course, a want not less urgent than the extrusion (by sharp currents of air) of the gaseous exhalations. The first differ from the last only in the fact that hollow viscera are provided for their temporary retention in the body; they are all alike, in a continual state of elimination from the blood. When once ejected from the body, and exposed to the action of the air, heat and moisture, they rapidly decompose, and generate vapours equally tending to provoke the outbreak of disease. As all these *exuviæ* are convertible into food for plants, it is certain that, as soon as chymists shall have invented a formula for this conversion, the value of the products will awaken the capitalist into efforts for their utilisation; and the opprobrium will no longer rest upon this metropolis, of throwing away "native guano," equal in worth to three millions sterling annually.

There is nothing, perhaps, in the habitations of the poor people, more urgently calling for reform than those retreats where the human being is called upon to perform his most humiliating function, an act in which he is placed on a level with the most humble of his mammalian fellow creatures, and with which nature has associated a feeling of shame. In the performance of these physiological acts, it is desirable that the individual should be protected from gross familiarity by decent seclusion, and that self respect be sustained, by the supply of means for personal cleanliness and purity. The wretched boxes which are placed in our small houses for the gratification of these wants, are deficient in all the postulates for modest decency and health, they are in fact, prolific sources of diseases. These cabinets ought to be capacious, well supplied with water, ventilated, sufficiently secluded; and each dwelling should possess a number proportionate to the number of inmates.

8th. As the builder of cities, and as the cause of accumulated edifices, and a concentrated population, the architect is responsible not only for the hygiene of particular dwellings, but also for the general salubrity. It is for him to supply remedies for the evils which his own acts produce. We look to the ingenuity of this artist for the preservation of wide streets, and open spaces for air and exercise, for copious supplies of water, for perfect facility of drainage, and for every aid that can be required for the health and cleanliness of the population.

From the enlightened influence of the architect we may hope for the abatement of that greatest evil of towns—the ground rent. The accidental proprietor of land in the neighbourhood of a growing town becomes, without the slightest personal merit, a magnate of wealth; by competition his land commands a fabulous price, which in future years imposes an absolute veto upon all improvement. Now the improved value of this person's land is entirely the work of society, and society has an undoubted right to measure out its benefits to this its member. The law of supply and demand is good, but there are social considerations which are paramount to it.

In such an unprecedented hive of human beings as London presents, every facility for cleanliness in person, clothes and habitation, should be supplied, not only in dwellings, but by such general establishments as baths and wash-houses, the erection of which is clearly within the municipal obligation of parishes. The accumulation of household dirt, and personal filth, is the result of the close agglomeration of the population in small spaces; it is produced by society, and society is bound to provide an adequate remedy.

The sketch of a house, which an artistic friend, eminent in another branch of pictorial art, has condescended to make for me, and which is shown in the appendix, is intended to show the appearance which a habitation, constructed in the way I suggest, would present. The *vomitorium* and the *atmode* are both represented, and shown not to be eyesores. A staircase of stone is supposed to ascend from the basement to the terrace, and to be the general approach to all the apartments. It has been objected to the idea of the "common" staircase, so universally prevalent on the continent, that it is repulsive to the habits of our people. The vanity of this objection is immediately shown, by the fact, that thousands upon thousands of persons, in London, do actually live in lodging houses, and use a common staircase, much narrower and more inconvenient than the one here proposed; and that these persons are of various ranks and means, a fact which brings the working people into proximity with the more opulent inhabitants, and places them within the compass of kindly counsel and sympathy.

It has been said, and perhaps truly, that the single sentiment of charity, notwithstanding the example of Mr. Peabody, is not powerful enough to produce such an outlay of capital, as the erection of solid and durable houses of this class implies. The wretched system of building dwellings upon leasehold security, instead of freehold, is the cause that the architecture of these edifices is so unsatisfactory, most of these houses being built merely with a view to sale, and a quick return of the capital with interest. It is rarely that a man erects a house for himself on his own ground; and no man ever thinks of building houses upon a large scale as a patrimony for his family, as many noblemen in France, Spain and Italy do. Speculating builders, even at the Court end of London, erect showy rows of mansions, decorated with the ordinary architectural millinery, but deficient in scientific construction, and intended only to last a limited time. Great expense will never be incurred in the production of ephemeral structures, but when ample revenues are to be created for centuries, in the form of estates in houses, then large investments of capital would be devoted to the construction of mansions, and the best materials, with the most skillful workmanship only, would be employed. If we look at the old cities on the Rhine, and in Belgium, and at many large Continental towns, we shall see that such investments are both safe and profitable.

Our vicious system of building, in England, is so rooted in the habits of small capitalists, that it will, probably, require an act of the legislature to restrain it. And this interference will not be long delayed, when public opinion becomes conscious that policy, as well as philanthropy, suggests that it is desirable the homes of the poor should be improved. That society is not safe, where the majority of its members do not very obviously see what benefit accrues to them from its action. There are signs which indicate that contentment is not the master sentiment in the minds of our industrial classes. Handsome churches are erected, and gorgeous rituals are invented to attract them, but they still hold back. Museums and literary societies are formed for their edification, but these compete too feebly with the fascination of the gin palace; and the poor man has no pleasant sentiment associated with the word *home*, because, to him, it is cramped, dirty and unhealthy.

Is it quite visionary to hope, that all the forces of this great English society, actuated by all the motives which press themselves upon our attention, are strong enough to accomplish such a reform in our domestic architecture, as that the hearth and home of the poor man may become the abode of peace,

health and contentment, the nursery of piety and the pure affections? I believe it is not. Perhaps we have all all been too solicitous to garnish, each his own little cell of self-interest, and careless of the security of that great social dome that should cover us all? Happily this supineness is now dispelled and the public heart is pregnant with great designs. It is felt that too great a repulsiveness has been allowed to grow between the several ranks of our people. They have been too much segregated, and the several ranks do not know each other, or appreciate their mutual virtues. In all coteries, there prevails a desire for reconciliation; and from my long intimacy with the character of our working men, with their good sense and right feeling, I feel sure that all efforts undertaken, with earnestness and in a proper spirit, will satisfy their judgment, and call forth their gratitude and affection.

I.—TABLE, *showing the comparative Length of Life, of the well-housed inhabitants of certain districts; and of the mass of inhabitants in the same districts, including paupers.*

Description of House.	NAMES OF DISTRICTS.												
	St. James's.	St. Giles's.	St. George, Hanover Sq.	St. George, Southwark.	Marylebone.	Whitechapel.	Greenwich.	Poplar.	Strand.	Bethnal Green.	Kensington and Chelsea.	Islington.	Rotherhithe.
	MEAN AGE AT DEATH.												
	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.
Comfortable dwellings.....	42	42	45	43	46	47	48	43	43	46	45	42	49
Other houses	37	34	39	27	30	32	45	35	33	33	32	35	39
Difference.....	5	8	6	16	16	15	3	8	10	13	13	9	10

Average life of the opulent..... 45
Ditto of the lower class 36
9

2.—*Comparison of in-door and out-door temperature, and relative humidity during the three hottest and the three coldest months, in Chelsea, compiled from the observations of Mr. C. Soare and Mr. Bacon, made during* 20 *years, from* 1827 *to* 1846, *showing the effects of architectural covering.*

Months and Seasons.	Mean Temp. out of doors.	Mean Temp. in-doors.	Wet bulb Thermo.	Dew point.	Diff. between in-door and out-door Temp.	Relative humid. in-doors.	Relative humid. out of doors.	
January	37·02	43·73	34·14	30·02	6·71	68·72	81·00	
February	39·39	46·44	35·39	30·30	7·05	65·40	77·00	
December.....	40·39	46·64	35·80	27·60	6·25	74·89	85·09	
Average	38·93	45·60				69·67	81·03	Average humidity for three months out of doors
		38·93					69·67	Ditto in-doors
Mean difference		6·67					11·36	Gain in dryness
June.....	59·99	65·11	47·99	37·40		57·70	62·30	
July	63·48	68·18	51·95	42·20	4·70	61·90	60·90	
August.....	61·27	66·97	51·27	42·60	63·58	63·58	69·50	
Average	61·58	66·75			5·70	61·06	64·23	Average humidity out of doors
		61·58					61·06	Ditto in-doors
Mean difference		5·19					3·17	Gain in dryness

3.—TABLE, *showing the difference between natural temperature, and the temperature maintained by architectural covering and artificial heat. The observations were made at Torquay,* 1826-27.

State of Thermometer.	Nov.	Dec.	Jan.	Feb.	March.	April.	The facts are supplied by Sir J. Clarke, F.R.S.
Mean natural temperature of the month.....	49·90	48·36	45·91	45·48	48·20	52·82	
Ditto in-doors	63·90	64·52	63·56	62·60	63·16	67·64	
Gain in absolute heat	14·00	16·14	17·65	17·12	14·96	14·82	Mean temperature raised
Natural monthly range ...	29·00	18·00	25·00	29·00	23·00	26·00	
Range in-doors	7·00	6·00	6·00	11·00	9·00	6·00	
Degrees gained in steadiness	22·00	12·00	19·00	18·00	14·50	20·00	Diminution in monthly range
Mean natural daily range	5·00	5·00	5·00	6·00	8·00	11·00	
Ditto in-doors	1·00	2·00	1·00	3·00	3·00	2·00	
Diminution of the mean daily range	4·00	3·00	4·00	3·00	5·00	9·00	
Natural extreme daily range	10·00	12·00	13·00	16·00	23·00	12·00	
Ditto in-doors	4·00	4·00	4·00	7·00	9·00	5·00	
Diminution in extreme daily range	6·00	8·00	9·00	9·00	14·00	7·00	Gain in steadiness

Mr. HENRY BURNELL, Associate, reported to the Society, that a *vomitorium* formed of a large zinc tube of a calibre equal to twice the area of the flues, according to the proportions named in Dr. Edwards's paper, and with six round holes on each side to admit jets of air, had been erected by Mr. Callow, of Chelsea, on two houses in Alpha Place, Flood Street, Chelsea. These cottages were badly ventilated, and had chimneys of a very bad character. They are also placed near much taller houses. Since the construction of the *vomitorium*, their ventilation has become efficient, the grates act briskly, the smoke escapes freely, and in the rooms without fires, no down draughts occur. In Mr. Callow's opinion, so far as the experiment goes, the success of the *vomitorium* is complete. The action of the side-apertures is remarkable, the air-currents let in through them impinge against the collars of the flues, and are reflected upwards, producing an exhaurient influence upon the flues, propelling the smoke upwards and outwards, and thus rendering down-draughts impossible.

Mr. JENNINGS, Fellow, rose to propose a vote of thanks to the gentleman who had so kindly given them the paper. It was of the utmost importance that they should have every possible assistance from the medical profession, and obtain any information they could give respecting the erection of buildings, and what they considered desirable with respect to sanitory arrangements. They were, therefore, extremely obliged to Dr. Edwards for this paper. At the same, time he must state that his own views, on some of the points referred to, differed very materially from those of the author. He (Mr. Jennings) had had some little experience in respect of the question of ventilation and other sanitory considerations, in connection with military head quarters, accommodating thirty-six families, and officers' quarters, in one building, as well as in factories, almshouses, and what were called model cottages, and he could not, at starting, agree with the idea that it was an expedient thing to adopt paved floors, and the foreign system of plaister, in preference to our English wooden floors: that this appeared to be so peculiarly a medical consideration, that he hardly liked to express an opinion that wooden floors were more healthy than paved: he had always understood paved floors to be regarded as a serious evil in rearing young children, in a cold and moist climate. In going over the City prisons he had heard the warders complain of the asphalte floor "drawing" the feet: that was, probably, owing to the conducting powers in that material. Certainly, there was discomfort to the persons who stood upon it. Then, on the subject of ventilating the cottages of the working classes, he believed the great difficulty was to keep the ventilation open when it was provided. Those who had built cottages with every convenience and every appliance for the most perfect ventilation, found that the ventilation was pasted up if it was within the reach of the occupants. The real difficulty was not to provide a proper supply of air to the inmates, but to get them to use it when supplied. On the subject of materials for building, he thought it worthy of consideration whether hollow bricks might not be used to a much larger extent than was the case at present. He believed they would be a great means of counteracting the effects of extreme alternations of heat and cold within the dwellings; he believed building walls with bricks on edge, so as to make them partly hollow, tended to keep the houses so constructed warmer in winter, cooler in summer, and drier throughout the year. He had found 14-inch walls the most convenient for hollow walls, with the bricks 14 inches long, which are now specially made for this purpose. Then as to the flat roofs, he could not think there was any advantage in adopting that form. They were more expensive than the open roof, and, he believed, if proper arrangements were made, the open space between the ceiling and the roof was very useful for ventilation, and also checked any great effects of heat and cold. Of course it would be more effectual for both purposes if they put on a sheet of felt between the rafters and the tiles or slates. It was extremely difficult, apart from expensive construction, to prevent the wet from getting through a flat roof: unless it was first-rate work it did not succeed, but, if executed in the best manner, it would not assist ventilation. Then, again, making a chamber to receive the air between two floors: he was afraid that the draught

coming from beneath the floor would hardly be prevented, and would not be found pleasant; the object generally was to admit the air into a room above the level of the head. He believed if the air was admitted at a higher level it practically ventilated more than from below, though theoretically it was not so. Another point of ventilation was, the size of the aperture for admitting the air was of the same size as that for the exit of the vitiated air: he had found it fail in a large workshop. The reduction of the aperture for the entrance of the air to one half, in that case, occasioned it to work perfectly. On the subject of windows, no doubt there were many evils connected with them, one, however, could be provided, in a great measure, by the introduction of a thicker quality of glass, which would present greater resistance to atmospheric influences, and also be less liable to fracture. Everyone must have found a room much warmer with plate glass in the windows, and the great reduction in the cost of glass enabled thick, if not plate glass, to be used for the commonest purposes. The question of chimneys is a very important one, and he believed the plan proposed in the paper was the most perfect of all if the flues were in use; but suppose there were two flues with fires, and the other two were without fires, and suppose there happened to be a room which wanted a supply of air, the opening into a well staircase, the staircase acted as a long arm of a syphon, and would very soon fill the room with smoke from the down draught, particularly as the staircase would, probably, supply the air for the rooms with fires. The great object should be to heat the passages instead of heating the rooms. If they heated the passages sufficiently, and the warmth entered the rooms, they occasioned not only more ventilation but made a more healthy house than when the rooms were heated by separate fireplaces. Another object was to bring pure heated air into the room. On the general question of obtaining this warmed air, if they could accomplish it by double flues, that would be the best thing; practically, this had not been done because it was too expensive, but in theory it was perfect, and no doubt it would eventually be accomplished, and they could, at all events, be employed in the higher class of houses. He begged personally to express his thanks to Dr. Edwards for bringing this subject before them.

Mr. W. WHITE, Fellow, in seconding the vote of thanks, remarked that, although much of the details could not be called architectural, yet there were several subjects treated of in the paper sufficiently associated with architecture to make them of use and interest to this Institute, especially those points commented upon by Mr. Jennings. It was scarcely clear whether this draught was to come in through the ceiling, or through the floor, as Mr. Jennings supposed. [Dr. Edwards replied, it came down from the ceiling.] That made all the difference; and it was simply following out an old device in the shape of a square tube carried through a room beneath the ceiling, perforated in the sides, which had the same effect as the mode proposed, and as he (Mr. White) thought with much simpler construction. As regarded the draught of the chimneys, if it so happened that these [referring to diagram] three fires were alight, and the other one (away from the wind) was not lighted, it appeared to him that this room would require a supply of air, which it would still, probably, receive from the chimney above, and, consequently, might draw down smoke. If the other fire-place, away from the wind, was alight, the others not being lighted, it might create ventilation by displacing the air above. But he thought the same remedy for a smoky chimney, by the prevention of down draughts arising from wind, was as easily effected by a plan he had adopted, by covering each flue at the outlet, transversely, by a gable projecting over the sides of the flue, through which the wind passed. The only thing to be careful of in that, was not to have a level space on the outside of the flue for the wind to collect upon, but it ought to slope upwards towards the flue, so that if the wind came on the incline, the air would rush upwards to the ridge of the gable and pass out. There was one other question, which was rather of a sanitary than an architectural character, yet practically connected with the building of dwelling houses, that was with respect to the disposition of all offensive drainage; and it seemed to him that the plan discovered and patented by a country clergyman, in

Dorsetshire, would be, if carried out by the nation at large, a great blessing to the country: that was the substitution of earth closets for water closets. *Earth* (not sand or ashes, or anything of that description), but gypsum or clay, or common vegetable mould, sufficiently dry to pulverize, it was found, would absorb so effectually all excrementious matter, that if dried again it might even be re-used seven or eight times without any effluvia arising from the drying, and so effectually that the presence of anything offensive in it could not be detected. Many present, no doubt, were acquainted with the discovery of Mr. Moule, but he was glad to take this opportunity of calling some attention to it.

Mr. W. A. Boulnois, Fellow, said, the only subject he would remark upon in the paper of Dr. Edwards, was the preference he gave to the building of freehold houses, by freeholders, over the building upon leaseholds by leaseholders. His own opinion was that, if by any accident we had fallen into this system a hundred years ago, we should have been immensely behind in our position to that we now attained in house-building in this country. It was the competition among householders to make their houses rather better than their neighbours which involved with it, as all competition did, the very best system they could adopt to meet the requirements of the age. The renewal of houses every 80 or 100 years, or their re-modelling, was an immense advantage. And when they looked at what had been done in Paris, and saw masses of buildings erected by freeholders, with small apartments and inconvenient arrangements, they must rejoice that even in such localities as Bethnal Green, or London over the Border, to select the worst instances, small houses, at about £30. a-year, had been put up, which were far preferable, as habitations for the working classes, to the fourth, fifth and sixth floors of the Paris houses. The arrangements abroad, particularly in Spain, which had been specially mentioned by Dr. Edwards, were dreadful, and no sanatory considerations seemed to influence the freeholders in building them. The only question which actuated the freeholder was to arrive at the greatest amount of lettable space. He should, for his own part, be sorry to see a change in our system in this respect. He thought, from the largest class of houses of £800. a-year, of which many were now being erected on leaseholds, down to the smallest of £20. or £15. a-year, though, doubtless, with the latter much remained to be desired, we had much better habitations than any of our continental neighbours.

Mr. H. H. Burnell, Associate, remarked that the flooring of the houses for the poor was always the great difficulty. It occurred to him that the most suitable was, that which could be easily and thoroughly cleansed; by houses for the poor, he meant those inhabited by the lowest class of labourers, earning perhaps 18s. per week; those who, upon the receipt of the Saturday night's wages, habitually drank to excess, and whose domestic habits, under such circumstances, were filthy. How could cleanliness be maintained with a wooden floor with interstices. It was not the comfort of the thing. If he could insure the floor being well cleansed, he would certainly prefer a wooden one; and amongst the class of tidier habits they might be adopted: but the case they had to meet was that of the class who lived in confirmed habits of uncleanliness.

Professor Kerr asked what would be the rent of such houses as Mr. Burnell was referring to.

Mr. Burnell replied, about 2s. per room per week.

Mr. Thomas Morris, Associate, thought the question of the use of hollow bricks was deserving of great consideration, inasmuch as the atmospheric air confined in the cavities was known to be the best non-conducting material that could be employed; and thinner hollow walls would, therefore, answer the purpose of solid brick walls. The old style of building wooden houses was on this cellular principle; and he had no doubt whatever that the old yeomanry of England had some of the most comfortable residences that were ever erected, in consequence of the equability of temperature due to their cellular construction. They would be cheaper, too, than brick buildings; so that when it was the object to construct economical, and at the same time comfortable dwellings for the use of the labouring classes, he believed the re-introduction of wooden houses, in suitable localities, would be of very great utility.

The vote of thanks having been unanimously accorded to Dr. EDWARDS for his paper, that gentleman rose and expressed his obligations to those who had discussed the views he had advanced. He had, he said, no interest in the subject beyond the solicitude which, as a medical man of fifty years experience in London, he naturally felt in the domiciliary condition of the poor. No one could pass through this metropolis, and look at the variety of wretched houses which the poor occupied, without feeling humiliated, especially if they knew the nature of the interiors of them. He thought, if capital were employed in the erection of large conventual houses, in blocks or terraces, of the best material and on sound principles of construction, such houses might be made to pay a good return upon the capital, and, at the same time, afford convenient dwellings for the working classes at rents within their means. He knew the houses of the poor were, for the most part, wretched and miserable abodes, the arrangements within them being totally inadequate to the common decencies of life. There was nothing like privacy, because, with two families living on the same floor, the partitions were so thin that they were penetrable by the slightest sound. He had no objection to a moveable wooden floor, over the paved one: but the objection to the wooden floors was, that they were never kept in a wholesome state of cleanliness, and a perpetual malaria issued from them. He spoke chiefly of the dwellings of the thoughtless, improvident and dissipated class of the poor, who lived but for the passing hour. The suggestion of hollow bricks, he thought, was an excellent one, and the introduction of open air spaces in the walls would, he believed, be very beneficial. With regard to letting in the air, upon the plan he suggested, it could be regulated with the greatest nicety through the *atmode*, or opening of the ceiling. The objection that had been taken, that the flues in which there was no fire burning would be subject to down draughts, he admitted, would undoubtedly obtain, were it not for the arrangement of the apertures he had provided on the side of the *vomitorium*.

Mr. JENNINGS remarked, if there was a staircase to form a funnel from the room at the same time, it would not act unless it was a syphon.

Dr. EDWARDS, having further explained his plans on the drawings by which the paper was illustrated, added, that this was an experiment of his own, and any gentlemen who would do him the favour to pay a visit to Mr. Callow, builder, of Chelsea, might see it operating, and judge practically of its efficiency. He could not think the architecture of houses was satisfactory, when he looked at the roofs of London, and surveyed the long rows of cottages and wigwams which were provided as habitations for the majority of the London millions.

Mr. BOULNOIS said, the great service which the President had rendered to the profession in his place in Parliament, induced him to ask that gentleman whether there was any probability of a change in the arrangements of the Commissioners for the erection of the New Courts of Justice with respect to the enlargement of the competition for the designs of that building: if so, it would be a great boon to the younger members of the profession, and it would be satisfactory to hear, before the Easter recess, that such an enlargement of the competition was contemplated.

The PRESIDENT, Mr. A. J. B. BERESFORD-HOPE, M.P., was happy to be able to reply, that the morning after the discussion took place in the Commons, he was informed by one of the Commissioners, that, in consequence of the opinion expressed by the House, it was intended to alter the conditions with respect to the competition for the designs for the New Law Courts. In the first place, the prohibition imposed upon the competitors not to engage in private practice for three years was to be abrogated; and, in the second place, it was intended that the number of competitors was to be largely increased.